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**SECTION 00 0115
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FURTHER DRAWINGS, IF REQUIRED IN EXPLANATION OF THE WORK, SHALL BE BINDING UPON THE CONTRACTOR AS PART OF THESE DRAWINGS. DRAWINGS AND SPECIFICATIONS SHALL BE CONSIDERED COMPLIMENTARY SO THAT ANYTHING SHOWN UPON ONE, OR DESCRIBED BY THE OTHER, OR IMPLIED BY EITHER OR BOTH, SHALL BE EXECUTED AND PERFORMED AS IF SHOWN AND/OR DESCRIBED BY BOTH.

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**SECTION 01 2200
UNIT PRICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. List of unit prices, for use in preparing Bids.
- B. Measurement and payment criteria applicable to Work performed under a unit price payment method.
- C. Defect assessment and non-payment for rejected work.

1.02 COSTS INCLUDED

- A. The Unit Prices established on the Bid Form will be used to adjust the contract sum in case a quantity is different from that shown on the drawings or if unforeseen conditions occur.
- B. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.
- B. Take all measurements and compute quantities. Measurements and quantities will be verified by Gardner Spencer Smith Tench and Jarbeau, PC.
- C. Assist by providing necessary equipment, workers, and survey personnel as required.
- D. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- E. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- F. Measurement by Area: Measured by square dimension using mean length and width or radius.
- G. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.
- H. Perform surveys required to determine quantities, including control surveys to establish measurement reference lines. Notify Gardner Spencer Smith Tench and Jarbeau, PC prior to starting work.
- I. Contractor's Engineer Responsibilities: Sign surveyor's field notes or keep duplicate field notes, calculate and certify quantities for payment purposes.

1.05 PAYMENT

- A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Gardner Spencer Smith Tench and Jarbeau, PC, multiplied by the unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.
 - 4. Products placed beyond the lines and levels of the required Work.
 - 5. Products remaining on hand after completion of the Work.

6. Loading, hauling, and disposing of rejected Products.

1.06 DEFECT ASSESSMENT

- A. Replace Work, or portions of the Work, not complying with specified requirements.
- B. If, in the opinion of Gardner Spencer Smith Tench and Jarbeau, PC, it is not practical to remove and replace the Work, Gardner Spencer Smith Tench and Jarbeau, PC will direct one of the following remedies:
 - 1. The defective Work may remain, but the unit price will be adjusted to a new unit price at the discretion of Gardner Spencer Smith Tench and Jarbeau, PC.
 - 2. The defective Work will be partially repaired to the instructions of the Gardner Spencer Smith Tench and Jarbeau, PC, and the unit price will be adjusted to a new unit price at the discretion of Gardner Spencer Smith Tench and Jarbeau, PC.
- C. The individual specification sections may modify these options or may identify a specific formula or percentage price reduction.
- D. The authority of Gardner Spencer Smith Tench and Jarbeau, PC to assess the defect and identify payment adjustment is final.

1.07 SCHEDULE OF UNIT PRICES

- A. Item: Unsuitable Soil Excavation.
 - 1. Provide cost per cubic yard for excavation of unsuitable soil.
- B. Item: Unsuitable Soil Haul-Off from Site.
 - 1. Provide cost per cubic yard for haul-off of unsuitable soil from the site.
- C. Item: Suitable Soil Haul-In to Site.
 - 1. Provide cost per cubic yard for haul-in of suitable soil to the site.
- D. Item: Compacting Fill.
 - 1. Provide cost per cubic yard for compacting suitable soil that replaced unsuitable soil.
- E. Item: Placement of Geotechnical Fabric.
 - 1. Provide cost per square yard for placement of geotechnical fabric.
- F. Item: Placement of #3 Stone.
 - 1. Provide cost per ton for placement of #3 stone.
- G. Item: Cut Grading and Haul-Off from Site.
 - 1. Provide cost per cubic yard for providing cut grading and haul-off from site.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 07 2250
NAILABLE BOARD INSULATION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rigid nailable roof and wall board insulation, including related installation accessories. To be substrate for siding and asphalt shingles over sloped metal deck roofs.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry.
- B. Section 07 3113 - Asphalt Shingles.

1.03 REFERENCE STANDARDS

- A. Applicable Standards:
 - 1. American Society for Testing and Materials (ASTM), standards as referenced herein.
 - 2. Factory Mutual Insurance Company. (FM):
 - a. "Wind Loads to Roof Systems and Roof Deck Securement," Loss Prevention Data Sheet 1-28, dated Revised September 2000.
 - b. "Above-Deck Roof Components," Loss Prevention Data Sheet 1-29, dated Revised September 2000.
 - c. "FM Approval Guide." 2005 Edition.
 - 3. National Roofing Contractors Association (NRCA), "The NRCA Roofing and Waterproofing Manual," Fifth Edition, 2001.
 - 4. Polyisocyanurate Insulation Manufacturers Association (PIMA), Technical Bulletin 101, "Roof Insulation Specimen Conditioning Procedure."
 - 5. Underwriters Laboratories, Inc. (UL).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's technical data and installation instructions for roof board insulation and accessory materials. Indicate specific insulation thickness required, material composition, venting provisions and compliance with specified thermal performance requirements. Include data for insulation fasteners indicating type and sizes required, corrosion-resistant coating and material specifications.
- C. Shop Drawings: Include roof plan showing layout of insulation boards and attachment methods to meet specified windstorm rating requirements. Indicate fastener types, sizes, spacings and patterns.
- D. Samples:
 - 1. Insulation board: Submit 1-ft. square size sample of roof insulation board indicating foam material and nailable surface.
 - 2. Fasteners: Submit three actual fasteners of type, size and length required for attachment of specified roof insulation board material.

1.06 QUALITY ASSURANCE

- A. Windstorm Rating: Provide materials and methods to achieve FM Class 1-90 windstorm resistance classification.
- B. Single Source Requirements: Roof insulation fasteners, shall be the product of the insulation board manufacturer or acceptable and approved in writing by insulation board manufacturer for the application specified.

