<u>Legal Notice</u>

Branford Public Schools
Facilities Department

Request for Bids
Translucent Skylight Panel Replacement

The Branford Board of Education is soliciting bids for the replacement of translucent skylight panels at Branford High School. Specifications may be obtained from the Central Office, Branford Board of Education, 185 Damascus Road, Branford, CT or on the BOE's website at: www.branfordschools.org/departments/business-finance/soliciations-rfps

Sealed bids supplying the required specifications will be received at 185 Damascus Road, Central Office, Branford, CT until 11:00 a.m. on March 28, 2025, at which time they will be opened. No bids will be accepted after that date and time.

Branford Public Schools reserves the right to select or reject any and/or all bids containing alternate proposals, to waive any informality in proposals and to reject any and/or all bids or accept such bid as shall, in their judgment, be in the best interest of the Town of Branford and Branford Board of Education.

Bidders shall be required to pay not less than the prevailing wage rates on the Project if the Bid amount exceeds $100,000 as established by the State of Connecticut. Each CONTRACTOR or Subcontractor performing Work on this Project shall comply in all respects with all laws governing the employment of labor, Social Security, and Unemployment Insurance of both the State and Federal Government. The Contractor who is selected to perform this State project must comply with CONN. GEN. STAT. §§ 4a-60, 4a-60a, 4a-60g, and 46a-68b through 46a-68f, inclusive, as amended by June 2015 Special Session Public Act 15-5. Contract award is contingent upon approval of the funding request by the Representative Town Meeting scheduled for April 2025.

CHRISTOPHER J. TRANBERG, PH.D.
Superintendent of Schools

ALLISON K. MORAN
Assistant Superintendent of Schools

BLAIZE LEVITAN
Chief Operating Officer

BRANFORD PUBLIC SCHOOLS
185 Damascus Road, Branford, CT 06405-3717
203.488.7276 • Fax 203.315.3505

March 14, 2025

Dear Interested Vendors:

You are invited to submit a Bid for the replacement of translucent skylight panels at Branford High School. The enclosed Bid specifications detail our requirements.

Bidders are urged to read all documents carefully and fill out all information requested. Bids which are incomplete, obscure, or conditional, and which contain irregularities of any kind, will be subject to rejection for failure to comply strictly with these conditions.

Bids must be submitted on the schedule form attached hereto. All unit prices must be filled in. Each Bid must be submitted with four (4) copies of the Bid. Bidders must submit Bids in a clear, concise and legible manner so as to permit proper evaluation of responsive Bids. Faxed or emailed bids will not be accepted.

The original Bid and copies must be in a sealed envelope plainly marked:

TRANSLUCENT SKYLIGHT PANEL REPLACEMENT BID
OPENING DATE: 03/28/2025
OPENING TIME: 11:00 A.M.
RFB NUMBER: 1006-25

Sealed bids for supplying the above will be received at 185 Damascus Road, Central Office, Branford, CT until 11:00 a.m. on March 28, 2025 at which time they will be opened. All bidders and other interested people are invited to be present at the opening of these bids. The bid opening will be located in the Central Office Conference Room.

Thank you for your interest,

Blaize Levitan
Chief Operating Officer
Branford Public School

Request for Bids (RFB) for Translucent Skylight Panel Replacement

I. Introduction

Branford Public Schools wishes to solicit a vendor to replace translucent skylight panels at Branford High School. In September 2024, the District performed an architectural and structural survey of the translucent walls and skylights on the high school building. The resulting recommendation was to replace three of the walls and skylights. The report is attachment #1 to this RFB for reference.

II. Background

The Town of Branford is located in the south-central region of Connecticut along the beautiful north shore of the Long Island Sound. Comprised of 28 square miles, with a population of 28,225, Branford is one of Connecticut's most desirable shoreline communities. Featuring an array of colonial and contemporary architecture coupled with cobblestoned sidewalks and historic lights posts, Branford offers a picturesque town center and business district. The town is surrounded by natural ponds, salt marshes, a river and many hiking and biking trails. The town has a state-of-the-art library, a community center, recreational facilities, public town beaches, many public parks and more.

Nestled in neighborhoods across the community, Branford Public Schools offer a comprehensive educational experience for nearly 2,600 students from pre-kindergarten through grade 12 across six campuses.

The services requested in this RFB pertain to Branford High School, located at 185 East Main Street. The existing skylight structure has reached the end of its useful life and currently leaks during weather events. The BHS roof and skylight system ultimately need a full replacement. Antinozzi and Associates was engaged in September 2024 to evaluate the skylight system, which recommended a full replacement. This summer, this project will only replace the skylights. As part of a separate project, the walls will be replaced.

III. Scope of Work

Based on the conclusions and recommendations of the architectural and structural report, the high school building requires the furnishing and installation of approximately 6,213 square feet of New Kalwall translucent panels for three (3) skylight openings. The successful bidder will be responsible for obtaining all necessary governmental approvals and permits.

<u>Expected Materials:</u>

- 2-3/4" Kalwall Translucent Insulated Structural Sandwich panels
- Miscellaneous aluminum system – various battens, flashings and covers
- Existing aluminum box beams and related interior metal components expected to remain.

Technical Details:

- Live Load: In accordance with the original shop drawings*
- Wind Load: In accordance with the original shop drawings*
- Drift Load: In accordance with the original shop drawings*
- Roof Pitch: 27.23° (6 3/16” in 12”)
- Exterior Face: 0.070 ice blue Super-weathering
- Interior Face: 0.045 white Type 25
- Metal Finish: A new standard colored, factory applied, corrosion resistant finish to be selected
- Grid: 12” x 24” shoji
- Insulation: 0.23 panel U-factor (NFRC Certified System U-factor = 0.23)

** The original shop drawings were prepared by SUI in 1996, included as attachment #2 to this RFB.*

Any alternates to specified materials or workmanship must be separately listed and described in detail. Alternates will be considered in awarding the contract only if they provide, as a minimum requirement, all features contained in the specifications. The Board of Education reserves the sole right to determine through its agents the equality of alternate products and/or installation procedures

IV. Bid Requirements

Bids must clearly convey the following information:

1. **Company Profile:**
   - Overview of the firm, including relevant experience and qualifications, that demonstrates necessary experience to execute the requirements of this bid.
   - Equipment and staffing to successfully complete this scope of work should be clearly highlighted.

2. **Fee Schedule:**
   - Must complete the attached COST REPLY SHEET

3. **Experience and References:**
   - At least three references from customers for whom you have performed similar services in the past.

4. **Completed, signed, and initialed bid specifications and addendums**

Performance Bond is required – successful bidders must furnish a Performance and Payment Bond in the amount of 100% of the contract sum.

Bidders must have at least 5 years' experience providing related services and be in good standing with the Board of Education/Town of Branford.

The Branford Public Schools reserves the right to investigate all references and qualifications statements made by the Bidder. Upon investigation and evaluation, the Branford Public Schools may choose to reject any bid where the Bidder's stated qualifications are such that the Bidder may not be able to perform the service in a safe and an efficient manner. The Bidder is invited to provide any additional information or data that further demonstrates its experience or qualifications, and/or ensures that high quality services will be provided to the District.

V. Consideration of Bids

The Branford Public Schools reserve the right to select or reject alternate proposals; to waive informality in proposals; and to reject any and all bids, or accept such bid as shall in its judgement be to the best interest of the Branford Board of Education/Town of Branford.

VI. Submission Instructions

Bids must be submitted by 11:00am on March 28, 2025 to:

Blaize Levitan
Chief Operating Officer
Branford Public Schools
185 Damascus Road, Branford, CT 06405

Sealed bids are due and must be received by the time and date below. No bids will be accepted after the date and time specified. Whether the bid is sent by mail or commercial express services, the bidder shall be responsible for actual delivery of the bid to the Branford Public Schools before the deadline time. Bids received after the deadline will not be considered.

All bidders and other interested parties are invited to be present at the bid opening which will take place at the Walsh Intermediate School, Branford Board of Education Building. All envelopes/submissions should be clearly marked:

TRANSLUCENT SKYLIGHT PANEL REPLACEMENT BID
OPENING DATE: 03/28/2025
OPENING TIME: 11:00 A.M.
RFB NUMBER: 1006-25

Please submit 4 copies of the bid.

Submission Terms:

Bidders are urged to read all documents carefully and fill out all information requested. Bids, which are incomplete, obscure or conditional, and which contain irregularities of any kind, will be subject to rejection.

Branford Public Schools reserves the right to reject any or all bids or to accept any bid, which appears to be in the best interest of the Board. Any bid may be withdrawn prior to the opening time and date. Any bid received after the time and date as specified will not be accepted.

If Branford Public Schools deems it necessary, Branford Public Schools may postpone the date for the opening of the bids by notifying each bidder by telephone, email, or the issuing of an addendum.

Branford Public Schools shall have the right to take such steps as it deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish Branford Public Schools with information and data for this purpose as Branford Public Schools may request. The Board reserves the right to reject any bid where, on investigation, the evidence or information submitted by such bidders does not satisfy Branford Public Schools and the bidder is not deemed qualified to carry out properly the terms of the contract.

VII. Estimated Timeline

- RFB Issued: March 14, 2025
- Bid Submission Deadline: March 28, 2025
- Evaluation Period: March 29-April 4, 2025
- Contract Award: April 10, 2025
- Project Start: July 1, 2025
- Project Completion: August 15, 2025

VIII. Questions and Clarification

All questions regarding this RFB must be submitted in writing to Maria Cacace, Assistant to the COO via email at mcacace@branfordschools.org by Wednesday, March 19th. Questions must include "RFB 1006-25 SKYLIGHT PANEL REPLACEMENT" in the subject line. All Answers will be posted as an addendum to our website, https://www.branfordschools.org/ no later than noon on Monday, March 24th. Failure to comply with these conditions will result in the bidder waiving his/her right to dispute the bid specifications and conditions. It is the bidder's responsibility to check our website for all addenda up to the day before the opening date.

IX. Terms and Conditions

Branford Public Schools reserves the right to:

1. Accept or reject any and all bids.
2. Request additional information or clarification from bidders.
3. Modify the RFB schedule.
4. Cancel or amend the RFB at any time.

By submitting a proposal, the vendor agrees to the terms and conditions outlined in this RFB.

Additional terms & conditions:

- No amount shall be added for the Connecticut Sales Tax or any Federal Tax. The Branford Public School system is exempt from the payment of taxes imposed by the Federal Government and/or State of Connecticut. Taxes must not be included in the proposal price.
- The Bidder is required to do Employee Background Checks as imposed by Connecticut state law.
- Bids must include the attached non-collusion affidavit.
- The Board will make determination of the acceptability of work. Work shall be completed in a responsive and professional manner and in accordance with the specifications of this RFB.
- Successful bidders shall be responsible for protection of their equipment and materials against theft, damage or deterioration on the site.
- Reasonable grounds for believing that a bidder is interested in more than one bid for the work contemplated will cause rejection of all bids in which the bidder is interested. Any or all bidders will be rejected if there is any reason for believing that collusion exists among the bidders. Participants in such collusion may not be considered in the future offers for the same work. Each bidder, by submitting a bid, certifies that it is not a part to any collusive action.
- The proposal will remain in effect for a period of ninety (90) calendar days from the deadline for submission of the proposal or until it is formally withdrawn, a contract is executed or this RFB is canceled, whichever occurs first.
- The Respondent shall acknowledge and agree that, should it be awarded the contract, it shall be solely responsible for strict compliance with all federal, state and local statutes, laws, codes, rules, regulations and ordinances, and for the procurement and maintenance of all necessary licenses and permits relating to the performance of services.
- Provisions of this RFB and the contents of the successful response will be used to establish final contractual obligations. The Board retains the option of canceling the award if the successful Respondent fails to accept such obligations. The Board and the successful Respondent shall enter into a written contract for the work to be performed. It is expressly understood that this RFB and the Respondent’s proposal shall be attached and included by reference in the contract signed by the Board and the successful vendor.

PERFORMACE BOND REQUIRED:

Successful bidders are required to furnish a Performance and Payment Bond in the Amount of 100% of the contract sum.

