

**ROANE COUNTY BOARD OF EDUCATION  
ROANE COUNTY, WEST VIRGINIA**

**SAFE SCHOOL ENTRANCE AND ROOF REPAIR AND REPLACEMENT FOR  
SPENCER MIDDLE SCHOOL**

**ADDENDUM #1**

**NOVEMBER 18, 2021**

**THRASHER PROJECT #060-0989**

TO WHOM IT MAY CONCERN:

A Pre-Bid Conference was held on Thursday November 18, 2021 on the above-referenced project, a copy of the sign in sheet is included in this Addendum. The following are clarifications and responses to questions posed by contractors for the above reference project.

**A. GENERAL**

1. **THE BID FORM HAS BEEN REVISED. YOU MUST USE THE REVISED BID FORM WHEN PREPARING YOUR BID PACKAGE FOR THIS PROJECT.**
2. Bid Bond Example BOR #2-3 has been added to this addendum.
3. BOR #5-6 has been added to this addendum.
4. Thrasher AIA A2017 Supplemental General Conditions has been added

**B. SPECIFICATIONS**

1. Specification Section #88000 has been revised

**C. DRAWINGS**

None

**D. QUESTIONS AND RESPONSES**

**QUESTION**

1. Are there B&O Taxes?

**RESPONSE**

Yes, B&O Taxes are required

**QUESTION**

2. Is a building permit required?

**RESPONSE**

3. Yes, a building permit is required.

**E. CLARIFICATIONS**

- 1. THE BID FORM HAS BEEN REVISED. YOU MUST USE THE REVISED BID FORM WHEN PREPARING YOUR BID PACKAGE FOR THIS PROJECT.**

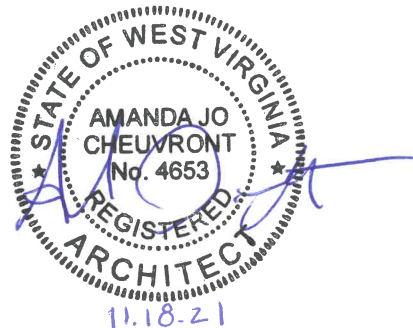
If you have any questions or comments, please feel free to contact me at your earliest convenience. As a reminder, bids will be received until 1:00 p.m. on Thursday, December 2, 2021, at The Thrasher Group, 160 Association Drive, Charleston, WV. Good luck to everyone and thank you for your interest in the project.

Sincerely,

THE THRASHER GROUP, INC.



Amanda Chevront, AIA, NCARB  
Project Manager



**ROANE COUNTY SCHOOLS  
ROANE COUNTY, WEST VIRGINIA  
SAFE SCHOOL ENTRANCE & ROOF REPAIR & REPLACEMENT FOR SPENCER MIDDLE SCHOOL  
THRASHER PROJECT #060-0989**

**MANDATORY PRE-BID CONFERENCE  
Thursday, November 18, 2021**

**Thrasher Project #060-0989**

Name	Representing	Phone #	Email Address
Greg Ashman	Neighborgall Construction Co.	(304) 525-5181	estimating@neighborgall.com
Ron Asher	S2F CONST	304) 532-6455 304) 741 6096	S2FCONSTRUCTION@YAHOO.COM
Justin Dozier	DANHILL CONSTRUCTION Co.	(304) 632-1600 (304) 632-1501 (Fax)	justin_dozier@yahoo.com
LEE MCLANAHAN	BEACON BUILDING PRODUCTS	304-638-7663	lee.mclanahan@becon.com
Glen Hutchman	OBRIEN CONST	304. 347. 8920	
Shelley Ordham	ABS Electric	304-372-6469	abs.electric.epa@gmail.com
Annika Chevront	Thrasher	304. 342. 7601	a Chevront@mcthrasher group.com
Richard Duncan	Roane Co. BOE	304 927 6400	rdduncan@k12.wv.us
Edgar Dodds	GRAE-COW	740-373-0849	ehergen@graecon.com