- C. Pre-Roofing Conference: Prior to commencing roofing work, a pre-installation meeting will be held at the site to review the Work to be accomplished.
 - 1. The conference shall be attended by Contractor, Gardner Spencer Smith Tench and Jarbeau, PC, roofing subcontractor, roofing materials manufacturers' representatives and all other subcontractors having equipment penetrating roof or whose work involves access to the roof.
 - 2. Contractor shall notify Gardner Spencer Smith Tench and Jarbeau, PC at least seven days prior to time of conference.
 - 3. Contractor shall record minutes of the meeting and distribute to all attending parties. Meeting minutes shall be included with the project close-out documents at the end of the project.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation materials to site in manufacturer's original protective packaging with labels intact.
- B. Store materials in dry location, off ground on pallets and under protective breathable waterproof cover. Stack insulation flat when storing.
 - 1. Comply with manufacturer's directions for storage of materials. Cut slits in manufacturer's protective packaging to permit circulation before storing under cover.
 - 2. Protect materials from exposure to flame, sparks or other ignition sources.
 - 3. Store insulation away from direct exposure to sunlight. Weigh down stored materials to prevent from wind damage.
- C. Handle insulation with care when placing to prevent damage to edges and ends of board.

1.08 PROJECT CONDITIONS

- A. Environmental Requirements: Install insulation materials only when forecasted weather conditions are suitable and substrates are dry. Do not attempt to install roof insulation in inclement weather conditions or if forecasted to occur during installation.
- B. Sequencing and Scheduling:
 - 1. Schedule installation of roof insulation and roofing materials to occur after erection of metal roof decking to limit prolong exposure to the environment.
 - 2. Coordinate and sequence roof insulation installation with roofing application so as to minimize prolong exposure of uncovered surfaces to weather conditions.
 - 3. Coordinate construction of eave fascia to ensure that roof insulation board venting channels are not obstructed.
 - 4. Coordinate and sequence flashing and sheet metal work required to be installed over roof board insulation as specified in Shingle sections.

1.09 WARRANTY

- A. See Division 01 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 VENTILATED NAILABLE ROOF BOARD INSULATION

- A. Acceptable Products; subject to compliance with specified requirements:
 - 1. Hunter Panel; Product: Cool Vent Panel: www.hunterpanels.com.
 - 2. Atlas Roofing Corporation; Product: AC Foam CrossVent: www.atlasrwi.com.
 - 3. Cornell Corporation; Product: ThermalCal2 Nail Base: www.gaf.com.
- B. Characteristics: Composite roof board insulation composed of nailable wood sheathing attached to polyisocyanurate foam insulation.
 - 1. Nailing surface: Minimum 7/16-inch (11mm) thickness APA Rated Sheathing; engineered wood or plywood panels.
 - 2. Insulation material: Rigid, cellular polyisocyanurate foam thermal insulation boards complying with ASTM C1289, Type II, Class1, with non-asphaltic glass facers on each side of board.

- a. Compressive strength: 20 psi, minimum, when tested in accord with ASTM D1621-04a.
- b. Density: 2.0, pcf, nominal, when tested in accord with ASTM D1622-03.
3. Long Term Thermal Resistance (LTTR): Minimum R-5.7 per inch.
4. Fire hazard classification: Meeting Class 1 complying with FM 4450 standard.
5. Board Size: Manufacturer's standard 4'-0" by 8'-0" panels.
6. Edges: Square.
7. Overall R value of system: R-25.
8. Thickness: As indicated on drawings.

2.02 NAILABLE WALL BOARD INSULATION

- A. Acceptable Products; subject to compliance with specified requirements:
 1. Atlas Roofing Corporation; Product: Energy Shield Ply Pro: www.wall.atlasrwi.com.
 2. Cornell Corporation; Product: ThermalCal Nail Base: www.gaf.com.
 3. Hunter Panel; Product: XCI Ply (Class A): www.hunterpanels.com.
 4. Rmax, Inc.; Product: ECOMAXci FR Ply: www.rmax.com.
- B. Characteristics: Composite roof board insulation composed of nailable wood sheathing attached to polyisocyanurate foam insulation.
 1. Nailing surface: Minimum 5/8-inch (15.9mm) thickness APA Rated Sheathing; engineered wood or plywood panels.
 2. Insulation material: Rigid, cellular polyisocyanurate foam thermal insulation boards complying with ASTM C1289, Type II, Class 1, with non-asphaltic glass facers on each side of board.
 - a. Compressive strength: 20 psi, minimum, when tested in accord with ASTM D1621-04a.
 - b. Density: 2.0, pcf, nominal, when tested in accord with ASTM D1622-03.
 3. Long Term Thermal Resistance (LTTR): Minimum R-5.7 per inch.
 4. Fire hazard classification: Meeting Class 1 complying with FM 4450 standard.
 5. Board Size: Manufacturer's standard 4'-0" by 8'-0" panels.
 6. Edges: Square.
 7. Overall R value of the system: R-9.8 with continuous air/vapor barrier.
 8. Thickness: As indicated on drawings.

2.03 ACCESSORIES

- A. Insulation Fasteners: Type required by roof insulation manufacturer's product data and meeting specified requirements. Fasteners shall be low-profile large diameter head type eliminating the need for stress plates.
 1. Sealing Tape: Provide pressure sensitive tape of type recommended by weather resistant membrane manufacturer for sealing joints and penetrations.
 2. Corrosion resistance: Passing FM 4470 Corrosion Test, modified DIN 50018 standard, with a maximum of 15% red rust after 15 wet and dry acidic atmosphere cycles in Kesternich cabinet.
 3. Size: As recommended by manufacturer for board thickness required and specified windstorm rating.
 4. Wind uplift: Meeting FM Class 1-90 windstorm rating.

PART 3 EXECUTION

3.01 PREPARATION

- A. Examine surface condition of metal deck substrate and conditions under which roof insulation installation work is to be performed.
 1. Surfaces on which the roof insulation is to be applied shall be clean, smooth, free of sharp edges, voids, projections, loose and foreign material.
 2. Deck substrates shall be dry, sound and secured rigid to supporting structural framing members.

- B. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Prior to application of roof insulation materials, sweep roof deck, removing debris and foreign material.
- D. During installation work do not subject substrate to any concentrated loading exceeding design loads.