MODIFICATION OR WITHDRAWAL OF PROPOSAL AFTER DEADLINE:

If bid security is required and a Respondent does not honor their proposal for the specified time, the bid check shall become the property of the Town; or, if a Bid Bond was furnished, the Bid Bond shall become payable to the Town. After the proposal deadline has passed, the submitted proposals become the property of the Town and are valid offers to be honored by the Respondent for ninety (90) days or longer, as specified in the Request for Bid. Respondents who do not honor their proposals for the ninety (90) day (or as specified) period, shall be declared irresponsible Respondents.

CONTRACT LENGTH:

This Request for Bids is for awarding a contract for a project starting on July 1, 2025 and must be completed by August 15, 2025. Once this Bid is awarded, the Bidder must make arrangements to meet with Branford Public Schools if required. It will include the option, if agreed by both parties, to extend the contract. Should the selected Bidder not perform to the satisfaction of Branford Public Schools, the District may cancel the contract with 30 days' notice.

The bidder may be asked to extend the period of this agreement for the school if agreeable to both parties. The bidder shall be notified in writing by BPS if Branford Public Schools intends to extend the contract period.

AWARD OF CONTRACT:

The contract will be awarded by Branford Public Schools to the qualified firm or person at compensation determined to be fair and reasonable considering budgetary limitations, scope, complexity and the nature of goods and/or services. This RFB and the successful bid response will be incorporated into the terms of the final contract. The District will email a notice of award to a successful Bidder, and this method of communication will be considered sufficient notice of an award of the contract.

INSURANCE REQUIREMENTS

Bidder shall agree to maintain in force at all times during which services are to be performed the following coverages and shall name the Branford Board of Education as an Additional Insured on a primary and non-contributory basis to the Respondent's Commercial General Liability and Automobile Liability policies. These requirements shall be clearly stated in the remarks section on the bidders Certificate of Insurance. Insurance shall be written with Carriers approved in the State of Connecticut and with a minimum Best's Rating of "A"VIII-. In addition, all Carriers are subject to approval by the Branford Board of Education and Town of Branford.

		(Minimum Limits)
General Liability	Each Occurrence	$1,000,000
	General Aggregate	$2,000,000
	Products/Completed Operations Aggregate	$2,000,000
Excess/Umbrella Liability	Each Occurrence	$1,000,000
	Aggregate	$1,000,000
Professional Liability	Each Occurrence	$1,000,000
	Aggregate	$1,000,000
Cyber Liability (1)	Each Occurrence	$1,000,000
	Aggregate	$1,000,000
Workers' Compensation and Employers' Liability (2)	WC Statutory Limits	
	EL Each Accident	$500,000
	EL Disease Each Employee	$500,000
	EL Disease Policy Limit	$500,000

If any policy is written on a "Claims Made" basis, the policy must be continually renewed for a minimum of two (2) years from the completion date of this contract. If the policy is replaced and/or the retroactive date is changed, then the expiring policy must be endorsed to extend the reporting periods for claims for the policy in effect during the contract for two (2) years from the completion date.

Original, completed Certificates of Insurance must be presented to the Board of Education prior to purchase order/contract issuance. Bidder/Contractor/Vendor agrees to provide replacement/renewal certificates at least 30 days prior to the expiration date of the policies. Should any policy be cancelled for nonpayment of premium, 10 days written notice must be provided to the Board of Education. Should any of the policies be cancelled for other reasons, limits reduced or, coverage altered, 30 days written notice must be given to the Board of Education.

Notes

(1) Cyber Liability is required if Contractor is on Town's network or houses School/Town information on their network.

(2) Workers Compensation is required if employees come onto School/Town property.

Hold Harmless Requirements

The contractor shall, at all times, indemnify and save harmless the Branford Board of Education/Town of Branford, its officers, agents, and servants on account of any and all claims, damages, losses, litigation expense, counsel fees and compensation arising out of injuries (including death) sustained by or alleged to have been sustained by the public, any or all persons affected by the contractor's work, or by the contractor, any subcontractor, material, men or anyone directly or indirectly employed by them or any one of them while engaged in the performance of this contract. The Branford Board of Education shall be named as an additional insured on said policy of public liability insurance to cover all claims against the Board of Education arising out of said contract.

REQUEST FOR BIDS #1006-25

REQUIRED FORMS & DOCUMENTS

1. Statement of Non-Collusion
2. Non-debarment Acknowledgements
3. Conflict of Interest Certification
4. Bidder Information Sheet
5. Insurance Acceptance Sheet
6. Reference Form
7. Cost Reply Sheet

<u>REQUEST FOR BIDS #1006-25</u>
<u>STATEMENT OF NON-COLLUSION</u>
Mandatory Reply Sheet

By submission of this bid, bidder and each person signing on behalf of bidder certifies, and in the case of joint bid, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of their knowledge and belief:

[1] The prices of this bid have been arrived at independently, without collusion, consultation, communication, or agreement, for the purposes of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor;
[2] Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and
[3] No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

A bid shall not be considered for award nor shall any award be made where (1), (2), (3) above have not been complied with; provided, however, that if in any case the bidder(s) cannot make the foregoing certification, the bidder shall so state and shall furnish below a signed statement which sets forth in detail the reason therefore, where (a) (1), (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that the bidder (a) has published price lists, rates or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

Any bid hereafter made to any political subdivision of the state of any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, ruled, regulation, or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

By signing below, the undersigned acknowledges reviewing and understanding the Non-Collusion statements contained herein and confirms compliance with the contents:

AUTHORIZED SIGNATURE: ____

PRINT NAME: ____

BIDDER'S COMPANY NAME: ____

REQUEST FOR BIDS #1006-25
NON-DEBARMENT ACKNOWLEDGEMENT
Mandatory Reply Sheet

______ I acknowledge that my firm has NO pending litigation and/or debarment from doing business with the State of Connecticut or any of its subordinate government units and/or federal government within the past five (5) years.

______ I acknowledge that my firm has pending litigation or has been debarred from doing business with the State of Connecticut or any of its subordinate government units and/or federal government, within the past five (5) years. If so, please provide an attachment describing the pending litigation or debarment.

______ I acknowledge none of this company's officers, directors, partners, or its employees have been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any state or federal government; and that no member of the Board of Education of the Branford Public Schools, Administrative or Supervisory Personnel, or other employees of the Board of Education has any interest in the bidding company except as follows:

As the duly authorized representative of the Offeror, I hereby certify that the above information is correct and that I will advise Branford Public Schools should there be a change in status.

____
By (Signature)

____
Name and Title

____
Witness Name and Title

REQUEST FOR BIDS #1006-25
CERTIFICATE REGARDING CONFLICT OF INTEREST
Mandatory Reply Sheet

The Proposer is required to certify that performance of the work will not create any conflicts of interest or is required to disclose any actual or potential conflicts of interest by completing and signing one of the following statements, as it pertains to Branford Town Code, which states, “ No individual holding a public office in the Town or who is employed by said Town shall be permitted to furnish trucks, equipment or supplies to the Town unless such trucks, equipment or supplies cannot be secured elsewhere in said Town.”

The Proposer hereby certifies that to the best of its knowledge and belief, and in accordance with Branford Town Code and as described in the Scope of Work/Requirements section of this RFB will not create any conflicts of interest for the Proposer, any affiliates, any proposed subconsultants, and key personnel of any of these organizations.

AUTHORIZED SIGNATURE ____

NAME AND TITLE ____

DATE _____________________

PROPOSER/COMPANY NAME _____________________________________

OR

The Proposer hereby discloses the following circumstances that could give rise to a conflict of interest for the Proposer, any affiliates, any proposed subconsultants, and key personnel of any of these organizations. (Attach additional sheets as needed.)

Name of the Individual/Company/Town/Entity to which potential conflict of interest might apply:

Nature of potential conflict of interest:

Proposed Remedy:

AUTHORIZED SIGNATURE ____

NAME AND TITLE ____

DATE _____________________

PROPOSER/COMPANY NAME _____________________________________

REQUEST FOR BIDS #1006-25
BIDDER INFORMATION SHEET
Mandatory Reply Sheet

BIDDER INFORMATION:

BIDDER'S COMPANY NAME ______________________________

ADDRESS ______________________________

TELEPHONE # ________________ **FAX #** ________________

E-MAIL ADDRESS ______________________________

WEBSITE ______________________________

AUTHORIZED SIGNATURE ______________________________

PRINT NAME ______________________________

TITLE ______________________________

STATE OF CT TAXPAYER ID # ______________________________

FEDERAL TAXPAYER ID # ______________________________

INCORPORATED IN THE STATE OF ________________ **Corporate Seal ☐ Yes ☐ No** ________

AWARD/CONTRACT SIGNATURE

The Bidder shall indicate below, the full name, title, and the complete mailing address of the authorized person (i.e., **officer of the company**) who will sign the contract (if applicable) for this procurement:

____

____

____

____

____

REQUEST FOR BIDS #1006-25
INSURANCE REQUIREMENTS ACCEPTANCE
Mandatory Reply Sheet

PLEASE NOTE:

THIS PAGE MUST BE RETURNED WITH YOUR BID/PROPOSAL. FAILURE TO DO SO MAY RESULT IN YOUR BID/PROPOSAL BEING REJECTED.

Please take the insurance requirements of the Contract to your agent/broker immediately upon receipt of the bid documents to determine your existing coverage and any costs for new or additional coverage required for the work noted in this Request for Bid/Proposal. Any bids/proposals with deficient insurance requirements will be rejected. The firm who is awarded the Bid/Proposal must return the compliant certificate of insurance form within two (2) weeks from the date on the award letter.

STATEMENT OF VENDOR:

I have read the insurance requirements for this work and have taken the documentation to my insurance agent/broker. The bid/proposal cost reflects any additional costs relating to insurance requirements for this work.

_________________________________ _________________________________
Authorized Signature Date

____
Name & Title

<u>REQUEST FOR BIDS #1006-25</u>
<u>MINIMUM REFERENCES</u>
Mandatory Reply Sheet

REFERENCES

Please list three (3) school districts, ideally in Connecticut or New York, where you or your company has performed these services. If you do not have a school district, please provide most closely related references.

1. ____
NAME AND ADDRESS

____
CONTACT PERSON AND TELEPHONE NUMBER/EMAIL

2. ____
NAME AND ADDRESS

____
CONTACT PERSON AND TELEPHONE NUMBER/EMAIL

3. ____
NAME AND ADDRESS

____
CONTACT PERSON AND TELEPHONE NUMBER/EMAIL

OR INDICATE WHICH PAGE OF YOUR PROPSAL INCLUDED REFERENCES BELOW
PAGE: ______

<u>REQUEST FOR BIDS #1006-25</u>
<u>COST FOR SERVICES</u>
Mandatory Reply Sheet

The undersigned Contractor hereby submits the following bid in response to this RFB to replace the translucent skylight panels. Fee proposals should include all equipment and materials..

All-In Cost Proposal: $ _______________

You must provide detailed information for any work that will be subcontracted, including the name of the subcontractor, a description of the work to be performed, and the associated costs.

The contract shall include all labor and materials, tools, equipment, and services required for proper performance of the work as specified in this RFB and as may be required for proper completion of the work in accordance with the highest standards of the trades involved. Bidders are responsible for any assumptions made regarding the site for the work to be performed.

REQUEST FOR BIDS #1006-25

ATTATCHMENTS

1. Architectural and Structural Evaluation Report (2024)
2. Branford High School Addition and Renovations & Code Compliance (1996)

BRANFORD PUBLIC SCHOOLS
BRANFORD HIGH SCHOOL

185 East Main Street
Branford, CT 06405

TRANSLUCENT WALL PANELS & SKYLIGHTS ARCHITECTURAL AND STRUCTURAL EVALUATION REPORT

December 6, 2024

Antinozzi Associates PC produced the content of this document under agreements between Antinozzi Associates PC and the Town of Branford. All terms and conditions of that agreement are included within this document by reference. Other than to the Town of Branford, Antinozzi Associates PC disclaims any obligations to any other person with respect to any material presented in this document, and no person may rely upon this document without advance and express written consent from Antinozzi Associates PC and such person's written agreement is to be bound by the limitations, qualifications, terms, conditions, and indemnities to Antinozzi Associates PC set forth in that agreement.