**CONTRACTOR:**  
(Name, legal status and address)

« »  
« »

**SURETY:**  
(Name, legal status and principal place of business)

« »  
« »

**OWNER:**  
(Name, legal status and address)

«Roane County Board of Education»  
«P.O. Box 609  
Spencer, WV 25276»

**BOND AMOUNT:** \$ « »

**PROJECT:**  
(Name, location or address, and Project number, if any)

«Safe Entrance & Roof Replacement for Spencer Middle School»  
«Spencer, WV»  
« »

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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Signed and sealed this « » day of « », « »

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Witness)

« »  
\_\_\_\_\_  
(Contractor as Principal) (Seal)

« »  
\_\_\_\_\_  
(Title)

« »  
\_\_\_\_\_  
(Surety) (Seal)

« »  
\_\_\_\_\_  
(Title)



WEST VIRGINIA CODE 21-1D-5 PROVIDES THAT AND SOLICITATIONS FOR A PUBLIC IMPROVEMENT CONSTRUCTION CONTRACT REQUIRES EACH VENDOR THAT SUBMITS A BID FOR THE WORK TO SUBMIT AT THE SAME TIME AN AFFIDAVIT OF COMPLIANCE WITH THE BID. THE ENCLOSED DRUG-FREE WORKPLACE AFFIDAVIT MUST BE SIGNED AND SUBMITTED IN THE FIRST ENVELOPE AS EVIDENCE OF THE VENDOR'S COMPLIANCE WITH THE PROVISIONS OF ARTICLE 1D, CHAPTER 21 OF THE WEST VIRGINIA CODE. FAILURE TO SUBMIT THE SIGNED DRUG-FREE WORKPLACE AFFIDAVIT IN THE FIRST ENVELOPE SHALL RESULT IN DISQUALIFICATION OF SUCH BID.



**State of West Virginia  
DRUG FREE WORKPLACE CONFORMANCE AFFIDAVIT  
West Virginia Code §21-1D-5**

**STATE OF WEST VIRGINIA,**

**COUNTY OF \_\_\_\_\_, TO-WIT:**

I, \_\_\_\_\_, after being first duly sworn, depose and state as follows:

1. I am an employee of \_\_\_\_\_; and,  
(Company Name)
2. I do hereby attest that \_\_\_\_\_  
(Company Name)

maintains a valid written drug free workplace policy and that such policy is in compliance with **West Virginia Code** §21-1D.

The above statements are sworn to under the penalty of perjury.

By: \_\_\_\_\_

Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Date: \_\_\_\_\_

Taken, subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

By Commission expires \_\_\_\_\_

(Seal)

\_\_\_\_\_  
(Notary Public)

**THIS AFFIDAVIT MUST BE SUBMITTED WITH THE BID IN ORDER TO COMPLY WITH WV CODE PROVISIONS. FAILURE TO INCLUDE THE AFFIDAVIT WITH THE BID SHALL RESULT IN DISQUALIFICATION OF THE BID.**



**ROANE COUNTY SCHOOLS  
ROANE COUNTY, WEST VIRGINIA  
FOR THE  
SAFE SCHOOL ENTRANCE & ROOF REPAIR AND REPLACEMENT FOR SPENCER  
MIDDLE SCHOOL  
PROJECT  
Thrasher Project #060-0989  
BID**

Proposal of \_\_\_\_\_  
(hereinafter called "BIDDER"), organized and existing under the laws of the State of \_\_\_\_\_  
doing business as \_\_\_\_\_ \*

To \_\_\_\_\_ (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for Safe School Entrance & Roof Repair and Replacement for Spencer Middle School in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within 90 calendar days. BIDDER further agrees to pay as liquidated damages, the sum of \$750.00 for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

\_\_\_\_\_

\_\_\_\_\_

\* Insert "a corporation", "a partnership", or "an individual" as applicable.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following lump sum:

**ROANE COUNTY SCHOOLS  
ROANE COUNTY, WEST VIRGINIA  
FOR THE  
SAFE SCHOOL ENTRANCE & ROOF REPAIR AND REPLACEMENT FOR SPENCER  
MIDDLE SCHOOL  
Thrasher Project #060-0989**

**BID SCHEDULE**

**BASE BID:**

*Provide all labor, materials, equipment, fees, bonds, insurance and taxes to perform the work as detailed in the plans and specifications and addenda.*

---

\_\_\_\_\_ Dollars (\$ \_\_\_\_\_)

(Amounts are to be shown in both words and figures. In case of discrepancy, the amount shown in words will govern.)

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**METHOD OF AWARD**

If at the time this contract is to be awarded, the lowest total bid submitted by a qualified, responsible Bidder does not exceed the amount of funds then estimated by the Owner, as available to finance the contract, the construction contract will be awarded. If such bids exceeds such amount, the owner may reject all bids.

SUBMITTED this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

By \_\_\_\_\_ (SEAL)  
(Company Name)

Doing business as \_\_\_\_\_

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No. \_\_\_\_\_

WV Contractor's License No. \_\_\_\_\_

Authorized Signature \_\_\_\_\_

**The Thrasher Group, Inc. Supplementary General Conditions  
to the**

**AIA Document A201-2017 General Conditions of the Contract for Construction**

The following supplements shall modify AIA Document A201-2017, "General Conditions of the Contract for Construction". Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

**GENERAL**

- A. Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known of the giver of the notice.
  
- B. The duties and obligations imposed by these General Conditions and Supplementary General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR and all of the rights and remedies available to OWNER and ARCHITECT thereunder, shall be in addition to, and shall not be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by law or contract, by special warranty or guarantee or by other provisions of the Contract Documents. The provisions of this paragraph shall be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. All representations and warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of this Agreement.

**ARTICLE 2 OWNER**

§2.2 delete *section 2.2.6 and substitute the following:*

“§2.2.6 The Owner will furnish the Contractor an electronic copy of the Contract Documents.”

**ARTICLE 3 CONTRACTOR**

§3.2 *add following:*

“§3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluation and responding to the Contractor’s requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.”

**§3.4 LABOR AND MATERIALS**

3.4.2 *add the following:*

“§3.4.2.1 After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications).

§3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor’s proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.”

### **§3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

#### **3.12** *add the following:*

“§3.12.11 The Architect’s review of Contractor’s submittals will be limited to examination of an initial submittal and two (2) resubmittals. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.”

### **ARTICLE 4 ARCHITECTS**

#### **§4.2** *add the following:*

“§4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.”

### **ARTICLE 7 CHANGES IN THE WORK**

#### **§7.1 GENERAL** *add the following:*

“§7.1.4 The combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor’s own forces, fifteen percent (15%) of the cost.
- .2 For the Contractor, for Work performed by the Contractor’s Subcontractors, eight percent (8%) of the amount due the Subcontractors.
- .3 For each Subcontractor involved, for Work performed by that Subcontractor’s own forces, fifteen percent (15%) of the cost.
- .4 For each Subcontractor involved, for Work performed by the Subcontractor’s Subcontractors, eight percent (8%) of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7.
- .6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall be itemized also.”

### **ARTICLE 9 PAYMENTS AND COMPLETION**

#### **§9.3 APPLICATIONS FOR PAYMENT** *add the following sentence to Section 9.3.1:*

“The form of Application for Payment, duly notarized, shall be a current authorized edition of AIA Document G702-1992, Application and Certificate for Payment, supported by a current authorized edition of AIA Document G703-1992, Continuation Sheet.”

#### **§9.8 SUBSTANTIAL COMPLETION** *add the following to section 9.8.3:*

“§9.8.3.1 The Architect will perform no more than three (3) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.”

#### **§9.10 FINAL COMPLETION AND FINAL PAYMENT** *add the following to section 9.10.1:*

“§9.10.1.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.”