3.02 INSTALLATION

- A. Install insulation boards over metal decking in accordance with manufacturer's product data, final reviewed shop drawings and complying with FM 1-28 requirements to achieve specified windstorm classification.
- B. Install insulation with panel length parallel to eave.
- C. Install insulation boards with end joints staggered at least 2-ft. in successive panel rows and with venting channels aligned to provide uninterrupted air circulation.
 - 1. Butt edges with 1/8" gaps for expansion and contraction.
 - 2. Bear edges of insulation board on metal deck ribs.
 - 3. Position insulation boards so that panel joints do not align with joints in metal decking.
- D. Mechanically attach insulation panels to metal roof decking using specified mechanical fasteners to meet FM 1-90 windstorm classification. Attach panels in fastening patterns complying with windstorm classification requirements and manufacturer's recommendations.
- E. Do not leave installed insulation exposed to the weather. Cover with subsequent roofing materials following insulation installation.
- F. Seal exposed insulation edges at end of each work period. Remove edge seals when work resumes.
- G. Seal joints and penetrations through weather resistant membranes with tape and fasteners before installation of finish material.
- H. Ensure that weather resistant membranes are air tight, free from holes, tears, and punctures.
 - 1. Repair any tears or punctures in weather resistant membrane immediately before concealment by other work. Cover with weather resistant membrane tape or another layer of weather resistant membrane.
- I. Tape all window and door penetrations in accordance with manufacturer's instructions.

3.03 CLEANING

- A. Remove all equipment, trash, debris and materials remaining at the site left from roof insulation installation work.
- B. Clean roof insulation surfaces and leave in sound, dry condition for installation of roof covering materials.

3.04 PROTECTION

- A. Protect installed insulation from damages, inclement weather conditions and excessive roof traffic by use of protective covering during roofing installation work.
- B. Remove installed insulation that has become wet or damaged and replace with new solid and dry insulation material.

END OF SECTION

**SECTION 07 2610
WEATHER RESISTANT MEMBRANES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Weather resistant membranes for light commercial buildings.

1.02 RELATED SECTIONS

- A. Section 01 6000 - Product Requirements.
- B. Section 09 2116 - Gypsum Board Assemblies.
- C. Section 07 4646 - Fiber-Cement Siding.

1.03 REFERENCES

- A. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 1998.
- B. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- C. ASTM E 1677 - Standard Specification for an Air Barrier (AB) Material or System for Low-Rise Framed Building Walls; 2005.

1.04 SUBMITTALS

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but not be limited to, specifications, installation instructions, and general recommendations from the manufacturer for types of products required.
- C. Test Results: Submit copies of test results showing performance characteristics equaling or exceeding those specified.
- D. Shop Drawings: Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer's standard product data.
 - 1. Submit manufacturer's installation instructions.
- E. Qualification Data: Submit qualification data for firms and persons specified in Quality Assurance Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names of architects and owners, and other information specified.

1.05 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of weather resistant membranes of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of five years.
 - 2. Installer Qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing weather resistant membranes similar in type and scope that required for this Project.
- B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

1.06 DELIVERY STORAGE AND HANDLING

- A. Deliver materials to Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.
- B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of design: DuPont Company; Wilmington, DE; ASD.; Product; Tyvek CommercialWrap: www.tyvek.com.
 - 2. National Shelter Products, Inc; Product; DRYline W: www.drylinewrap.com.
 - 3. Pactiv Corp.; Product; GreenGuard C2000 Building Wrap: www.green-guard.com.
 - 4. Substitutions: See Division 01 - Product Requirements.
- B. Provide all weather resistant membranes from a single manufacturer.

2.02 MATERIALS

- A. Classification: ASTM E 1677, Type I; air leakage at 25 mph wind pressure less than 0.06 cubic feet per minute per square foot.
- B. Water Vapor Transmission: Greater than 20 perms, when tested in accordance with ASTM E 96 Procedure B.
- C. Water Penetration Resistance: Minimum 78.7 inches per AATCC Test Method 127.
- D. Sealing Tape: Provide pressure sensitive tape of type recommended by weather resistant membrane manufacturer for sealing joints and penetrations.
- E. Fasteners:
 - 1. Steel Framing: Rust-resistant screws with washers.
 - 2. Masonry: Polyurethane or elastomeric adhesives.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to Heard County Commissioner's Office and Gardner Spencer Smith Tench and Jarbeau, PC, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.
 - 1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the installer.

3.02 PREPARATION

- A. Surface Preparation: Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of weather resistant membranes. Protect adjacent surfaces. Clean and prepare surfaces in accordance with manufacturer's written instructions.

3.03 INSTALLATION

- A. Install weather resistant membranes in accordance with manufacturer's instructions over exterior sheathing.
 - 1. Install under foam board of exterior insulation and finish system.
- B. Seal joints and penetrations through weather resistant membranes with tape and fasteners before installation of finish material.
- C. Ensure that weather resistant membranes are air tight, free from holes, tears, and punctures.
 - 1. Repair any tears or punctures in weather resistant membrane immediately before concealment by other work. Cover with weather resistant membrane tape or another layer of weather resistant membrane.
- D. Tape all window and door penetrations in accordance with manufacturer's instructions.

3.04 PROTECTION

- A. Provide final protection and maintain conditions in a manner acceptable to Installer, that shall ensure that the weather resistant membranes shall be without damage at time of substantial Completion.

END OF SECTION

**SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Perimeter sealant.

1.02 RELATED REQUIREMENTS

- A. Section 02 4300 - Miscellaneous Work.
- B. Division 05: Structural Steel.
- C. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- D. Section 07 2610 - Weather Resistant Membranes: Sealing framing to weather barrier installed on adjacent construction.
- E. Section 07 9005 - Joint Sealers: Sealing joints between frames and adjacent construction.
- F. Section 07 9005 - Joint Sealers: Perimeter sealant and back-up materials.
- G. Section 08 7100 - Door Hardware: Hardware items other than specified in this section.
- H. Section 08 8000 - Glazing: Glass and glazing accessories.
- I. Section 09 9000 - Painting and Coating: Field painting.
- J. Section 10 2810 - Toilet Accessories: Attachments to framing members.
- K. Section 12 2113 - Horizontal Louver Blinds: Attachments to framing members.
- L. Division 26: Electrical.