Antinozzi Associates PC specifically states that its review of the property in question is subject to monetary and time restraints, as well as scope limitations. Given those restraints and limitations, they have made what is in their opinion a reasonable investigation. The materials presented in this document shall be considered "to the best of Antinozzi Associates PC collective knowledge". This phrase means to the facility assessment team's actual knowledge of the subject matter after such inquiry as Antinozzi Associates PC considered reasonable in light of the restraints and limitations upon the contracted scope of work.

The extent of the physical observation for the production of this report has been limited to "walk-around" visual inspections of the building. Assumptions regarding the overall condition of the property have been developed based upon observation of representative areas of the building. As such, the development of schematic methods and associated costs for the correction of identified deficiencies is based upon the overview observation and is also limited with respect to completeness.

3.0
Executive Summary

Introduction

In September of 2024, Antinozzi Associates was requested to conduct an Architectural and Structural evaluation of the translucent wall panels and skylights for the Branford High School in the Town of Branford. This assessment is intended to provide the Town of Branford an overview of the deficiencies and for developing a potential renovation plan for the wall panels and skylights.

Study Scope

The assessment of the skylights and wall panels included a field survey to investigate and evaluate the current conditions, as well as to identify and prioritize elements requiring repairs, restoration, and/or replacement.

The survey included the following elements:

- Translucent Wall Panels & Skylights

The above noted procedure has limitations, as some elements of the facility are concealed from view and cannot be inspected without selective demolition. Unless specifically noted within this report, no engineering calculations, disassembly of building components, or material testing was completed by the Study Team for this assessment. This report describes the condition of the building and site components at the time of the observations in October of 2024. The report of an item functioning at the time of the observation should not be taken as a guarantee. This report provides no guarantee or warranty, either expressed or implied.

In the cost estimate component of the report, certain assumptions were made that must be considered when interpreting the cost figures associated with each line item. The cost listed is specific to the identified scope.

Regular maintenance cost is not included in this line-item report. The report assumes the Town will allocate maintenance cost, following the implementation of certain line-item scopes of work.

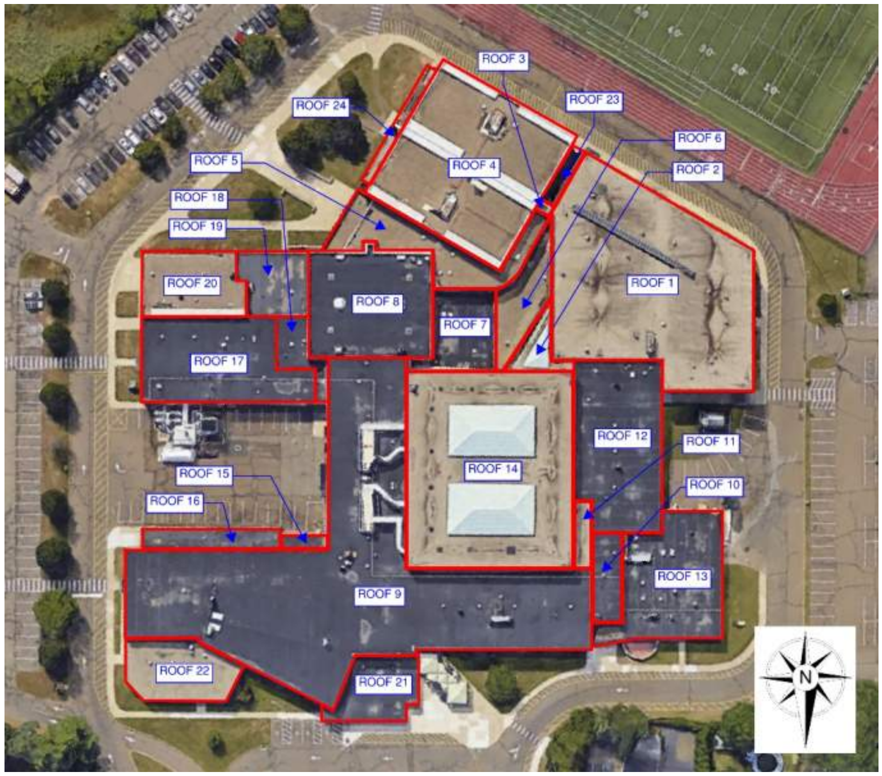
Study Team

The list of individuals below are collectively responsible for the work that resulted in the development of this facility assessment report.

Architect	**Antinozzi Associates, P.C.** 271 Fairfield Avenue Bridgeport, CT 06604 P: 203-377-1300 *Paul Lisi, AIA – Principal / Project Manager* *Stephen Hennebry, RA, NCARB – Project Architect*
Structural Engineer	**Michael Horton Associates, Inc.** 780 East Main Street Branford, CT 06405 P: 203-481-8600 *Paul Sheehan, P.E. – Principal / Vice President* *James Thompson, P.E.*

4.0
Existing Translucent Wall Panel & Skylight Survey

Building Translucent Wall panels & Skylights

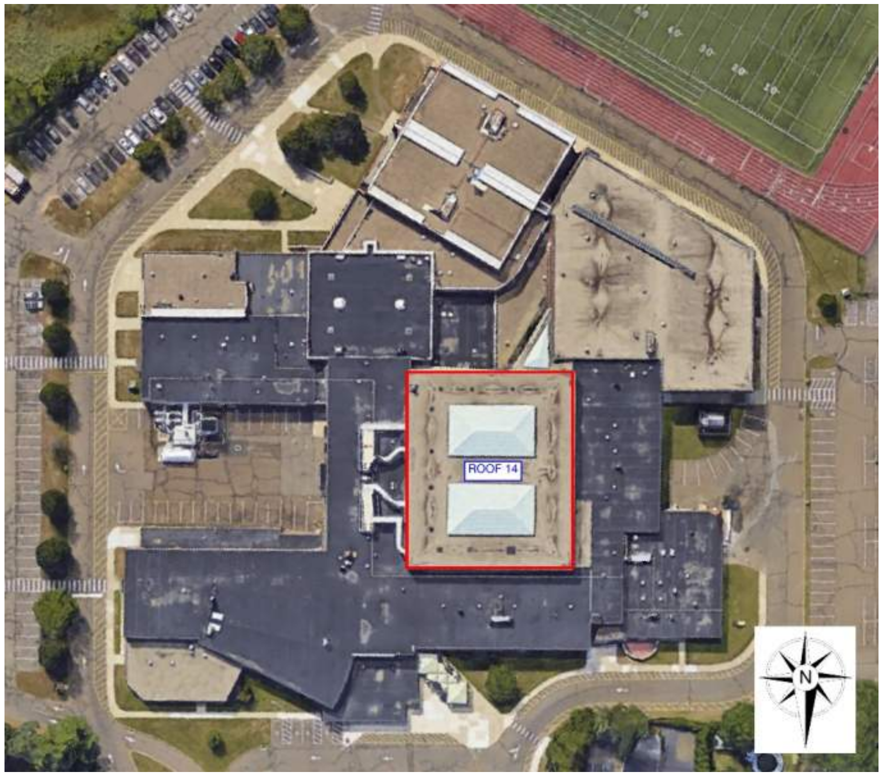


Roof Diagram Plan

At the request of the Branford Public Schools, representatives from Antinozzi Associates and Michael Horton Associates, Inc. visited Branford High School, located at 185 East Main Street, to perform both a structural and architectural assessment of the existing (2) large skylights and translucent wall panel systems located in the areas identified a Roof #14, and the (1) smaller skylight located in Roof Area #2, as shown in the Antinozzi Associates Roof Report dated September 17, 2024. The Roof Diagram Plan is included above for reference.

The roof structure, skylights, and translucent wall panels were reviewed from above on the exterior and from below on the interior at multiple locations.

Roof 14 Skylights



Roof 14 Plan

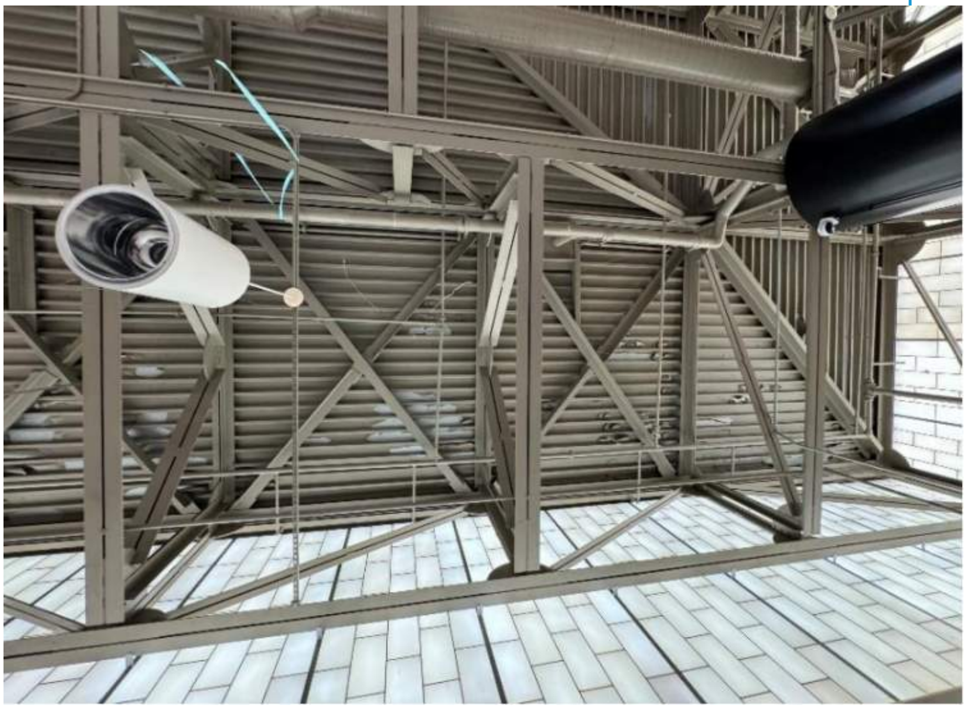
- The structure consisted of galvanized metal deck supported by open-web steel joists and wide-flange beams.
- Galvanized roof decking was observed in sound condition throughout. Peeling paint was observed at the underside of the cafeteria roof deck, though no structural concerns were observed.
- Open-web joists were observed to be in sound condition. No structural concerns were present.
- The (2) rectangular aluminum skylight structures at Roof 14, spanning 64'x36' both appeared to be in sound condition structurally, however, the translucent panels have faded, delaminated, and gaps were observed in multiple areas causing leaks during wind driven rain storms.

Large skylight at Roof 14

Close up of large skylight. Note the fading, delaminating, and gaps.

Interior view of skylight. Roof supporting structure.

Interior view of roof deck and structure.


Interior view of roof deck and structure, and perimeter translucent panels. Peeling paint is visible.


Interior view closeup of peeling paint at roof deck

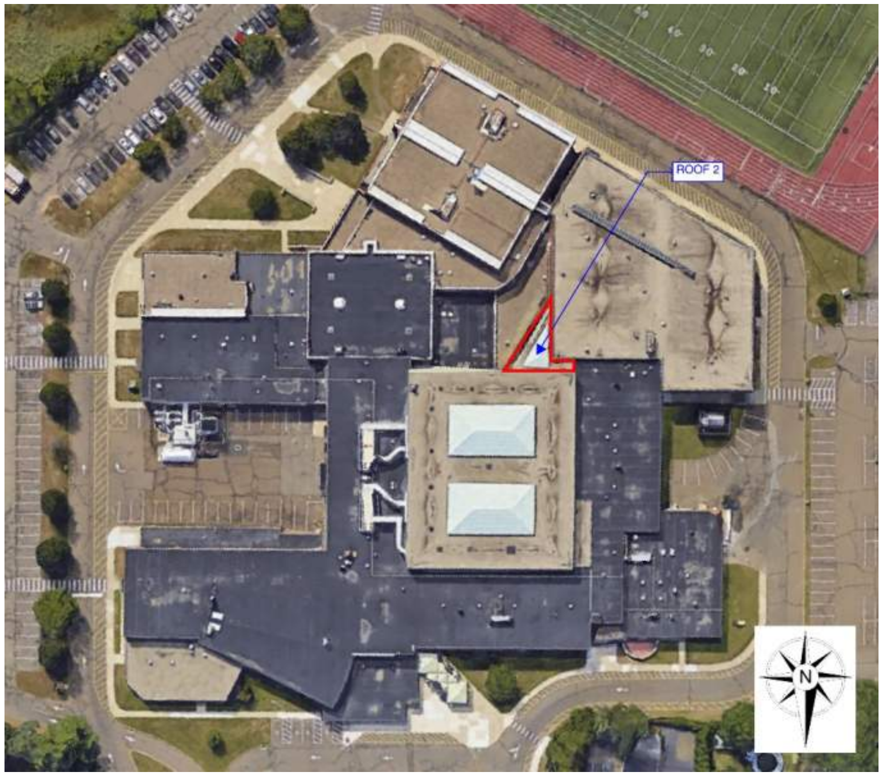
Roof 14 Translucent Wall Panels

A translucent wall panel system lines the perimeter of Roof 14. Similar to the skylights, the wall system shows no obvious structural concerns, however the panels are faded, delaminated, and gaps were observed in multiple areas causing leaks during wind driven rain storms.

