

## SECTION 08 85 13 aa STRUCTURAL TAPE GLAZING

*This guide can be used to prepare a specification section for structural tape glazing. Structural tape glazing utilizes a high-performance acrylic foam structural glazing tape to attach glass panels to metal glazing frames in lieu of sealants or gaskets and mechanical fixing. Wind loads on the panels are transferred through the structural tape to the supporting framing and then to the building structure. Only acrylic foam structural glazing tapes are appropriate for structural tape glazing applications and each application must be designed and detailed to withstand the imposed loads. These acrylic foam structural glazing tapes will be further listed as "structural glazing tapes" in this specification guide.*

*This specification guide specifies factory glazed curtain wall/commercial window framing components that are then delivered to the site and assembled to form a facade or fill a window opening.*

*Where [ ] are indicated, edit the specification by selecting one or more of the bracketed choices, or delete the bracketed choices and insert project specific language.*

### **PART 1 - GENERAL**

#### **1.1 GENERAL INSTRUCTIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes
  - 1. Structural glazing tape and related accessories.
  - 2. Structural engineering and detailing of structural glazing tape joints.
  - 3. Preparing joint substrate surfaces.
  - 4. Application of primers and adhesion promoters.
  - 5. Adhesive installation of glass panels with structural glazing tape.
  - 6. Pressure application to facilitate contact of structural glazing tape to substrate surfaces.
  - 7. Application of weatherproofing sealant to corner seam edges of glazing tape and perimeter weather seal.

#### **1.3 RELATED REQUIREMENTS**

- A. Work specified in this Section is to be installed in conjunction with work specified in the following sections.
  - 1. Section 08 41 13 - Aluminum-Framed Entrances and Storefronts
  - 2. Section 08 44 13 - Glazed Aluminum Curtain Walls
  - 3. Section 08 80 00 - Glazing

## 1.4 REFERENCES

- A. American Architectural Manufacturers Association (AAMA)
    - 1. AAMA 501-05 - Methods of Test for Exterior Walls
    - 2. AAMA 501.1-05 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure
  - B. American Society of Civil Engineers (ASCE)
    - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
  - C. ASTM International (ASTM):
    - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants
    - 2. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
    - 3. ASTM C1193 - Standard Guide for Use of Joint Sealants.
    - 4. ASTM D897 - Standard Test Method Tensile Properties of Adhesive Bonds
    - 5. ASTM D1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
    - 6. ASTM D3330 - Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape
    - 7. ASTM D3654 - Standard Test Method for Shear Adhesion of Pressure-Sensitive Tapes
    - 8. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
    - 9. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
    - 10. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  - D. Glass Association of North America (GANA)
    - 1. GANA Glazing Manual (50th Anniversary Edition).
    - 2. GANA Sealant Manual (2008).
  - E. International Code Council (ICC)
  - F. International Building Code (IBC)
- Note to Specifier: Retain the following for projects which require LEED certification.*
- G. Leadership in Energy and Environmental Design (LEED), under the U S Green Building Council's (USGBC) Green Building Rating System Standards
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## 1.5 DEFINITIONS

- A. Structural Bite: Minimum width of structural glazing tape (to bond glass panel to metal support frame) required to meet the project performance and design requirements.

## 1.6 SUBMITTALS

- A. Provide in accordance with Section 01 33 00 Submittal Procedures
  - 1. Product Data: Provide manufacturer's materials literature for structural glazing tapes, weatherproofing sealants, primers, adhesion promoters, cleaning solvents, and other accessories. Include material safety data sheets (MSDS) when applicable and certifications showing compliance with specified standards.
  - 2. Shop Drawings
    - a. Indicate detailed tape placement, dimensions, structural bite width, weather seal materials and support framing.
    - b. Glass Schedule: Follow the same format and nomenclature indicated on the Drawings
    - c. Prepare shop drawings under direct supervision of professional structural engineer experienced in design of glazing systems. Provide shop drawings bearing engineer's certification.
  - 3. Design Data Calculations
    - a. Provide structural glazing tape joint design calculations indicating compliance with performance criteria and applicable loads, structural bite, dead load support, tension, shear, and other parameters. Provide calculations bearing engineer's certification.
  - 4. Field Quality Control Submittal: Reports indicating results of preconstruction testing specified in Article 1.8.
  - 5. Manufacturer's Instructions: Standard Operating Procedure for installation and quality control testing.
  - 6. Copy of warranties specified in Paragraph 1.12 for review by Architect.