1.03 REFERENCE STANDARDS

- A. AA DAF-45 - Designation System for Aluminum Finishes; The Aluminum Association, Inc.; 2003.
- B. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- C. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2013.
- H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 PERFORMANCE REQUIREMENTS

- A. Deflection in plane of wall: Not greater than that which would reduce glass edge clearance to 25 percent of design dimension or 1/8 inch, whichever is greater, or that which would reduce glass bite to 75 percent of design dimension.
 - 1. Design system to withstand 150 percent of design wind load with no failure or permanent deformation greater than 0.2 percent of span.
- B. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
 - 1. Structural loads.
 - 2. Thermal movements.
 - 3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
 - 4. Dimensional tolerances of building frame and other adjacent construction.
 - 5. Failure includes the following:
 - a. Deflection exceeding specified limits.
 - b. Thermal stresses transferred to building structure.
 - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
 - d. Glazing-to-glazing contact.
 - e. Noise or vibration created by wind and thermal and structural movements.
 - f. Loosening or weakening of fasteners, attachments, and other components.
 - g. Sealant failure.
 - h. Failure of operating units to function properly.
- C. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. Provide sealant that fails cohesive before sealant releases from substrate when tested for adhesive compatibility with each substrate and joint condition required.
 - 1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
 - 2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.
- D. Structural-Sealant Joints: Designed to produce tensile or shear stress in structural-sealant joints of less than 20 psi (138 kPa).
- E. Structural Performance: Completed systems shall withstand positive and negative wind pressure loading complying with governing authorities and particular code; loads acting perpendicular to wall plane. Test per ASTM E330, Procedure A.
 - 1. Design pressure loading:
 - a. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 - b. No glass breakage.
 - c. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
 - d. When tested at positive and negative wind-load design pressure, systems do not evidence deflection exceeding specified limits.

- e. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
 - f. Test Durations: As required by design wind velocity but not less than 10 seconds.
- F. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss. Submit certification to the below from a professional structural engineer licensed in Georgia to Gardner Spencer Smith Tench and Jarbeau, PC. for file.
- 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
 - 2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. Test High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Test Low Exterior Ambient-Air Temperature: 0 deg F.
 - c. Test Interior Ambient-Air Temperature: 75 degF.
- G. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at minimum static-air-pressure difference of 6.24 lbf/sq. ft..
- H. Water Penetration Under Static Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- I. Water Penetration Under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
- 1. Maximum Water Leakage: No uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.
- J. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.
- K. Average Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having average U-factor of not more than 0.69 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Substitutions: 01 6000 - Product Requirements.
- C. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
- D. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.

3. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.
- E. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- F. Samples: Submit two samples 6 x 6 inches in size illustrating finished aluminum surface, glass, glazing materials.
- G. Fabrication Sample: Of each vertical-to-horizontal intersection of systems, made from 12-inch lengths of full-size components and showing details of the following:
 1. Joinery.
 2. Sealant adhesion.
 3. Anchorage.
 4. Expansion provisions.
 5. Glazing.
 6. Flashing and drainage.
- H. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- I. Qualification Data: For Installer.
- J. Field quality-control test and inspection reports.
- K. Maintenance Data: For aluminum-formed systems to include in maintenance manuals.
- L. Glass manufacturer's approval: Indicate on shop drawings, or by letter prior to submission of shop drawings, that selected glass manufacturer's have reviewed and approved details, including glass bite, clearances, system weepage, air circulation around interior window treatments, shading by exterior building components and glazing methods.
- M. Warranty: Submit manufacturer warranty and ensure forms have been completed in Heard County Commissioner's Office's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

- A. Single Source Requirements: Entrances and storefront systems shall be products of a single manufacturer or acceptable to storefront manufacturer. Storefront framing system receiving window unit installation shall be acceptable to aluminum window manufacturer.
- B. Installer Qualifications: Capable of assuming engineering responsibilities and performing work of this Section and who is acceptable to manufacturer with minimum three years of documented experience.
 1. Engineering Responsibility: Preparation of data for aluminum-framed systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project and submission of reports of tests performed on manufacturer's standard assemblies.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
 1. Do not modify intended aesthetic effects, as judged solely by Gardner Spencer Smith Tench and Jarbeau, PC, except with Gardner Spencer Smith Tench and Jarbeau, PC's approval. If modifications are proposed, submit comprehensive explanatory data to Gardner Spencer Smith Tench and Jarbeau, PC for review.
- D. Accessible Entrances: Comply with the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

- E. Structural-Sealant Glazing: Comply with recommendations in ASTM C 1401, "Guide for Structural Sealant Glazing."
- F. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

1.08 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 PROJECT CONDITIONS

- A. Coordinate the work with installation of firestopping components or materials.
- B. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on shop Drawings.

1.11 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.
- B. Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids and other harmful surfaces and from coreless handling, storage or machining.

1.12 WARRANTY

- A. Correct defective Work within a five year period after Date of Substantial Completion.
- B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Basis of design Metal-Framed Storefronts and Doors: Kawneer Company, Inc; Product Tri-Fab 451UT: www.kawneer.com.
 - 2. Basis of design Metal-Framed Doors: Kawneer Company, Inc; Product 500 tuffline door entrances: www.kawneer.com.
 - 3. EFCO Corp.: www.efcocorp.com.
 - 4. Special-Lite, Inc: www.special-lite.com.
 - 5. TRACO: www.traco.com.
 - 6. Tubelite, Inc.: www.tubeliteinc.com.
 - 7. United States Aluminum: www.usalum.com.
 - 8. YKK Corp.: www.ykk.com.
 - 9. Wausau Window and Wall Systems: www.wausauwindow.com.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Metal-Framed Storefront System Framing Characteristics:
 - a. Member sizes: 2" wide by minimum 4-1/2" deep.

- b. Construction: Flush glazed two-piece mullion & stop system for inside glazing.
 - c. System construction: Screw spline two-piece snap together, or shear block tubular mullion.
 - d. Glazing pocket depth: As required by glass manufacturer.
 - e. Make provisions in framing for minimum edge clearance, nominal edge cover, and nominal pocket width for thickness and type of glazing.
 - f. Design framing for panel removal from interior.
 - g. Provide all required subframing, blocking, shims, and other items necessary for complete installation. Subframes and reinforcing members shall be of carbon steel with shop applied protective coating.
2. Finish: Class I natural anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.

2.03 COMPONENTS

- A. Sill flashing: Provide special shaped sill flashing at all exterior storefronts. Sill flashing shall match storefronts in material and finish. Sill flashing shall be continuous, set in storefront sealant and joints sealed as herein specified; form endams at terminations and corners.
- B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.