Translucent wall panel at Roof 14 perimeter

Translucent wall panel at Roof 14 perimeter from the interior

Roof 2 Skylight



Roof 2 Plan

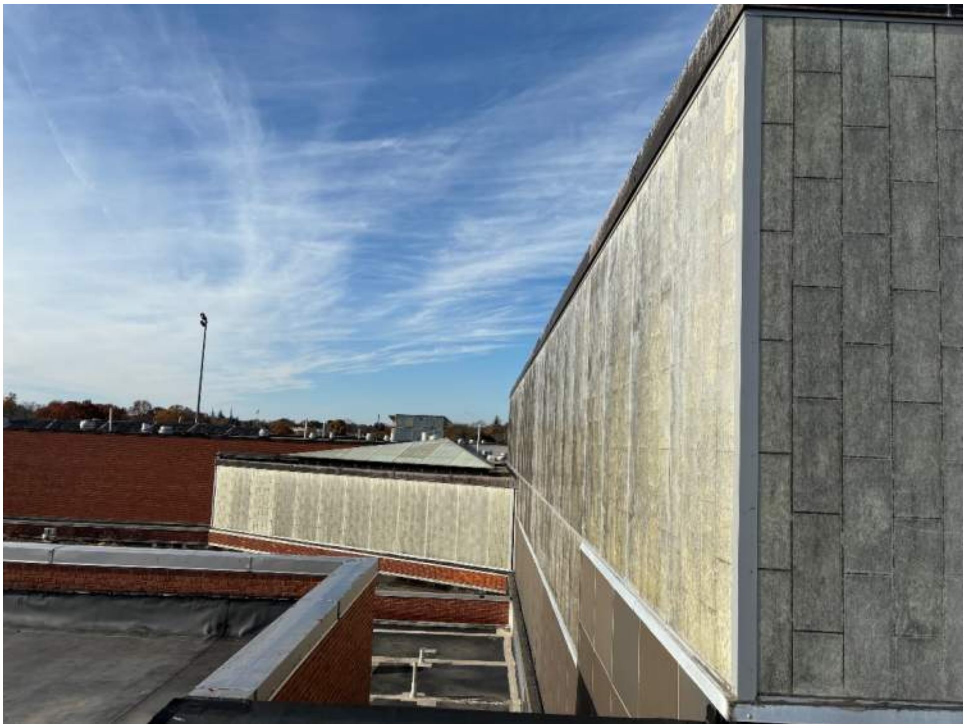
- The structure consisted of galvanized metal deck supported by open-web steel joists and wide-flange beams.
- Galvanized roof decking was observed in sound condition throughout. Peeling paint was observed at the underside of the cafeteria roof deck, though no structural concerns were observed.
- Open-web joists were observed to be in sound condition. No structural concerns were present.
- The (1) aluminum skylight structure at Roof 2 is triangular in shape and appeared to be in sound condition structurally, however, the translucent panels have faded, delaminated, and gaps were observed in multiple areas. These gaps are causing leaks during wind driven rain storms.


View looking west


Interior view of Roof 2 skylight and translucent wall panel

Roof 2 Translucent Wall Panels

A translucent wall panel system lines the south wall of Roof 2. Similar to the skylights, the wall system shows no obvious structural concerns, however the panels are faded, delaminated, and gaps were observed in multiple areas causing leaks during wind driven rain storms.



View looking east towards Roof 2 skylight and translucent wall panel. Roof 14 translucent wall panel is visible on the right.

Recommendation Summary

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As noted in this report, the existing structures for the skylights and the translucent wall panels are in good condition. It is recommended that the structure remain, however, it should be scraped of loose paint, cleaned, and re-painted.

The skylight and wall panels, however, should be replaced due to fading, delaminating, and gaps. The existing systems are well past their useful material life and new translucent skylights and wall panels should be installed.

STRUCTURES UNLIMITED, INC.

37 UNION STREET, P.O. BOX 4105
MANCHESTER, N.H. 03108-4105
TELEPHONE: (603) 627-7887
TOLL FREE: (800) 225-3895
FAX: (603) 627-3110

August 20, 1996

SUBMITTED
AUG 21 1996
CHERRY HILL GLASS CO., INC.

Mr. Kevin O'Neill
Cherry Hill Glass Company, Inc.
303 Main Street
Branford, CT 06405

RE: Branford High School - Branford, CT

TO WHOM IT MAY CONCERN:

Please be advised that the product which we will furnish will meet or exceed the test reports submitted in accordance with the requirements of the specifications as outlined below:

ICBO Listing
SBCCI Listing
ASTM E 84
ASTM D 635
ASTM D 2244
SPI Method B
ASTM C 297
ASTM D 1002
ASTM D 1037
ASTM C 236
ASTM E 108

STRUCTURES UNLIMITED, INC.

R R Keller

Robert R. Keller, Jr.
President

State of NH
County of Hillsborough

Subscribed and sworn to before me this 20th day of August, 1996.

Darlene R. Cairo
NOTARY PUBLIC

My commission expires: 10/18/2000

EVALUATION REPORT

COMPANY CONFIDENTIAL

Report No. PFC-1705
April, 1994

Filing Category: ROOF, WALL AND FLOOR PANELS—Sandwich Panels (216)

KALWALL TRANSLUCENT WALL, SKYLIGHT AND ROOF PANELS

KALWALL CORPORATION
1111 CANDIA ROAD
POST OFFICE BOX 237
MANCHESTER, NEW HAMPSHIRE 03105

I. **Subject:** Kalwall Translucent Wall, Skylight and Roof Panels.

II. **Description:** A. **General:** The Kalwall translucent panel is of a sandwich-type construction $2^3/_4$ inches thick and is composed of an extruded 6005-T5 aluminum alloy frame and grid covered on both sides with flat fiberglass reinforced polymer facings, and is provided in the following types:

TYPE	THICKNESS (inches)	CLASS OF PLASTIC	FLAME-SPREAD CLASSIFICATION
Type 25	.045	CC-1	Class I
Type S-170	.045	CC-1	Class II
Type SW	.070	CC-2	Class III
Type 20LS	.045	CC-1	Class I

The aluminum extruded members form a grid 8 inches by 20 inches nominal and the panels are available in various widths and up to 20 feet in length. The aluminum I-beams are spaced 8 inches on center and are continuous in the direction of the panel span. Panels are also available in a 12-inch by 24-inch grid-core module where aluminum I-beams are spaced 12 inches on center and are continuous in the direction of the panel span. See Figure No. 1 for details. The I-beams are 2.6 inches in height and .05 inch thick and have a flange width of .43 inch. See Figure No. 1. The facing is bonded to the aluminum frame with a proprietary elastomeric-type adhesive. The exterior facing of the panels are Types SW or 20LS and the interior facings are Types 25 or S-170.

B. **Installation:** Aluminum extrusions are provided for connecting the panels to the building. The panels are interconnected with either a 2-inch tee batten or a $3^1/_4$-inch integral heavy stiffener (IS-H). Design and details are to be submitted to the local building official for acceptance. See Figure No. 2 for typical installation details.

C. **Identification:** The panels are identified by the manufacturer's name type designation, material classification and the evaluation report numbe stamped on the perimeter, together with the stamp of the quality contro agency, U.S. Testing Company, Inc. (AA-543).

III. **Evidence Submitted:** Reports of tests in accordance with ICBO ES Acceptance Criteria for Sandwich Panels, dated April, 1977, (correctec August, 1988) and Acceptance Criteria for Plastic Skylights, dated January, 1989, U.B.C. Standard No. 42-1, ASTM D 1929-68 (1975) and ASTM D 635-74, load tests, wind-driven rain tests and installation instructions

Findings

IV. Findings: That Kalwall Translucent Wall, Skylight and Roof Panel as described in this report comply with the 1991 *Uniform Buildin Code*™, subject to the following conditions:

1. **The panels are installed in accordance with this report as re quired by Chapter 52 of the code.**
2. **The allowable unsupported span for Kalwall wall and roof panel does not exceed those specified in Table No. I.**
3. **No diaphragm values are assigned to the Kalwall panels. A hori zontal bracing system must, therefore, be provided in the plan of the roof for resistance to wind and seismic loads.**
4. **When exposed to the building interior, flame-spread classifica tion must comply with Chapter 42 of the code.**
5. **The panels are manufactured at Manchester, New Hampshire under a recognized quality control program with inspections b the United States Testing Company (AA-543) and Underwriter Laboratories Inc. (NERQA-403).**

1993 Accumulative Supplement to the U.B.C.: This report is unaffecte by the supplement.

This report is subject to re-examination in two years.

TABLE NO. I

NO.	TYPE OF PANEL	ALLOWABLE SPAN (Ft.-In.)[2] Positive and Negative Loads (psf)						
		20	30	40	50	60	70	80
1	8-inch by 20-inch grid with 2-inch Tee Batten[1]	9-8	8-5	7-8	7-2	6-9	6-5	6-1
2	8-inch by 20-inch grid with $3^1/_4$-inch IS-H Batten[1]	15-3	13-4	12-1	11-3	10-7	10-1	9-8
3	12-inch by 24-inch grid with 2-inch Tee Batten[1]	8-5	7-4	6-8	6-2	5-10	5-6	5-3
4	12-inch by 24-inch grid with $3^1/_4$-inch IS-H Batten[1]	14-11	13-0	11-10	11-0	10-4	9-10	9-5

[1]Battens are installed on each side of the panels parallel to the panel span with a maximum batten spacing of 48 inches on center.
[2]Deflection limited to L/180.