**ARTICLE 11 INSURANCE AND BONDS**

**§11.1.2 CONTRACTORS LIABILITY INSURANCE** *add the following:*

A. The limits of liability for the liability insurance required by Paragraph 11.1.1 of the General Conditions shall provide coverages for not less than the following amounts or greater where required by law or regulations and the coverages under Paragraphs 11.1.1 shall be as follows:

(1) Workers' Compensation

- |    |   |              |
|----|---|--------------|
| a. | State:                                    | Statutory    |
| b. | Applicable Federal (e.g. Longshoremen's): | Statutory    |
| c. | Employer's Liability:                     | \$ 1,000,000 |

(2) Comprehensive or Commercial General Liability (including Premises Operations; Independent CONTRACTORS' Protection; Products Liability – Completed Operations; Broad Form Property Damage):

- |    |   |              |
|----|---|--------------|
| a. | General Aggregate   | \$ 2,000,000 |
| b. | Products - Completed Operations Aggregate   | \$ 2,000,000 |
| c. | Personal/Advertising Injury (Per Person/Organization)   | \$ 1,000,000 |
| d. | Each Occurrence (Bodily Injury & Property Damage)   | \$ 1,000,000 |
| e. | Limit per Person Medical Expense  | \$ 5,000     |
| f. | Personal Injury Liability Coverage will include claims arising out of Employment  |              |
| g. | Exclusions of Property in CONTRACTOR'S Care, Custody or Control will <u>not</u> be eliminated and will include West Virginia Stop Gap Liability |              |
| h. | Property Damage Liability Insurance will provide coverage for Explosion, Collapse & Underground Damage  |              |

(3) Comprehensive Automobile Liability

- |    |   |
|----|---|
| a. | Property Damaged and Bodily Injury: The CONTRACTOR shall provide for a combined single limit of \$ 1,000,000 each, including hired and non-owned autos for Property Damage and for Bodily Injury. |
|----|---|

(4) Contractual Liability

- |    |  |              |
|----|--|--------------|
| a. | General Aggregate                                | \$ 2,000,000 |
| b. | Each Occurrence Bodily Injury & Property Damage) | \$ 1,000,000 |

(5) Additional insured, Liability coverage for the OWNER AND ARCHITECT, will be provided by a separate protective liability policy covering all parties issue by CONTRACTOR's general liability carrier subject to customary exclusions for professional liability.

(6) Excess liability coverage shall be supplied by the CONTRACTOR

- |    |                   |              |
|----|-------------------|--------------|
| a. | General Aggregate | \$ 1,000,000 |
| b. | Each Occurrence   | \$ 1,000,000 |

**§11.2.4 PROPERTY INSURANCE** *add the following:*

Property insurance to the full insurable value of above ground structures in accordance with Article 11.2 of the General Conditions will be provided by the CONTRACTOR and will be in the form of Completed Value. This insurance will be subject to a deductible amount of \$ 1,000.

**ARTICLE 15 CLAIMS AND DISPUTES**

**§15.4 ARBITRATION** *delete section 15.4 in its entirety and replace with the following:*

“Any unresolved disputes will be filed in the appropriate circuit court.”

## SECTION 088000 - GLAZING

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites, and storefront framing.
2. Glazing sealants and accessories.

#### 1.2 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.
- C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Preconstruction adhesion and compatibility test report.

#### 1.5 QUALITY ASSURANCE

- A. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

#### 1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

## 1.7 WARRANTY

- A. **Manufacturer's Special Warranty for Coated-Glass Products:** Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

- B. **Manufacturer's Special Warranty for Laminated Glass:** Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

- C. **Manufacturer's Special Warranty for Insulating Glass:** Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AGC Glass Company North America, Inc.
2. Cardinal Glass Industries.
3. Cristacurva.
4. Dlubak Corporation.
5. Gardner Glass, Inc.
6. GGI; General Glass International.
7. Glasswerks LA, Inc.
8. GTI; Glaz-Tech Industries.
9. Guardian Glass;
10. SunGuard. Hartung Glass