2.04 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
- B. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 2. Extruded Structural Pipe and Tubes: ASTM B 429.
 3. Structural Profiles: ASTM B 308/ B 308B.
- C. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
 1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.05 FRAMING SYSTEMS

- A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.
 1. Construction: Framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by an elastomeric material of low thermal conductance.
- B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with non-staining, nonferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonbleeding fasteners and accessories compatible with adjacent materials.
 1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
 2. Reinforce members as required to receive fasteners threads.
 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

- D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/ A 153M requirements.
- E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.
- F. Sill Flashing: Formed of minimum 0.062" thickness aluminum; matching storefront framing of type with interior end and rear legs turned up minimum 1/2" against framing member to form watertight gutter. Seal all aluminum to aluminum laps with sealant.
- G. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.
- H. Design framing for panel removal from interior.
- I. Trim and Closures: Provide exterior and interior trim and closure components in materials and finishes matching storefront framing for complete installation. Trim components shall be attached without use of exposed fasteners.

2.06 GLAZING SYSTEMS

- A. Glazing: As specified in Section 08 8000 - Glazing.
- B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, mold or extruded, that maintain uniform pressure and watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealant will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type and as follows:
 - 1. Structural Sealant: ASTM C 1184, neutral-curing silicone formulation compatible with system components with which it comes in contact, specifically formatted and tested for use as structural sealant, and approved by structural-sealant manufacturer for use in aluminum-framed systems indicated.
 - a. Color: Gardner Spencer Smith Tench and Jarbeau, PC to select from manufacturer's full range.
 - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; neutral-curing silicone formulation compatible with structural sealant and other systems components with which it comes in contact; and recommended by structural- and weatherseal-sealant and aluminum-framed system manufacturers for this use.
 - a. Color: As selected by Gardner Spencer Smith Tench and Jarbeau, PC from manufacturer's full range.

2.07 DOORS

- A. Doors: Manufacturer's standard glazed doors, for manual swing operation.
 - 1. Door Construction: 1-3/4 inch overall thickness, with minimum 0.125 inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
 - 2. Door Design: Wide stile; 5 inch nominal width.
 - a. Accessible Doors: Smooth surface for width of door in area within 10 inches above floor or ground plane.
 - 3. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
 - a. Provide nonremovable glazing stops on outside of door.
- B. Door Hardware: As specified in Division 08 Section "Door Hardware."

2.08 ACCESSORY MATERIALS

- A. Insulating Materials: As specified at perimeter of aluminum-framed systems, as specified in Section 07 2100 - Thermal Insulation.
- B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Section 07 9005 - Joint Sealers.
 - 1. Storefront sealant shall be non-skinning type meeting AAMA 800-86.
- C. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos formulated for 30-mil thickness per coat.
- D. Framing Anchors: Series 300 stainless steel, sizes as required to be structurally adequate to carry dead load, accommodate thermal movement, resist wind load specified herein, and withstand normal loads imposed by entry door operation.
- E. Exposed-to-View Fasteners: Series 300 stainless steel or hardened aluminum flat-head, phillips head type in finish to match framing members.

2.09 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Perimeter Sealant: Type as specified in Section 07 9005 - Joint Sealers.
- D. Glass in Storefront System: As specified in Section 08 8000 - Glazing and as noted on the drawings.
- E. Glass in Doors: Tempered and as specified in Section 08 8000 - Glazing and as noted on the drawings.
- F. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- G. Glazing Accessories: As specified in Section 08 8000 - Glazing.

2.10 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M10C22A31 Clear anodic coating not less than 0.7 mils thick.
 - 1. Color and Gloss: As selected by Gardner Spencer Smith Tench and Jarbeau, PC from manufacturer's full range.
 - 2. All framing members shall be in the uniform color range of manufacturer's standard finish range, and the colors of all framing members within the same unit shall be identical. The fabricator shall carefully select framing materials from the manufacturer to comply with this criterion.
 - 3. Unexposed aluminum components: Mill finish.
- D. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.11 FABRICATION

- A. Reinforce components internally for door hardware and door operators.
 - 1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- B. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
 - 4. Physical and thermal isolation of glazing edge clearances.
 - 5. Provision for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricated for flush glazing (without projecting stops).
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device (dutchman) to retain glazing in place while structural sealant cures.
- F. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- H. Form aluminum shapes before finishing.

2.12 SOURCE QUALITY CONTROL

- A. Structural-Sealant-Glazed Systems: Perform quality-control procedures complying with ASTM C 1401 recommendations including but not limited to, system material qualification procedures, sealant testing, and system fabrication reviews and checks.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify dimensions, tolerances, and method of attachment with other work.
- C. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Inserts and Anchorage:
 - 1. Furnish inserts and anchoring devices, which must be present in concrete on timely basis to avoid delay in the work. Set at locations indicated on approved shop drawings.
 - 2. Coordinate setting drawings, diagrams, templates and instructions for installation of concrete inserts, anchor bolts and miscellaneous items having integral anchors cast in concrete construction.
- B. Anchor Locations: Verify location and alignment of preset anchors. Report deviations and proposed method for correction to Gardner Spencer Smith Tench and Jarbeau, PC prior to proceeding with installation.

3.03 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.

- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
- I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- J. Protect aluminum in contact with masonry, steel, concrete or other dissimilar material from contact by neoprene gaskets or bituminous coating.
- K. Install sill flashing at all exterior storefronts in accordance with written recommendations. Flashing shall extend continuous with joints lapped and sealed; set in full continuous bed of storefront sealant. Where possible, secure sill flashing at ends, otherwise, seal all penetrations through flashing.
- L. Locate expansion mullions in accordance with manufacturer's recommendation, as indicated on approved shop drawings.
- M. Install weep hole baffle with filter at weep holes. Install filter under 30% compression.
- N. Verify during installation that storefront system allows water which enters the system to be collected in gutters and weeped to exterior. Ascertain that weep holes are open and that metal to metal joints are sealed.
- O. Set thresholds in bed of sealant and secure.
- P. Install hardware using templates provided.
- Q. See Section 08 7100 - Door Hardware for hardware installation requirements.
- R. Install glass and infill panels in accordance with Section 08 8000 - Glazing, using glazing method required to achieve performance criteria.
- S. Install perimeter sealant in accordance with Section 07 9005 - Joint Sealers.
- T. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.
 - 1. Caulk metal-to-metal internal storefront joints using storefront sealant.
 - 2. Caulk perimeter of storefronts using medium modulus silicone sealant. Caulk both exterior and interior faces of storefront perimeter.