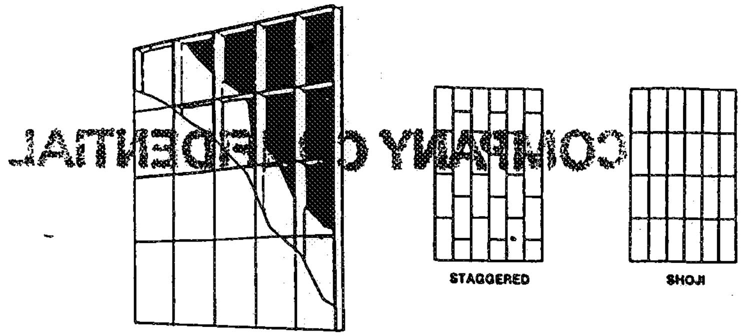

FIGURE NO. 1

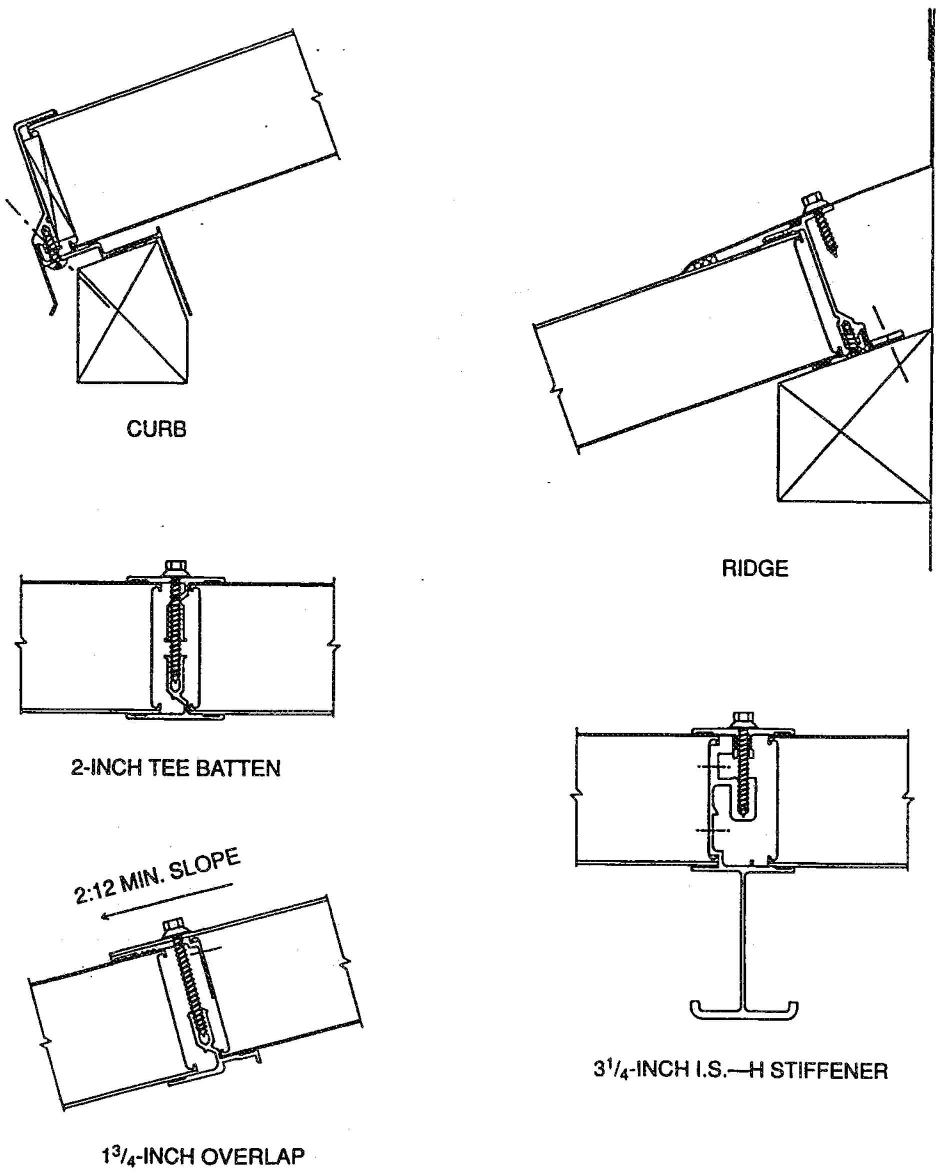

FIGURE NO. 2—INSTALLATION DETAILS

SBCCI PST&ESI

SBCCI PUBLIC SAFETY TESTING AND EVALUATION SERVICES INC.

900 Montclair Road, Suite A
Birmingham, Alabama 35213-1206

Evaluation Reports are the opinion of the Committee on Evaluation, based on the findings, and do not constitute or imply an approval or acceptance by any local community. The Committee, in review of the data submitted, finds that in their opinion the product, material, system, or method of construction specifically identified in this report conforms with or is a suitable alternate to that specified in the Standard Codes, SUBJECT TO THE LIMITATIONS IN THIS REPORT.

The Committee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code*© and submits to the Building Official or other authority having jurisdiction the following report. The Committee on Evaluation, SBCCI PST & ESI and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report. Portions of this report were previously included in SBCCI Evaluation Report #SBCCI 9303 and PST & ESI Evaluation Report #9446.

REPORT NO.: 9446A

EXPIRES: See current SBCCI PST & ESI EVALUATION REPORT LISTING

CATEGORY: FLOOR, WALL, AND ROOF SYSTEMS

SUBMITTED BY:

KALWALL CORPORATION
P.O. BOX 237
1111 CANDIA ROAD
MANCHESTER, NEW HAMPSHIRE 03105

1. PRODUCT TRADE NAME

Kalwall™ Sandwich Panels for Roof and Wall Systems With Face Sheet Types 25, S-170, SW-C, SW, 20LS, B-3A, and A

2. PERFORMANCE OF PRODUCT FOR WHICH EVALUATION IS REQUESTED

2.1 Class A Roof Covering Fire Classification
2.2 Interior Finish Classification
2.3 Approved Light-transmitting Plastic
2.4 Wall Panels

3. USES

Kalwall™ panels together with joining and mounting accessories are intended for use as light-transmitting closures for openings in exterior walls and in roofs.

With certain face sheet arrangements as detailed in Item 4.3, Kalwall™ panels may be used as a class A roof covering.

4. DESCRIPTION

4.1 GENERAL

Kalwall™ roof and wall systems use prefabricated structural composite sandwich panels, 2.75 inches (70 mm) thick, formed by grid core of extruded, 6005-T5, noncombustible aluminum or thermally broken aluminum I-beam shapes on each face of which have been bonded, by means of a resin-type adhesive, sheets of fiberglass reinforced polymer facings. The fiberglass reinforced polymer facings come in standard material compositions designated as shown in Table #1. By proper selection of sheet types for the inner and outer surfaces certain Kalwall panels achieve a Class A roof covering rating. Each sheet type varies by thickness, formulation, and colors. See Table #1.

The grid core is arranged in a rectangular 12 inch x 24 inch (305 mm x 610 mm) nominal grid system with continuous longitudinal members, called mullions, running the length of the panel. Short grid core shapes of the same size called muntins, are placed between the mullions. The muntin sections are interlocked with the mullions by means of notches cut in the ends of the muntins and which engage the returns along the edges of the mullion flanges. Panels are also available with an 8 inch x 20 inch (203 mm x 508 mm) grid core system, in which the I-beams are continuous in the long direction of the panel.

Standard width of panels is 4 ft. (1219 mm) or 5 ft. (1524 mm), and other widths are available. Panel lengths vary from 3 ft. (914 mm) to 20 ft. (6096 mm) as standard sizes but are available in greater lengths. Standard thickness of completed panel is $2^3/_4$ inches (70 mm).

Panels are joined together along their longitudinal sides by a variety of batten assemblies involving pairs of flat and stiffened aluminum extrusions, placed on opposite sides of the pairs of panels, and connected by screws. Additional extruded aluminum shapes are furnished for fastening the panels to the building structure at top, sides and bottom of wall openings and for joining panels together at roof ridge lines and for connecting roof panels to curbs.

TABLE #1

TYPE	WHERE USED	FACING THICKNESS	CLASS OF PLASTIC	CLASS A ROOF	FM 4411 WALL	INTERIOR FINISH CLASSIFICATION
Type 25	INTERIOR FACE	0.045" (1.143 mm)	CC-1	INTERIOR	N/A	Class A
Type S-170	INTERIOR FACE	0.045" (1.143 mm)	CC-1	INTERIOR	N/A	Class B
Type SW-C	EXTERIOR FACE	0.070" (1.778 mm)	CC-1	EXTERIOR	EXTERIOR	N/A
Type SW	EXTERIOR FACE	0.070" (1.778 mm)	CC-2	N/A	N/A	N/A
Type 20LS	EITHER FACE	0.045" (1.143 mm)	CC-1	EXTERIOR AND/OR INTERIOR	N/A	Exposed Side Dull-Class A Glossy - Class B*
Type B 3A	INTERIOR FACE	0.052"	CC-1	INTERIOR	INTERIOR	Class A
Type A	EXTERIOR FACE	0.70" (1.778 mm)	CC-1	EXTERIOR	N/A	N/A

* Is not exposed in any panel construction.

4.2 INSULATION

These panels can have an insert of translucent fiberglass insulation within the voids. The density of the insulation can be changed to vary the insulation value of the panel.

4.3 CLASS A ROOF COVERING

When tested in accordance with ASTM E-108, certain panel configurations achieved the Class A Roof Covering designation with no slope limitation. See Table #1. The panel must be installed with a slope sufficient to provide drainage. Such Kalwall Class A Roof Panels are manufactured with an interior facing of either Type B-3A, Type S-170, Type 20LS, or Type 25 and an exterior facing of Type 20LS, Type SW-C, or Type A applied over the standard aluminum or thermally broken aluminum frame. The grid system is 8 inches x 20 inches (203 mm x 508 mm) or 12 inches x 24 inches (305 mm x 610 mm). This Class A roof panel may be used with insulation designated as either 0.15U, 0.19U, or 0.24U. The mechanics of such performance for combustible materials was demonstrated to be a function of the insulation of the unexposed face by the glass fiber matting which remained after the resins of the exposed face had been consumed. Panels of these configurations are exempt from the requirements of Section 2604 and are covered by Section 1509.2

4.4 WALL PANEL(S)

Certain wall panel configurations passed the FM 4411 test which included (1) a wall channel test; (2) a heat release rate test; (3) potential vertical flame spread within the core test; and (4) a susceptibility to radiant heat damage test. Such Kalwall™ wall panels are manufactured with Type SW-C on the exterior face and Type B-3A on the interior face. The limitation of Section 2603 relating to size and spacing of plastic exterior wall panels need not be applied to this assembly, provided the maximum height is 30 ft. (9144 mm) or less. See Table #1.

4.5 FIRE TESTING

Kalwall™ Face Sheets were tested in accordance with ASTM D 1929 Ignition Properties of Plastics, ASTM E-84 Surface Burning Characteristics, and ASTM D 635 Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position. The Kalwall™ Class A roof covering assemblies noted in Item 4.3 have been tested in accordance with ASTM E-108 Fire Tests of Roof Coverings. The Class 1 Kalwall™ wall panels noted in Item 4.4 were subjected to full scale fire testing by FM 4411.

5. INSTALLATION

The manufacturer's published detailed installation instructions shall be strictly adhered to and shall be incorporated into the working drawings which shall be available at all times on the job site during installation.

The scope of this report does not include an evaluation of structural performance of the panels. Engineering calculations and test reports must be submitted to the building official demonstrating that the panels will resist the design loads from Chapter 16 of the *Standard Building Code*©.

6. SUBSTANTIATING DATA

6.1 Manufacturer's descriptive literature.

6.2 Test reports for ASTM D-635 by Factory Mutual Research:

6.2.1 Type 20LS; dated February 20, 1987; Serial Number OP1F1.CY; signed by E. R. Mitchell and R. C. Merritt

6.2.2 Type S-170; dated August 23, 1984; Serial Number 1KOK8.MH; signed by P. J. Conroy

6.2.3 Type 25 and Type SW dated April 19, 1988; Serial Number 0Q2F1.CY; signed by D. W. Lewin

6.2.4 Type SW-C; dated October 14, 1992; Serial Number OW6F5.CY; signed by D. W. Lewin

6.2.5 Type B3A; dated Nov. 5, 1992, Serial Number OW7FI.CY, signed by D.W. Lewin

6.3 Test reports for ASTM D-1929 by Factory Mutual Research:

6.3.1 Type 25; dated September 22, 1988; Serial Number OQ7F9.C4; signed by J. T. Kelliher, Jr.

6.3.2 Types 20LS and 25; dated April 22, 1986; Serial Number ON2F3.CY; signed by D. W. Lewin

6.3.3 Type SW-C, dated November 5, 1992; Serial Number OW6F7.CY, signed by D. W. Lewin

6.3.4 Type B3A, dated November 5, 1992; Serial Number OW7FI.CY, signed by D. W. Lewin

6.3.5 Type SW; dated August 24, 1981; Serial Number OG9KO.MH; signed by P. J. Conroy

6.4 ASTM E-84 Test Report by Underwriters Laboratories Inc; issued August 20, 1986, and revised November 18, 1986; File R7415, Project 86NK9396; signed by J. G. Marzullo and R. K. Laymon;

6.4.1 Types 25 and 20LS, dated August 20, 1986, revised November 18, 1986; File R7415, Project 86NK9396; signed by J.G. Marzullo and R.K. Laymon

6.4.2 Type S-170; dated December 13, 1983; File R7415, Project 83NK17264; signed by R. N. Walke and W.A. Kleinfelder

6.5 ASTM E-84 Test Report by Factory Mutual Research on

6.5.1 Type SW; dated August 6, 1982; Reference J.I. 1H2Q4.AC, Class No. 4820, signed by J.E. Beauregard

6.5.2 Type SW-C; dated January 29, 1992; Reference OWOO4.AC; File ST029B; Engineer, T. M. Chestnut

6.6 Sealed letter from George P. Reed III, P.E.; #810 New Hampshire conveying ASTM E-84 on Type B-3A.

6.7 ASTM E-108 Test Report By Underwriters Laboratories Inc; dated January 16, 1984; Reference R7878 and 83NK18436; signed by E. Iwanski and R. L. Donahue.