11. JE Berkowitz, LP.
12. Northwestern Industries, Inc.
13. Oldcastle BuildingEnvelope™.
14. Pilkington North America.
15. Schott North America, Inc.
16. Tecnoglass.
17. Trulite Glass & Aluminum Solutions, LLC.
18. Vetrotech Saint-Gobain.
19. Viracon, Inc.
20. Vitro Architectural Glass.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E1300.
  1. Design Wind Pressures: As indicated on Drawings.
  2. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
  3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- B. Windborne-Debris Impact Resistance: Exterior glazing shall pass ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996 for Wind Zone 3 for protection.
  1. Large-Missile Test: For glazing located within 30 feet (9.1 m) of grade.
  2. Small-Missile Test: For glazing located between 30 feet (9.1 m) and 60 feet (18.3 m) above grade.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
  2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
  3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
  4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.
- B. Ultraclear Float Glass: ASTM C1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent and solar heat gain coefficient of not less than 0.87.
- C. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.
- D. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
- E. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

## 2.5 LAMINATED GLASS

- A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
  1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written instructions.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
  3. Interlayer Color: Clear unless otherwise indicated.
- B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with one of the following to comply with interlayer manufacturer's written instructions:
1. Polyvinyl butyral interlayer.
  2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
  3. Ionomeric polymer interlayer.
  4. Cast-in-place and cured-transparent-resin interlayer.
  5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

## 2.6 INSULATING GLASS

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.
1. Sealing System: Dual seals.
  2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Technoform Glass Insulation NA, Inc.
      - 2) Thermix; a brand of Ensinger USA.

## 2.7 GLAZING SEALANTS

- A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Dow Corning Corporation.
- b. GE Construction Sealants; Momentive Performance Materials Inc.
- c. May National Associates, Inc.; a subsidiary of Sika Corporation.
- d. Pecora Corporation.
- e. Sika Corporation.
- f. Tremco Incorporated.

## 2.8 SPALL-RESISTANT FILM

- A. Spall-Resistant Film: Composite of clear polyvinyl butyral film and clear abrasion-resistant polyester film.
- B. Laminating Process: Factory laminate spall-resistant film to glazing assemblies to produce laminated lites free of foreign substances, air, and glass pockets.

## 2.9 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
  1. AAMA 804.3 tape, where indicated.
  2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.10 MISCELLANEOUS GLAZING MATERIALS

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks:
  1. Type recommended by sealant or glass manufacturer.
- C. Spacers:
  1. Type recommended by sealant or glass manufacturer.
- D. Edge Blocks:
  1. Type recommended by sealant or glass manufacturer.

- E. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

### PART 3 - EXECUTION

#### 3.1 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

#### 3.2 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Apply heel bead of elastomeric sealant.

- F. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.3 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.4 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.5 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry

surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

### 3.6 LAMINATED GLASS SCHEDULE

- A. Glass Type GL-#1: Clear laminated glass with two plies of fully tempered float glass.
1. Minimum Thickness of Each Glass Ply: 6 mm.
  2. Interlayer Thickness: 0.060 inch.
  3. Safety glazing required.

### 3.7 INSULATING-LAMINATED-GLASS SCHEDULE

- A. Glass Type GL-#2: Low-E-coated, tinted, insulating laminated glass.
1. Overall Unit Thickness: 1 inch.
  2. Minimum Thickness of Outdoor Lite: 6 mm.
  3. Outdoor Lite: Tinted fully tempered float glass.
  4. Tint Color: Gray.
  5. Interspace Content: Air.
  6. Indoor Lite: Clear laminated glass with two plies of fully tempered float glass.
    - a. Minimum Thickness of Each Glass Ply: 6 mm.
    - b. Interlayer Thickness: 0.060 inch.
  7. Low-E Coating: Pyrolytic or sputtered on second or third surface.
  8. Safety glazing required.

END OF SECTION 088000

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