3.04 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:
 - 1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
 - 2. Alignment:
 - a. Where surfaces abut in line, limit offset from true alignment to 1/6 inch.
 - b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.
 - 3. Diagonal Measurements: Limit differences between diagonal measurement to 1/8 inch.

3.05 FIELD QUALITY CONTROL

- A. Basis of Design: Trulite Glass & Aluminum Solutions, LLC; 351 Series.
- B. Test installed storefront for water leakage in accordance with AAMA 501.2 hose test.
- C. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

- D. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take results for previously completed areas show compliance with requirements.
 - 1. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- E. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.06 ADJUSTING

- A. Adjust operating hardware and sash for smooth operation.
- B. Entrances: Adjust operating hardware for smooth operation according to hardware manufacturer's written instructions.
- C. For doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

3.07 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Remove excess sealant by method acceptable to sealant manufacturer.

3.08 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

**SECTION 08 8000
GLAZING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.02 RELATED SECTIONS

- A. Section 02 4300 - Miscellaneous Work.
- B. Section 07 2100 - Thermal Insulation: Insulation fill around window units.
- C. Section 07 9005 - Joint Sealers: Sealant and back-up material.
- D. Section 08 1416 - Flush Wood Doors: Glazed doors.
- E. Section 08 4313 - Aluminum-Framed Storefronts.

1.03 REFERENCES

- A. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2004.
- B. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 1999 (Reapproved 2005).
- C. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2005.
- D. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.
- E. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.
- F. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; Sealed Insulating Glass Manufacturers Association; 2004.

1.04 PERFORMANCE REQUIREMENTS

- A. Wind Loads: Comply with wind load criteria specified in Metal-Framed Storefronts section.
- B. Thermal Insulating Units: Units shall comply with the requirements of ASTM E774-97 and be certified by Associated Laboratories, Inc., (ALI) or insulating Glass Certification Council (IGCC) for Class A.
- C. Tinted Glass Types: Whether used in a monolithic state or as a lite of thermal insulating unit, shall each be the product of a single manufacturer.
 - 1. Basis of Color Design:
 - a. PPG Solarban 60 on clear Low-E (3) Solargray Tinted or equal.
 - b. Minimum 1/4" thickness except as otherwise indicated.
 - c. Visible light transmittance for insulated unit: 35%.
 - d. Thermal transmittance ("U" value) winter, night for insulated unit: 0.29.
 - e. Thermal transmittance ("U" value) summer, day for insulated unit: 0.27.
 - f. Shading coefficient for insulated unit: 0.33.
- D. Glazing Materials: Whether in a monolithic state or as a lite of a thermal insulating unit, shall be heat treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing.
- E. For heat-treated glass, orient lites with roll distortion parallel to head and sill members.
- F. Tempered and laminated glazing materials shall comply with CPSC 16-CFR, Part 1201, Category II.

- G. Tinted and spandrel glass types, whether used in a monolithic state or as a lite of a thermal insulating unit, shall each be the product of a single manufacturer.

1.05 SUBMITTALS

- A. See Division 01 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements. Include technical data, storage and handling procedures and performance characteristics.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples 12 x 12 inch in size of glass units, showing coloration and design.
- E. Certificates: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Certificate: Certify that sealed insulated glass meets or exceeds specified requirements.
- G. Framing Manufacturer's Approval: Prior to submission of shop drawings, indicate by letter that an authorized representative of hollow metal frames and metal-framed storefront framing manufacturer has reviewed and approved details, including glass bite, clearances and glazing methods.
- H. Calculations: Submit for Gardner Spencer Smith Tench and Jarbeau, PC's information only. Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building components or wind loading. Identify factors affecting breakage probability which have been taken into consideration and breakage probability anticipated by calculations.
- I. Maintenance Data: Submit glazing material manufacturer's maintenance data for cleaning and care of each type of glazing material.

1.06 QUALITY ASSURANCE

- A. Labeling: Label each piece of glass and glazing and mirrors with manufacturer's name, and the grade or quality of the material. Labels shall be intact before and after installation.
 - 1. Glazing shall bear manufacturer's label identifying type, quality and thickness of material. Labels for single thickness annealed float glass, if not available on each lite shall at least be factory applied to shipping crates. All other glazing materials shall be required to bear labels on each lite either temporary or permanent types as required by governing building codes or certification agency where specified.
 - 2. Tempered glass shall have permanent etched or ceramic fired identification on each unit indicating compliance with safety glazing standard. Identification shall be visible in completed installation and oriented in an inconspicuous corner.
- B. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum ten years documented experience.

1.07 MOCK-UP

- A. See Section 01 4000 - Quality Requirements, for additional mock-up requirements.
- B. Construct a masonry wall as part of the brick mock-up panel. See Section 04 2100 - Brick Masonry for related items to be installed and coordinated.
- C. Locate where directed.

1.08 PRE-INSTALLATION MEETING

- A. Convene one week before starting work of this section.

- B. Contractor, Gardner Spencer Smith Tench and Jarbeau, PC, storefront supplier and erector, a representative of glass manufacturer, a representative of sealant manufacturer and glazing subcontractor will be present.
- C. Material submitted by Contractor, interfacing of glass and glazing and window wall work, dimensions and tolerances, sealant joint widths and depths and butt joint glazing will be reviewed.

1.09 DELIVERY, STORAGE, AND PROTECTION

- A. Move no cases which have been partially unpacked. Unpack glazing materials in accord with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer's product data.
- B. Utilize rolling blocks to rotate glazing materials.
- C. Handle insulating units without rotating, warping or cartwheeling units. Prevent damage to glazing material or edge seal.

1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.11 WARRANTY

- A. See Division 01 - Closeout Submittals, for additional warranty requirements.
- B. Provide a ten (10) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
- C. Provide a ten (10) year warranty guaranteeing to correct failures in weathertightness signed by the installer and contractor. Failure is defined as water leakage through glazing assembly. Correction may include repair or replacement.
- D. Provide a ten (10) year warranty to cover silver spoilage in mirrors.
- E. Provide a two (2) year warranty to cover materials and labor to replace glazing damage for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of the Heard County Commissioner's Office's operations.
- F. All warranties shall commence on the Date of Substantial Completion of the Project.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND FABRICATORS

- A. To maximum extent possible, provide domestically manufactured and fabricated glass, and provide glass from one manufacturer.
- B. Types of glass specified or indicated shall be subject to compliance with specified requirements and manufactured or fabricated by one of the following:
 - 1. Basis of Design: Vitro Architectural Glass: www.vitroglasshub.com.
 - 2. ACH Glass/Versalux: www.versaluxglass.com
 - 3. AFG Industries, Inc: www.afgglass.com.
 - 4. Global Security Glazing: www.security-glazing.com.
 - 5. Pilkington North America: www.pilkington.com.
 - 6. Viracon, Inc: www.viracon.com.
- C. Substitutions: Refer to Division 01 - Product Requirements.