6.8 ASTM E-108 Test Report by Underwriters Laboratories Inc; dated January 14, 1987; Reference R7878 and 86NK15534; signed by K. Conroy and L. A. Plencner.

6.9 Quality Assurance Procedures for Kalwall™ Translucent Wall and Roof Panels; by United States Testing Company, Inc; dated June 10, 1992; Reference EN92-0087; signed by R. C. Smith.

6.10 FM 4411 Test Report by Factory Mutual Research documenting FM Class I Fire Approval as a non-load bearing wall;

6.10.1 dated June 29, 1992; Reference OWIAI.AM; signed by E. R. Dunn and G. A. Smith

6.10.2 dated November 12, 1991; Reference J. I. ITOA8.AM, signed by E.R. Dunn and G. A. Smith

6.11 Documentation of UL Follow-up Procedures to Items #7 and #8 detailing interior face types, u-values, and exterior face types for the ASTM E-108 test; signed by D. Otto; revised April 15, 1992.

6.12 Sealed letter from George P. Reed III, P.E., #810 New Hampshire, conveying proof that Kalwall™ panels will not delaminate below 300°F.

6.13 Noncombustibility of Aluminum by NFiPA Fire Protection Handbook; 17th edition; pages 3-149.

6.14 Test report on Kalwall's Type SW-C and Type A face in accordance with ANSI/UL 790 (ASTM E 108), prepared by Underwriters Laboratories Inc., File R7878, Project 93NK10509, dated September 30, 1993, signed by Douglas C. Miller and James W. Hatcher.

6.15 Report on Kalwall Face Sheet 0.070 Type A, prepared by Factory Mutual Research, Serial No. 0X4F1.CY, dated August 10, 1993, signed by D. W. Lewin.

6.16 Report on testing of Thermally Broken I Beam for use in Kalwall Roofing Systems per ANSI/UL790, prepared by Underwriters Laboratories Inc., File R7878, Project 94NK21852, dated September 15, 1994, signed by Douglas C. Miller and James W. Hatcher.

VII. REFERENCES TO THE STANDARD CODES

Standard Building Code - 1994 Edition

Section 103.7	Alternate Materials and Methods
Section 202	Plastic, Approved - Definitions
Section 1509.2	Fire Resistance Classification
Section 2407	Sloped Glazing
Section 2604	Light-Transmitting Plastics
Section 3108.5	Signs Displays - Use of Plastic Materials

8. COMMITTEE FINDINGS

The Committee on Evaluation in review of the data submitted finds that, in their opinion, the Kalwall™ panels as described in this report conform with or are suitable alternates to that specified in the *Standard Building Code* or Supplements thereto.

9. LIMITATIONS

9.1 This Evaluation Report and the installation instructions, when required by the Building Official, shall be submitted at the time of permit application.

9.2 The scope of this report does not include an evaluation of structural performance of the panels. Engineering calculations and test reports must be submitted to the Building Official that the panels will resist the design loads from Chapter 16 of the *Standard Building Code*©.

9.3 There shall be no added loads in the form of intentionally or accidentally retained water, or building equipment, applied to the panels.

9.4 When oriented as walls less than 30 feet high, the panels may be installed in the exterior walls of all types of construction subject to the limitations of Table 600 relating to allowable percentage of openings. The limitations of Section 2604.4 relating to size and spacing of plastic exterior wall panels need not be applied.

9.5 The assemblies noted in Item 4.5 have attained a Class A roof covering classification and they are exempt from the limitations of Section 2604.5 relating to separation of roof panels and maximum area of individual panels, and from the similar limitations of Section 2604.6 relating to skylights.

9.6 The face of wall and roof panels which are exposed to the interior of the building shall exhibit the flamespread classifications based on occupancy required in Section 803 and Table 803.3.

9.7 Kalwall™ panel assemblies other than those shown in Items 4.3 and 4.4 may be used subject to the limitations of Section 2604.

9.8 Kalwall™ sandwich panels have not been tested by ASTM E-119 to obtain an hourly rating.

10. IDENTIFICATION

All packing of Kalwall™ sheets listed in this report shall bear the manufacturer's name and/or trademark, the type of material, the SBCCI Public Safety Testing and Evaluation Services, Inc. Seal or initials (SBCCI PST & ESI), and the number of this report for field identification.

The phrase "**Refer to this Evaluation Report for Code compliance**" shall be printed in the manufacturer's literature and installation instructions referencing this Evaluation Report number.

11. PERIOD OF ISSUANCE

SEE CURRENT SBCCI PST & ESI EVALUATION REPORT LISTING FOR STATUS OF THIS EVALUATION REPORT.

For information on this report contact:
Woods F. McRoy, P.E.
205/599-9800

STRUCTURES UNLIMITED, INC.

37 UNION STREET, P.O. BOX 4105
MANCHESTER, N.H. 03108-4105
TELEPHONE: (603) 627-7887
TOLL FREE: (800) 225-3895
FAX: (603) 627-3110

BTOR
Reinforced Plastic

February 15, 1994

KALWALL CORP

R7415 (N)
(B-cont. from A card)

	Type 20LS		
	Dull Surface	Glossy Surface	
Flame Spread	25	35	
Smoke Developed	50	125	
	Type A	Type 25	Type S-170
Flame Spread	15	20	45
Smoke Developed	over 500	200	350

1111 CANDIA RD P O BOX 237

LOOK FOR CLASSIFICATION MARKING ON PRODUCT

Replaces R7415B dated February 7, 1994.
457825002 Underwriters Laboratories Inc.® A1I/0131747

COMPANY CONFIDENTIAL

FACTORY MUTUAL | Factory Mutual System

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts 02062
Telephone (617) 762-4300
Fax (617) 762-9375

Serial No. 0B3F3.CY

June 13, 1996

COMPANY CONFIDENTIAL

FLAMMABILITY TESTING
ON A
PLASTIC PANEL MATERIAL
FOR
KALWALL CORPORATION
1111 CANDIA ROAD
P.O. BOX 237
MANCHESTER, N.H. 03105

INTRODUCTION

Mr. Donald E. Folsom of Kalwall Corporation has requested that testing be performed on a plastic panel material.

SAMPLE IDENTIFICATION

The sample was identified as Kalwall FRP designated .045 Type 25.

TEST REQUESTED

The standard method test for the flammability of self-supporting plastics according to the ASTM Test Procedure designated D-635 per the Purchase Order No. 007060.

TEST RESULTS

Tests were performed on 10 unconditioned test samples of material having average thicknesses of .045 inches. This sample has an average burning time of 4.1 seconds and a range of burning of 1-11 seconds. The average extent of burning is 8.6 mm and the range of burning of 6-11 mm.

Tests and Report by D.W. Lewin

DWLewin

KALWALL SUPERWEATHERING FRP FACE SHEET

ASTM D2244-79

Color Difference

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

For

KALWALL CORPORATION

1111 CANDIA ROAD

MANCHESTER, NH 03103

By

Richard W. Harold

Report No: Kalwall #189-b

April, 1983

COMPANY CONFIDENTIAL

HunterLab

Hunter Associates Laboratory, Inc.
11495 Sunset Hills Road
P.O. Box 2637
Reston, Va. 22090
Telephone: (703) 471-6870

COMPANY CONFIDENTIAL

KALWALL SUPERWEATHERING FRP FACE SHEET

COLOR DIFFERENCE - STANDARD WHITE

ASTM D2244-79

1. Purpose - The purpose of this test is to determine small color differences between a reference specimen (control) and a test specimen. For product specification, the permissible color difference between the test specimen and reference specimen shall be agreed upon by the purchaser and seller.

2. Apparatus - HunterLab D25-9 AF (small spot), Serial #9036. The specimens were backed with an 85% reflectance white porcelain tile causing a double reflectance and magnifying the color change, thus making this test particularly severe.

3. The test specimens were supplied by the Kalwall Corporation. The specimens were labled as follows:

   A. The test specimen had been exposed to outdoor weathering at 7^{o} to the horizontal facing south in South Florida and the control (reference) specimens were unexposed samples of the same material:

Test Specimen	Control Specimen No.	South Florida Exposure (Months)
B-189-T	B-189-C	65
B-182-T	B-182-C	67
B-171-T	B-171-C	67

   B. The test specimen had been exposed to 150^{o}F constant temperature and the control specimens were unexposed samples of the same material:

Test Specimen	Control Specimen No.	150^{o} Oven Exposure (Weeks)
B-105-T	B-105-C	2

4. Procedure - The instrument was operated according to the D25A-9 operating manual. The instrument was standardized on a working standard whose calibration is traceable to the National Bureau of Standards.

5. Results - Report No. Kalwall #189-b
   April, 1983

   Table 1 shows results according to ASTM D2244 11.1. Scale system 4.3.2.4 was used for these data.

Richard W. Harold

Richard W. Harold
Manager, Applications Engineering

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TABLE I

Kalwall Superweathering FRP Face Sheet

	Color Scale System B2*			CIELAB			CIE			Color Scale System B2*			CIELAB			ΔE*		Lab Adams ΔE Average of 3 Test Specimens
	L	a	b	L*	a*	b*	X	Y	Z	ΔL	Δa	Δb	ΔL*	Δa*	Δb*		ΔE_H	
	South Florida Exposure Color Difference Results																	
3-189-C	78.99	-5.22	6.34	83.12	-5.45	6.80	58.86	62.39	65.23							2.45		
3-189-T	80.53	-5.61	8.21	84.41	-5.82	8.85	61.06	64.06	64.86	1.55	-.39	1.87	1.29	-.38	2.05		2.46	3.0
3-182-C	78.40	-5.01	6.11	82.63	-5.24	6.56	58.06	61.46	64.51							3.06		
3-182-T	81.08	-5.47	8.02	84.86	-5.65	8.61	61.97	65.74	66.67	2.68	-.45	1.91	2.24	-.41	2.05		3.32	
3-171-C	79.17	-5.57	6.79	83.27	-5.82	7.30	58.98	62.68	64.95							2.99		ΔE*
3171-T	81.85	-5.84	8.64	85.50	-6.03	9.28	63.00	66.99	67.18	2.68	-.26	1.85	2.23	-.21	1.98		3.27	Average 2.83
	$150^{o}F$ Oven Exposure Color Difference Results																	
B-105-C	77.98	-5.34	4.76	82.28	-5.59	5.08	57.29	60.82	65.66									
3-105-T	77.89	-5.65	6.20	82.20	-5.93	6.68	57.02	60.68	63.51	-.09	-.31	1.44	-.08	-.33	1.60		1.48	

*Color Scale System called out under ASTM D2244-79 Sec. 4.3.2.4

Note: 6/91 ΔE* calculated from CIELAB Data.

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37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

Mr. George Reed, Sr.
KALWALL CORPORATION
Manchester NH 03105

IMPACT TESTING OF FRP PANELS

NEW HAMPSHIRE MATERIALS LABORATORY, INC.

Frederick G. Hochgraf
Principal Investigator

N.H.M.L. #2061

62A Littleworth Road
Dover, New Hampshire 03820

603-742-8526
In NH 1-800-334-5432

June 21, 1988

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STR[illegible] INC,
37[illegible] STREET
PO BOX 4105
MANCHESTER, NH 03108

IMPACT TESTING OF FRP PANELS

Testing Program

Samples of 0.070 inch (nominal) Type SW fiberglass reinforced polyester faces were tested according to the SPI Falling Ball Test, Method B. The impact ball was 3.5 inch diameter and weighed 6.41 lbs. Except for unrelated details of the supporting structure the test fixture conforms to Exhibit A of the test specifications.