*Note to Specifier: Include all or portions of the following for projects which are LEED certified and edit the subparagraph according to project requirements.*

- 7. Sustainable Design Submittals: Submit the following for LEED Certification:
  - a. Product Data for Credit IEQ 4.1 Low-Emitting Materials: Adhesives and Sealants: For adhesives and sealants used to adhere glass panels to metal substrates, documentation including printed statement of VOC content for [New Construction and Major Renovations V2.2.] [Commercial Interiors V2.0.] [Core and Shell V2.0.]

*Note to Specifier: Retain one or both to the Sections for closeout as appropriate for the Project.*

- B. Provide in accordance with Section [01 77 00 - Closeout Procedures] [01 78 00 - Closeout Submittals]:
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1. Warranties:
  - a. Installer's fully executed warranty for workmanship.
  - b. Manufacturers' fully executed warranty for application.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Company experienced in installing structural glazing systems with 5 years minimum successful experience and having completed 5 installations of similar scope and type as proposed Project, and acceptable to structural glazing tape manufacturer for installing their products.
- B. Design structural glazing tape dimensions under direct supervision of professional structural engineer experienced in design of glazing systems. Provide calculations and shop drawings bearing engineer's certification.
- C. Single Source Responsibility: Provide each type of structural glazing tape, related primer(s) and backing products by a single manufacturer.
- D. Manufacturer's Representative: Visit the assembly facility to provide initial training prior to start of production and to provide periodic quality control reports (production audits) on tape installation. The glazing tape manufacturer is responsible for training employees engaged in assembly using structural glazing tape. This training must be provided in advance of any employee working on Projects which utilize structural glazing tapes.

## 1.8 PRECONSTRUCTION ACTIVITIES

- A. Design Review: Submit details of the structural glazing tape application, including drawings, glass schedule, windloads (design pressure), glazing specifications and structural bite calculations, to structural glazing tape manufacturer for technical review.
- B. Adhesion Testing: Prior to application of structural glazing tape, test each application condition to ensure satisfactorily adhesion to project specific substrate finishes (glass and frame).
  1. Submit representative samples of substrates to manufacturer for laboratory test. Samples to include glass (2 panels, 12 inches x 12 inches (300mm x 300mm)) and production finished frame sections (6 pieces, 12 inches (300mm) long).
  2. Peel Adhesion Testing: Perform a 90 degree peel adhesion test in accordance with ASTM D3330 on each substrate (glass and frame) and issue a Technical Report summarizing results. Test results shall meet or exceed the performance capacities of the structural glazing tape specified in Article 2.3.
  3. Compatibility Testing: Prior to application of primary weather sealant, test gaskets, setting blocks and other glazing accessories being provided for project to determine compatibility with structural silicone sealants.
    - a. Submit product name, manufacturer and part number of primary weather seal materials and accessories to tape manufacturer for review.
    - b. Perform test in accordance with ASTM C1087.
  4. Comply with manufacturer's requirements for surface preparation, primer and/or adhesion promoters as summarized in the Technical Report.

- C. Compatibility Test: Contact structural glazing tape manufacturer to determine compatibility of specified sealants and if additional testing is required.
- D. Test Report: Submit Technical Report to Architect with description of test, results and recommendations for correcting design or material deficiencies.