2.02 GLASS MATERIALS

- A. General: Conform to ASTM C 1036, ASTM C 1048 and to ANSI Z97.1. Label factory cut panes.
- B. Float Glass: Type I, (transparent glass flat), Class 1 (clear), Quality q3, (glazing select), minimum 1/4 inch thickness unless otherwise indicated or required.

- C. Tinted Float Glass: Type I, Class 2 (tinted heat absorbing and light reducing), quality q3, color as selected by Gardner Spencer Smith Tench and Jarbeau, PC, minimum 1/4 inch thickness unless otherwise indicated or required.
- D. Tempered Glass: Condition A, Type I or II, Class 1, Quality q3, Kind FT, match color of clear or tinted glass as applicable; fully thermal tempered, heat strengthening or chemical tempering is not permitted. Perform tempering by horizontal oscillating roller hearth or high speed roller hearth process. Do not permit fabrication processes leaving gripper or tong marks. Handle and size glass according to manufacturer's written instructions.
- E. Insulated Glass: Pre-assembled sealed lite units with dehydrated space between glass units, complying with ASTM E 774 for Class CBA units.
- F. Low Emissivity Glass (Low E Glass): Provide units with thin metallic high-transmittance coating applied to the number 3 surface of the unit, unless otherwise indicated. The U-value for the IGU shall be no greater than 0.29, unless otherwise indicated.
- G. Obscure Glass: Type II, Class 1, Form 3, Quality q7, patterned one side, pattern as indicated or selected.

2.03 GLASS SETTING MATERIALS

- A. Setting Blocks: ASTM C 864, channel shape; having 1/4 inch internal depth, Shore A hardness of 80 to 90 Durometer. Blocks shall be a minimum 2 inch long. Block width shall be approximately 1/16 inch less than the full width of the rabbet. Block thickness shall be at least 3/16 inch, sized for rabbet depth as required.
- B. Spacers: ASTM C 864, channel shape, with 1/4 inch internal depth, 3/32 inch flanges, web, 1/8 inch thick, one to 3 inches long. Spacers shall provide Shore A hardness of 40 to 50 Durometer.
- C. Vinyl Glazing Channels: Profile compatible with framing system and designed to accommodate glass of specified thickness, light gray in color. Provide for dry glazing aluminum frames where indicated or permitted.
- D. Glazing Tape: Poly-isobutylene based sealant tape, conforming to AAMA 804.1, with adhesive one side protected by temporary paper cover, Extru-Seal manufactured by Pecora Corp., No. 303 by Protective Treatments, Inc., or equal.
- E. Spring Steel Spacers: Galvanized steel wire or strip designed to position glazing in channel or rabbet sash with stops.
- F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbet sash without stops.
- G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond-shaped pieces, 1/4 inch minimum size.
- H. Glazing Sealants for Metal Sash: GE Silicones Silglaze II 2800, GE Silicones Silpruf, GE Silicones 1200 Silicone, and Dow Corning 999A. Polybutylene, oleoresinous, asphalt, and oil base sealants are not permitted. Provide sealant of same color as structural silicone sealant unless otherwise required.
- I. Glazing Compound for Wood Sash: Acrylic latex caulk by Tremco. Provide for bedding and caulking glass in wood frames.
- J. Glazing Compounds and Sealants for Thermoplastic: Provide silicone, butyl, or polysulfide glazing compound.
- K. Mirror Setting Materials: Manufactured by Palmer Products Corporation, or equal, for installation of mirrors, and as follows:
 - 1. Mirror backing paint: Mirro-Bac Paint, or equal, formulated to protect mirror silvering.
 - 2. Mirror bond coat: Mirro-Mastic Bond, or equal, formulated to isolate deleterious backing materials from mastic and mirror.

3. Mirror mastic: Mirro-Mastic, or equal, formulated for adhering mirrors and glass to substrates.

2.04 FLAT GLASS MATERIALS

- A. Clear Float Glass (Type G1): Clear, fully tempered for interior applications unless otherwise indicated.
 1. 1/4" thick complying with ASTM C1048-92. Glass for butt-joint glazing shall be free of tong marks and surface defects on exposed edges.

2.05 SEALED INSULATING GLASS MATERIALS

- A. Tinted Insulated Unit (Type IG1): Low-E Tinted Insulating Glass. Cool Gray color, low-reflective glass outdoor appearance. Fully tempered glass for both inboard and outboard lites in units designated with a "T" on the Drawings. Located at exterior locations unless otherwise indicated.
 1. Product: "Solarban" 60 + "Solargray" (2) Clear by Vitro Architectural Glass.
 2. Insulating Unit Construction: 1/4 inch (6mm) "Solargray" + "Solarban" 60 Solar Control Glass (2), + 1/2 inch (13mm) air space + 1/4 inch (6mm) Clear Float Glass.
 3. Total unit thickness of 1", minimum.
 4. Performance Values:
 - a. Visible Light Transmission – 35 percent.
 - b. SHGC – 0.25.
 - c. Shading Coefficient – 0.33.
 - d. Outdoor Visible Light Reflectance – 6 percent.
 - e. Heat Transfer Coefficient: U-Value Winter – 0.29, U-Value Summer – 0.24
 5. Spacers: Manufacturer's standard steel or aluminum spacer with welded, fused or bent corners and welded or fused splices and joints, filled with desiccant; hermetically sealed, dehydrated air space.

2.06 GLAZING COMPOUNDS

- A. Manufacturers:
 1. Dow Corning Corp; Product #795 Silicone Building Sealant: www.dowcorning.com.
 2. GE Silicones; Product Ultraglaz SSG4000: www.gesilicones.com.
 3. Tremco, Inc; Product Spectrem II: www.tremcosealants.com.
 4. Substitutions: Refer to Division 01 - Product Requirements.
- B. Silicone Sealant : Single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining; cured Shore A hardness of 15 to 25; color as selected.
- C. Provide primers as required by adhesion testing, backer rod and accessories acceptable to sealant manufacturer.