The specification defines "failure" as a test outcome in which the ball passes completely through the material. "Rupture" is defined as a small tear completely through the face of the test panel.

Variable Height Rupture Testing
Eighteen panels were tested by dropping the ball from a 9 foot height with subsequent drops from additional one foot increments until rupture occurred. Due to test site limitations the maximum drop height was 14 feet. Samples which did not rupture at 14 feet are noted in the data table as "dnf" and the calculations are based on passing at 14 feet, although they may well have passed with higher drops. The temperature was 82°F and the samples had not been subjected to a temperature/ humidity conditioning cycle.

In the data table the location column refers to positions from which the test panels were cut.

The thickness of each test panel was measured at several points and the average is reported for the panel.

The Fail height is the drop height which resulted in rupture. The Pass height is the height of the previous drop. An argument can be made that the pass height would be a more accurate estimator of impact performance if it was half way between the height of rupture and the previous height.

Statistical Analysis
The remaining columns are based on all the preceding tests so that the last entry in each column is the best estimater for the set of samples. The "Student's t" statistical distribution is used since it applies to small samples from populations which can be expected to have the same variance. The df column is the degrees of freedom which is one less than the number of tests in the sample. The final column is the 95% lower confidence limit which is formed from

$$x - t*s/ n$$

where x is the average pass height, t is the Student's t statistic, s is the sample standard deviation and n is the number of tests.

After 12 tests there was little additional convergence between the 95% confidence limit and the average.

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NEW HAMPSHIRE MATERIALS LABORATORY, INC.

62A Littleworth Road Dover, New Hampshire 03820

603-742-8526
In NH 1-800-334-5432

N.H.M.L.#2061

Mr. George Reed, Sr.
KALWALL CORP.

June 23, 1988

Samp Loc	No.	t in.	Fail ft.	Pass ft.	Avg. ft.	Std Dev	df	Student "t"	95%
A	1	0.068	11	10	10.00	0.000	0	0.000	0.00
B	2	0.068	14	13	11.50	1.500	1	6.314	4.80
C	3	0.068	dnf	14	12.33	1.700	2	2.920	9.47
D	4	0.069	14	13	12.50	1.500	3	2.353	10.74
A	5	0.067	10	9	11.80	1.939	4	2.132	9.95
B	6	0.068	13	12	11.83	1.772	5	2.015	10.38
A	7	0.067	dnf	14	12.14	1.807	6	1.943	10.82
B	8	0.069	13	12	12.13	1.691	7	1.895	10.99
C	9	0.066	12	11	12.00	1.633	8	1.860	10.99
D	10	0.067	14	13	12.10	1.578	9	1.833	11.19
A	11	0.068	dnf	14	12.27	1.601	10	1.812	11.40
B	12	0.069	14	13	12.33	1.546	11	1.796	11.53
A	13	0.068	12	11	12.23	1.527	12	1.782	11.48
B	14	0.069	14	13	12.29	1.485	13	1.771	11.58
C	15	0.069	14	13	12.33	1.445	14	1.761	11.68
D	16	0.067	10	9	12.13	1.615	15	1.753	11.42
A	17	0.066	dnf	14	12.24	1.628	16	1.746	11.55
B	18	0.066	14	13	12.28	1.592	17	1.740	11.62

Test with 17 foot drop

Samp Loc.	Test No.	Result
A	1	Rupture, full length
B	2	Rupture, full length
C	3	dnf
D	4	Rupture, full length
A	5	Rupture, full length
B	6	dnf
B	7	dnf
A	8	Rupture, full length
C	9	Rupture, full length
D	10	Rupture, full length
B	11	Rupture, full length
A	12	Rupture, full length

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Failure Testing
Working outdoors in the shade at 85°F the same ball was dropped from a height of 17 feet with results as indicated in the table.

Conclusions
Using the 3.5 inch ball the average drop height without rupture is 12.28 feet with a 95% lower confidence limit of 11.62 feet.

In the 17 foot drop test no samples failed. Nine samples ruptured more-or-less edge to edge while three samples exhibited the same slight rupture as in the variable-height drop test.

Summary

	Impact Passing Height @95 % Confidence Level	Impact Energy (height x 6.41)
0.070 in. Type SW	11.62 ft	74.5 ft lbs.

Frederick G. Hochgraf
Professional Engineer
New Hampshire 3776

THE STATE OF NEW HAMPSHIRE
PROFESSIONAL ENGINEER

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

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STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

unh
UNIVERSITY OF NEW HAMPSHIRE
DURHAM, NEW HAMPSHIRE 03824

Department of Mechanical Engineering
College of Engineering and Physical Sciences
Kingsbury Hall
(603) 862-1352

TENSION TEST OF FLAT SANDWICH CONSTRUCTIONS IN FLATWISE PLANE (ASTM C297)

FOR

Kalwall Corporation
1111 Candia Road
Manchester, N. H. 03105

BY

Timothy M. Kenney
Frederick G. Hochgraf, P.E.

June 29, 1984

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TENSION TEST OF FLAT SANDWICH CONSTRUCTIONS IN FLATWISE PLANE (ASTM C 297)

Scope

This method covers the procedure for determining the strength in tension, flatwise, of the core, or of the bond between core and facings, of an assembled sandwich panel. The test consists of subjecting a sandwich construction to tensile load normal to the plane of the sandwich, such loads being transmitted to the sandwich through thick loading blocks bonded to the sandwich facings.

The intent of this test was to observe and record the effects of aging on the tensile strength of the glue line between the skin and grid of Kalwall Corporation panels.

Test Specimens

The test specimens were taken from panels manufactured by standard production methods and materials. Each specimen was approximately 2" x 7/16" x 2-3/4"* and was attached with high strength epoxy to two aluminum loading blocks. The untreated samples were bonded only 10 days before testing. The heat treated samples were post-cured at 160°F dry heat for 16 hours and stored for 30 days at room temperature (65°F) while the accelerated aging was being performed.

The aged specimens were tested after two exposures (6 cycles each) to accelerated aging in accordance to ASTM D 1037 (see NHML Report No. 380).

Procedure

A tensile load was applied at a constant rate of 2.0 inches per minute*.

Results

The results of this testing are summarized on the enclosed data table. From these results it is concluded with 95% confidence that there is no decrease of the ultimate tensile strength of the bond caused by the aging cycle.

*Specimen size and load rate are not as specified in ASTM C-297. See attached note.

SUMMARY OF TENSILE DATA

Sample Identification	Sample No.	Tensile Strength (psi)
	1	259
	2	259
Untreated Samples Bond age - 10 Days	3	243
	4	267
	5	273
	6	273
	7	223
	8	243
	9	266
	10	267
	Mean	257
	SD	16
	1C	381
	2C	519
Heat Treated Samples	3C	435
	4C	413
	5C	452
	6C	438
	7C	449
	8C	457
	9C	354
	10C	481
	Mean	438
	SD	47
	1A	705
	2A	752
Aged Samples ASTM 1037 Double Exposure	3A	751
	4A	767
	5A	820
	6A	751
	7A	725
	8A	919
	9A	808
	10A	825
	Mean	782
	SD	62

The purpose of ASTM C-297 is to evaluate a commercial material which is considerably different from the Kalwall building panel. The panel which this test was written for is a sandwich consisting of two outer surfaces of plastic laminate adhered to a core which consists of a relatively thin-walled, honeycombed section. The adhesive bonding the honeycomb to the laminate surfaces tends to form a significant fillet to provide a greater bonding area than the cross section of the honeycomb. Failure of the sample will be either in the adhesive or in the honeycomb. Because of the large (8 x 20) cell size of the Kalwall panel, this test method cannot be completely complied with. Section 4 (3) of C-297 requires that samples from products having cells larger than 1/2 inch shall be a minimum of 4 square inches or large enough to include at least one complete cell. The block (described in Figure 1) which must be adhered to the face of the laminate and which must be at least as large as one cell is dimensioned 1 9/16 x 1 1/2 inches. Therefore, one cell cannot have a dimension over 1 9/16 inches and meet the requirement of this test.

It is desired to have a test method which will measure the adhesive strength between the composite panel and the supporting core material. ASTM D-952 titled "Bond or Cohesive Strength of Sheet Plastics and Electrical Insulating Materials" is a different method which measures interlaminar strength or adhesive strength within a sample. Again, this test could not be directly run on this product due to dimensions. The sample required is a 51 x 51 millimeter sample adhered to two identically dimensioned blocks. Both of these methods are standards which have a similar intent to the desired evaluation of the Kalwall product but neither could be used without exception. ASTM C-297 was selected as most suitable compromise and the exceptions were noted. There is no ASTM standard even today that will evaluate this product without some exceptions.

Materials Laboratory File #CC749-11-84
29 June 1984

Timothy M. Kenney

Timothy M. Kenney
Technical Specialist
Materials Science

Frederick G. Hochgraf

Frederick G. Hochgraf, P.E.
Associate Professor
Materials Science

United States Testing Company, Inc.

Engineering Services Division

1415 PARK AVENUE • HOBOKEN, NEW JERSEY 07030 • 201-792-2400

REPORT OF TEST

88119

COMPANY CONFIDENTIAL

NUMBER

August 8, 1

CLIENT: Kalwall Corporation
1111 Candia Road
P.O. Box 237
Manchester, New Hampshire 03103

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

SUBJECT: Evaluation of Sandwich Panel Adhesives

REFERENCE:

Kalwall Corporation Purchase Order No. 1693 dated June 1, 1984

SAMPLE IDENTIFICATION:

Twenty-five (25) metal-to-metal (2024-T6 Aluminum) lap shear specimens were submitted and identified by the Client as prepared with a Type I, Class 2 adhesive.

TEST PERFORMED:

The submitted specimens were tested in accordance with ICBO "Acceptance Criteria for Sandwich Panel Adhesives" for the following:

A. Shear Tests per ASTM D-1002

1. 5 specimens @ 73°F, 50% R.H.
2. 5 specimens after exposure to accelerated aging per ASTM D-1183, Proc. C.
3. 5 specimens @ 182°F.
4. 5 specimens after immersion in 73°F water for 48 hours and dried for 8 hours @145°F followed by 3 cycles of soaking for 16 hours and then drying for 8 hours under the same conditions of temperature.
5. 5 specimens after exposure to 500 hours oxygen bomb (182°F).

Testing Supervised by:

Frank Pepe
Assistant Vice President

SIGNED FOR THE COMPANY

BY

Frank Savino, Supervis
Materials Eng. Section

tg

Kalwa.l Corporation

88119
Number

TEST RESULTS:

Test Condition	Det.	Shear Strength, psi	Type of Failure
73°F, 50% Relative Humidity	1	644	60% Cohesive
	2	578	40% Cohesive
	3	519	100% Cohesive
	4	525	50% Cohesive
	5	481	100% Cohesive
	Avg.	549	70% Cohesive
Accelerated aging D-1183, Proc. C	1	727	95% Cohesive
	2	666	95% Cohesive
	3	727	95% Cohesive
	4	681	75% Cohesive
	5	784	80% Cohesive
	Avg.	717	90% Cohesive
182°F	1	94.1	90% Cohesive
	2	67.2	60% Cohesive
	3	46.2	90% Cohesive
	4	68.0	60% Cohesive
	5	43.1	90% Cohesive
	Avg.	63.7	80% Cohesive
Cycle Soak, Para. 7.2	1	616	20% Cohesive
	2	733	100% Cohesive
	3	769	50% Cohesive
	4	657	50% Cohesive
	5	800	100% Cohesive
	Avg.	715	65% Cohesive
Oxygen bomb, D-572 @182°F, 300 psi	1	1400	75% Cohesive
	2	1460	50% Cohesive
	3	1560	90% Cohesive
	4	1270	90% Cohesive
	5	1370	90% Cohesive
	Avg.	1410	80% Cohesive

NOTE: Crosshead speed was 0.10 inches/minute as specified by Client.

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

NEW HAMPSHIRE MATERIALS LABORATORY

14 Schoolhouse Lane Durham New Hampshire 03824

603 868-1456

ACCELERATED AGING

(ASTM D1037)

SCOPE

Accelerated aging test shall be used to obtain a measure of the inherent ability of a material to withstand severe exposure conditions. The cycling exposure to which the material shall be subjected is a simulated condition developed to determine relatively how a material will stand up under weathering conditions.