### 1.9 MOCK-UPS

- A. In accordance with Section 01 40 00 - Quality Requirements, construct mock-up of [aluminum storefront framing] [aluminum curtain wall framing] [\_\_\_\_\_] with glass panels adhered with structural glazing tape to illustrate workmanship, performance, and appearance.

1. Mock-Up consisting of:
  - a. [Aluminum] [Stainless steel] [\_\_\_\_\_] framing to support glass panels specified in [Section 08 41 13 - Aluminum-Framed Entrances and Storefronts.] [Section 08 44 13 - Glazed Aluminum Curtain Walls.]
  - b. [Insulating] [Monolithic] glass panels specified in Section 08 80 00 - Glazing.
  - c. [\_\_\_\_\_] specified in Section [\_\_\_\_\_].
  - d. Structural glazing tape, primer, adhesion promoters and other accessories specified in this Section.
2. Approximate Size of Mock-Up Unit: [\_\_\_\_\_].
3. Test mock-up to determine if design satisfies project performance requirements. Specific performance tests include [\_\_\_\_\_].
4. Submit report describing tests, results, and any modifications made to correct deficiencies or to improve performance.
5. Do not proceed with installation until mock-up has been inspected and accepted by qualified Architect, Engineer or Consultant.
6. Retain accepted mock-up during construction as quality standard if required. Completely remove at Project completion.

### 1.10 DELIVERY, STORAGE, PRODUCT HANDLING

- A. Deliver products in manufacturer's original containers clearly labeled with product identification, date of manufacture, and shelf life.
- B. Protect materials according to manufacturer's written instructions. Prevent damage to materials from condensation, temperature changes, direct exposure to sun, or other causes.
- C. Do not use tapes and primers/adhesion promoters after manufacturer's stated shelf life.

### 1.11 FIELD CONDITIONS

- A. Optimum Tape Application Temperature: Between 70 to 100 degrees F.( 21 to 38°C.)
  - B. Do not install tapes when temperature is:
    1. Below 60 degrees F (15 degrees C.)
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2. Above 122 degrees F. (50 degrees C.)

## 1.12 WARRANTIES

*Note to Specifier: Retain one or both to the Sections for closeout as appropriate for the Project.*

- A. Provide in accordance with Section [01 77 00 - Closeout Procedures] [01 78 00 - Closeout Submittals]:

*Note to Specifier: The Manufacturer of the structural glazing tape provides a limited application warranty for a period that is equal to the warranty of the finish or coating on the bonded substrates. Only projects which strictly adhere to manufacturer's process protocol for structural glazing projects will qualify for limited application warranty. Contact manufacturer to verify warranty time period and other requirements.*

1. Installer's [5] [10] [\_\_\_\_]-year workmanship warranty printed on installer's preprinted letterhead, with authorized signatures and endorsements indicating obligations, remedies, limitations, and exclusions of warranty, and date of Substantial Completion.
2. Manufacturer's [10] [20] [\_\_\_\_] year application warranty for properly installed structural glazing tape printed on installer's preprinted letterhead, with authorized signatures and endorsements indicating obligations, remedies, limitations, and exclusions of warranty, and date of Substantial Completion.

## **PART 2 - PRODUCTS**

### 2.1 MANUFACTURERS

- A. 3M, 3M Center, Building 225-5S-06, St. Paul, MN 55144-1000, 800-362-3550.
- B. Substitution Limitations
  1. During Bidding/Procurement Phase: To provide equivalent products of other manufacturers submit substitution requests in accordance with Document 00 26 00 - Procurement Substitution Procedures.
  2. During Construction Phase: To provide equivalent products of other manufacturers submit substitution requests in accordance with Section 01 25 00 - Substitution Procedures.

### 2.2 DESIGN CRITERIA

- A. General: Design and install structural tape glazing to withstand these loads without rupture, loss, failure of adhesion, product deterioration and other defects.
  1. Dead and Live Loads: Determined by ASCE 7 and calculated in accordance with applicable codes.