2.07 GLAZING ACCESSORIES

- A. Manufacturers:
 1. Pecora Corp: www.pecora.com.
 2. Saint-Gobain: www.plastics.saint-gobain.com.
 3. Tremco, Inc: www.tremcosealants.com.
 4. Substitutions: Refer to Division 01 - Product Requirements.
- B. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- C. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- D. Interior Hollow Metal Partition Glazing: Manufacturer's standard resilient glazing beads.

- E. Glazing Gaskets: Resilient polyvinyl chloride extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I; black color.
- F. Glazing Clips: Manufacturer's standard type.
- G. Muntin Spacer Bars: Manufacturer's rectangular aluminum spacer bars factory-installed within air space of sealed insulated glazing units, simulating divided lites in patterns indicated on drawings.
 - 1. Grille members shall be 5/8" face width by depth of air space in finish matching storefront system at locations coinciding with applied-on muntins.
- H. Glazing Gaskets for Metal Framed Skylights: Glazing assembly manufacturer's standard extruded or molded neoprene, Ethylene Propylene Diene Monomer (EPDM) or silicone rubber gaskets as required or recommended for system specified.
- I. Fire-Rated Glazing Accessories:
 - 1. Fire-Rated Glazing Frames: Fire-rated glazing manufacturer's fire tested frames used with glazing assemblies for required ratings. Furnish for installation in fire-rated doors and hollow metal work in wall openings as required by manufacturer's fire tested assemblies.
 - 2. Glazing Gaskets and Tapes: Closed cell polyvinyl chloride (PVC) foam tape, EPDM tape, ceramic glazing tape or other flame resistant gasket material as recommended by fire-rated glazing manufacturer and fire tested with glazing assemblies for specified ratings.
 - 3. Setting Blocks: Neoprene, EPDM or calcium silicate setting blocks as recommended by fire-rated glazing manufacturer and fire tested with glazing assemblies for specified ratings.
 - 4. Cleaners, Primers and Sealers: Types as recommended by glazing and gaskets manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.
- C. Verify compliance with the following requirements prior to beginning glazing work:
 - 1. That framing is anchored in position, plumb and square within 1/8" of normal dimensions indicated.
 - 2. That fastener heads, and other projections are removed from glazing rabbets.
 - 3. That corners and fabrication intersections are sealed and framing is weathertight.
 - 4. That rabbets at sills weep to outside and rabbets are sufficient depth and width to receive glazing material and provide the required bite of the glazing material.
 - 5. That surfaces to receive zipper type gaskets comply with tolerances required by gasket manufacturer.
 - 6. That hollow metal frames have received paint finish in accord with Painting section.

3.02 PERFORMANCE REQUIREMENTS

- A. Install glazing materials to obtain air-tight and water-tight installation and to withstand normal temperature changes and wind loads without failure.
- B. Protect glazing material faces and edges during handling and installation.
- C. Size glazing materials for each opening to ensure correct bite on glazing material, without imposing strain, in accordance with manufacturer's product data.
- D. Maintain minimum bed clearance between glazing material and sash of 1/8", both sides, except where greater clearances is required by either glazing material or framing manufacturer.

3.03 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.

- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.
- F. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.
- G. Tempered and insulating glass shall not be cut or otherwise altered in the field.

3.04 GLAZING PROCEDURES

- A. General: Install glazing materials in accordance with manufacturer's written product data and applicable standards, except where more stringent requirements are specified.
- B. Setting Blocks: Install setting blocks for all glazing materials over six square feet in area. Install at sill rabbet located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Size setting blocks in proportion to glass weight; minimum 4" in length.
- C. Shims: Shim all lites over 100 united inches, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming; unless otherwise specified.
- D. Edge Blocks: Provide edge blocks at vertical jambs to prevent lateral movement of glass. Provide edge blocks at 3" minimum in length. Maintain 1/8" clearance between edge of glass and edge block.
- E. Interior Hollow Metal Glazing: Glaze using specified glazing beads in accordance with manufacturer's instructions.
- F. Fire-Rated Glazing: Comply with glazing manufacturer's instructions and NFPA 80 requirements for installation in doors and windows or framed openings.
 - 1. Install glazing materials of ratings scheduled for fire-rated doors and framed openings.
 - 2. Install glazing so that permanent labels are positioned in an inconspicuous corner for visual inspection by building official.
- G. Exterior Hollow Metal Window Channel Glazing:
 - 1. Glaze using specified glazing tape inboard and outboard.
 - 2. Shim lites over 75 united inches, inboard and outboard, on all sides in accordance with glazing tape manufacturer's recommendations.
 - 3. Cut tape to size to allow for tight butted joints; install to horizontal members first, then to verticals. Install tape to exterior stops so that top edge is approximately 1/8" below sight line of stop for sealant cap bead installation.
 - 4. Remove backing paper from tape prior to setting glass; center glazing in rabbet and pressed firm against tape. Apply heel bead sealant to interior side for minimum 3/16" bite and positive bond with metal framing.
 - 5. Install glazing tape to interior glass edges so that top edge will be flush with sight line of interior stop when installed. Install stops to framing and secure in position.
 - 6. Apply cap bead sealant to exterior side of glass over edge of glazing tape full perimeter of frame.
- H. Glazing Sealant Installation: Comply with applicable provisions of Joint Sealers section. Prevent filling of weep holes with sealant.

3.05 MANUFACTURER'S FIELD SERVICES

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.06 ALLOWABLE TOLERANCES

- A. Mirrors:
 - 1. Fabrication tolerances:

- a. Variation in mirror dimensions: +/- 1/32".
- b. Variation in square (diagonal measurements): +/- 1/16".
2. Installation tolerances:
 - a. Variation in plumb or square: +/- 1/8" in 10'-0".
 - b. Variation in face plane of adjacent mirrors: +/- 1/32".

3.07 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.08 PROTECTION OF FINISHED WORK

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials and materials not meeting specified design criteria prior to Date of Substantial Completion.
- C. Final cleaning: Just prior to Date of Substantial Completion, clean glass inside and out. Clean using pretested detergent and water. Flush with clean water. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

END OF SECTION