The intent of this test was to observe and record:

1. Discoloration as an indication of delamination.
2. Separation due to differential movement of skin and grid.
3. Result of thermal shock (rapid change of extreme temperatures.)

TEST SPECIMENS

Thirteen tensile samples approximately 2" x 7/16" x 2-3/4" consisting of an aluminum I-beam bonded to two FRP face sheets, .045 inch and .079 inch nominal respectively, fabricated as "production run" material.

PROCEDURE

Normal ASTM D1037 Procedure calls for each specimen to be subjected to six complete cycles of accelerated aging. In order to increase the severity of this test, the number of cycles was doubled to twelve (12). Each cycle consisted of the following:

1. Immersed in water at 120± 3F. (49± 2C.) for 1 hr.
2. Sprayed with steam and water vapor at 200± 5F. (-93± 3C.) for 3 hrs.
3. Stored at 10± 5F. (-12± 3C.) for 20 hrs.
4. Heated at 210± 3F. (99± 2C.) in dry air for 3 hrs.
5. Sprayed again with steam and water vapor at 200± 5F. (93± 3C.) for 3 hrs.
6. Heated in dry air at 210± 3F. (99± 2C.) for 18 hrs.

After completion of the twelve cycles of exposure, the material was further conditioned at 20± 2°C. with a relative humidity of 65± 1% for 96 hours.

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P.O. BOX 4105
MANCHESTER, NH 03108

NEW HAMPSHIRE MATERIALS LABORATORY

RESULTS

Frequent inspections of the test specimens were made during the aging cycles for any sign of delamination or other disintegration. The results were as follows:

1. No white spots indicative of skin separation from the grid were observed.
2. No separation of skin from grid was observed including problematic separation resulting from differential movement.
3. No observable failure occurred due to thermal shock including problematic skin separation from the grid, skin crazing or cracking, and grid intersection failure.

It is reasonably inferable from this test that internal material failures will not occur and that glue line failure between materials will not occur under similar circumstances.

NEW HAMPSHIRE MATERIALS LABORATORY
File #380

June 29, 1984

Timothy M. Kenney
Timothy M. Kenney
Laboratory Supervisor

Frederick G. Hochgraf
Frederick G. Hochgraf, P.E.
Principal Investigator

THE STATE OF NEW HAMPSHIRE
FREDERICK G. HOCHGRAF
No. 2703
REGISTERED PROFESSIONAL ENGINEER

COMPANY CONFIDENTIAL

NORTHWEST LABORATORIES

APPLIED INDUSTRIAL RESEARCH

STAFF AFFILIATIONS A.S.T.M. · ACS · A.I.Ch.E. · ACI · ASM · AOCS · AMI · NSPE

200 JAMES STREET · SEATTLE, WASHINGTON 98104 · TELEPHONE MA. 2-0680

Report to: Kalwall Corporation | **Date:** May 25, 1971

Report on: Thermal Transmittance "U" Tests | **Lab. No.** D 2556-2 4-19-71 Test

Thermal conductivity tests were conducted according to ASTM procedure C-236 on a specimen "Kalwall" building panel submitted on February 19, 1971 and described as follows:

Panel A-6 standard 2-3/4" thick translucent insulated "Kalwall" panel, having fiberglass reinforced polyester faces laminated to the extruded aluminum grid core. The air spaces are filled with 2-1/2" x 28 gram/sq.ft. translucent fiberglass insulation batts. Light transmission is 20%.

Edge insulation was applied to specimen during test to minimize guard area conduction. Copper-constantan thermocouples located 4" from panel surfaces were employed for air temperature measurements. Same type thermocouples held in place with a single layer of masking tape were used to record surface temperatures. A model 8105 Foxboro indicatin potentiometer, calibrated from -200 to +200°F. was used to read thermocouple output.

Refrigeration temperatures were attained by circulating air (15 mph velocity at test surface) through copper tube heat exchanger carrying cooled alcohol. The metered test box was 3'x3'x1-1/2' surrounded by a 6'x6'x3' guard box. Metered box air natural circulation was assisted by a .01 hp blower unit mounted within the box and metered as part of the power input. Panel was tested without preconditioning.

Test Results:	Panel A-6
Thermal transmittance "U", BTU/hr./sq.ft/°F.	.263

Test Data:

Test Area, sq. ft.	9
Guard area, sq. ft.	23
Refrigeration area, sq. ft.	32
Air velocity, warm side	Natural convection + .01 hp fan
Air velocity, cold side	15 mph
Average air temperature 4" from warm side, °F.	66.675
Average air temperature 4" from cold side, °F.	-4.3
Test period, hrs.	4
Average heat input, W.H.	49.25

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

NORTHWEST LABORATORIES

Bernard F. Sharron

Bernard F. Sharron

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KALWALL "U" FACTOR

Per Northwest Laboratories Test # D 2556-2, Kalwall Insulated Panel has a "U" factor of 0.263 BTU/hr.- sq. ft. - °F @ 15 mph wind velocity

Kalwall Resistance "R" $= \frac{1}{U} = \frac{1}{0.263}$ $= 3.80$

Conductance of Air Film* "f_o" @ 15 mph = 5.1

Therefore "R" of Air Film "f_o" $= \frac{1}{5.1}$ $= .20$

"R" minus outside Air Film $= 3.60$

Conductance of Air Film* "f_o" @ 2 mph = 2.0

"R" of Air Film* "f_o" @ 2 mph $= \frac{1}{2.0}$ $= .50$

"R" @ 2 mph 4.10

"U" @ 2 mph $= \frac{1}{R} = \frac{1}{4.10} =$ 0.244 BTU/hr. - sq. ft. - °F

Therefore a Kalwall Insulated Panel has a "U" factor of 0.24 BTU/hr. - sq. ft. - °F at 2 mph wind velocity.

THE STATE OF NEW HAMPSHIRE
GEORGE P. REED, III
No. 810
REGISTERED
PROFESSIONAL ENGINEER

George P. Reed III

George P. Reed III
P.E.

* Fig. 30 page 85 "Heating, Ventilating, and Air Conditioning Fundamentals" by Severns and Fellows

ETC Laboratories 40 Ajax Road • Rochester, New York 14624 • Telephone 716-328-7668 • Fax 716-328-7777

NFRC 100-91 Thermal Test Report

Prepared for:
KALWALL CORPORATION
1111 CANDIA ROAD, P.O. BOX 237
MANCHESTER, NEW HAMPSHIRE 03103

Product Description

Series/Model: KCP+ A-R
Type: Curtain Wall
Size: 58-7/8" x 71-1/8" x 2-3/4" (1494mm x 1807mm x 70mm)
Report Number: ETC-94-066-1409-2

Report Date
August 2, 1994

ETC Laboratories 40 Ajax Road • Rochester, New York 14624 • Telephone 716-328-7668 • Fax 716-328-7777

NFRC Thermal Test Summary

AUG 8 1994

Prepared For:
KALWALL CORPORATION
1111 CANDIA ROAD, P.O. BOX 237
MANCHESTER, NEW HAMPSHIRE 03103

Productline:	Translucent Sandwich Panel
Model/Series:	KCP+ A-R
NFRC Type:	Curtain Wall
Representative Size:	58-7/8" x 71-1/8" x 2-3/4" (1494mm x 1807mm x 70mm)
Report Number:	ETC-94-066-1409-2
Test Start Date:	06/07/94
Test Finish Date:	06/08/94
Report Date:	08/02/94
Expiration Date:	08/02/98

NFRC Lowest U-Value Baseline Product

Overall Thickness	Layer 1	Cavity	Layer 2	Standardized U-Value (BTU/hr•ft²•F)
2-3/4"	Fiberglass 0.070"	Fiberglass Insulation	Fiberglass 0.045"	0.29
(70mm)	(1.8mm)		(1.1mm)	(1.64 W/m²K)

ARCHITECTURAL TESTING INC. TWO INTERCHANGE PLACE • YORK, PA 17402 • FAX 717-764-4129 • PHONE 717-846-7700

PERFORMANCE TEST REPORT

STRUCTURES UNLIMITED, INC.
37 UNION STREET
P.O. BOX 4105
MANCHESTER, NH 03108

Rendered to:

KALWALL CORPORATION
1111 Candia Road
Manchester, New Hampshire 03105

Report No: ATI-6566
Test Date: 04/26/89
Report Date: 05/19/89

SERIES/MODEL: 0.40U Panel

TEST SPECIMENS: 2-3/4" thick translucent skylight-roof panels, total of 3 specimens

OVERALL SIZE: 3'-4" wide by 4'-4" high

FINISH: Aluminum was mill finished

TEST SPECIMEN CONSTRUCTION: Each panel consisted of a nominal 2-3/4" thick I-beam panel of sandwich-type construction with an aluminum curb perimeter, a vertical 2" double tee batten and a horizontal overlap batten. The interior and exterior skins were bonded to an aluminum I-beam grid core. The exterior, referred to as "Standard Super-weathering", had a nominal wall thickness of 0.070". The interior sheet, referred to as "Standard S-170", had a nominal wall thickness of 0.045". Both skins were fiberglass reinforced plastic. The air space between the two skins was a nominal 2-5/8" (see Figure #1).

TEST PROCEDURE: The burning brand test was performed in general accordance with Section 9 of ASTM E 108-83 "Fire Tests of Roof Coverings" on three test specimens.

For each of three test decks at an incline of 5" to the horizontal foot, a well ignited Class A burning brand was positioned over the "T" joint formed in the test sample.

Similar results were obtained in each test. Smoke was observed on the underside at the horizontal joint after approximately four to five minutes. All action ceased and the tests were terminated after approximately nine to ten minutes.

At no time during these tests were any flying flaming brands of roof covering material produced. Also, at no time during these tests were any sparks or flames noted on the underside of the test deck. These results comply with the Class A requirements.

TITLE OF TESTS	RESULTS
1. Burning Brand Test	Class A performance

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A copy of this report will retained by ATI for a period of four years. The test specimens were returned to the client per their request. This report is the exclusive property of the client so named herein and is applicable to the sample tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory.

ARCHITECTURAL TESTING, INC.

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Daniel J. Wise
Technician

Reviewed by:

David G. Moyer
Director of Testing Services

DJW:dml
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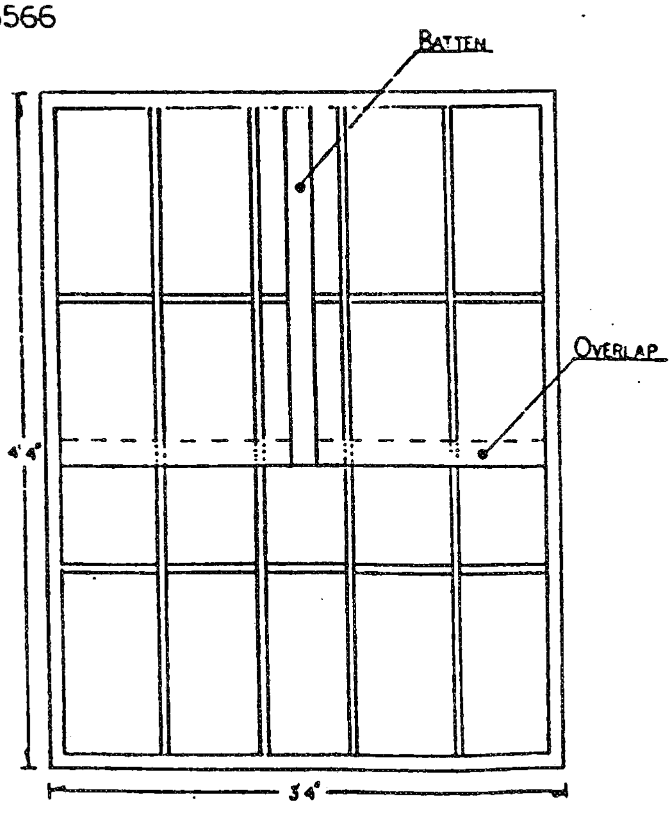
KALWALL
ATI-6566

FIGURE # 1



TYPICAL TEST PANELS