*Note to Specifier: Select the appropriate criteria below.*

2. Wind Loads
    - a. Basic Wind Speed: [85 mph (38 m/s)] [90 mph (40 m/s)] [100 mph (44 m/s)] [110 mph (49 m/s)] [\_\_\_\_].
    - b. Importance Factor: [\_\_\_\_].
    - c. Exposure Category: [A] [B] [C] [D].
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3. Uniform Load Structural Test: Effects of applicable wind load acting inward and outward normal to plane of wall when tested in accordance with ASTM E330.
  - a. Test Pressure: 1.5 times the Wind Load Pressure applied both positive and negative normal to plane of glass.
  - b. Allowable Results: No glass breakage, permanent damage to [aluminum curtain wall] [storefront] parts.
  - c. Allowable Permanent Deformation of Main Frame Members: Not in excess of 0.2 percent of the span.
4. Deflection of Structural Support Framing: Measure deflection normal to wall plane when tested in accordance with ASTM E330.
  - a. Limited to [edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite] [1/175 of clear span for spans up to 13 feet 6 inches (4.1 m) and to 1/240 of clear span plus 1/4 inch (6.35 mm) for spans greater than 13 feet 6 inches (4.1 m)] <Insert deflection limit> or an amount that restricts edge deflection of individual glazing lites to 3/4 inch (19 mm), whichever is less.

*Note to Specifier: Retain the indicated differential air pressure or insert another differential air pressure required for the project.*

5. Air Leakage: No allowable air leakage at a minimum static-air-pressure differential of [6.24 lbs per sq. ft. (0.29 kPa, 50 mph),] [\_\_\_\_\_] when tested in accordance with ASTM E283.

*Note to Specifier: Retain the indicated differential air pressure or insert another differential air pressure required for the project.*

6. Water Leakage: No water leakage at a minimum static and dynamic air-pressure differential of [6.24 lbs per sq. ft. (0.29 kPa, 50 mph),] [\_\_\_\_\_] when tested in accordance with ASTM E331 and AAMA 501.1.
  7. Thermal Loads and Movement: Ambient temperature range of [[120] [\_\_\_\_\_] degrees F] [[49] [\_\_\_\_\_] degrees C].
  8. Seismic Loads: Designed and installed system to comply with applicable seismic requirements for Project location and Seismic Zone defined by ICC/IBC.
- B. Structural: Design glazing tape joints as follows:
2. Structural Bite Under Dynamic Loading (Wind, Seismic): Determine based on a limiting tensile stress of 12 psi (85 kPa). Round up calculated bite to the nearest 1/8 inch or 1/4 inch (5 mm).
    - a. Provide minimum bite of 5/8 inch (15 mm) for all 4-sided or 2-sided structural glazing tape applications.
  3. Structural Bite Under Static Loading (Dead Load): Determine based on a limiting shear stress of 0.25 psi (1.7 kPa). Round up calculated bite to the nearest 1/4 inch (5 mm).
    - a. Provide mechanical dead load support for insulated glass units.
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- b. Perform static load and dynamic load calculations on unsupported dead load structural glazing applications.
  - c. Use the calculation resulting in the greater structural bite to determine the appropriate tape width for the application.
4. Shear Strain: Limit shear strain arising due to differential movement of glass and framing (Thermal, Seismic, Tolerance Effects) to 300 percent of the tape thickness: 0.27 inches (<6.9 mm).

### 2.3 STRUCTURAL GLAZING TAPE MATERIALS

- A. Structural Glazing Tape: High performance double coated pressure sensitive acrylic foam tape used to attach glass to metal frames in storefront systems, curtain wall systems and commercial windows replacing commonly used structural silicone sealants or mechanical fasteners and gaskets, complying with specified, and third-party verified, test results for performance, durability, UV and temperature resistance of acrylic foam chemistry.

*Note to Specifier: Select B23F for black colored tape or select G23F for grey colored tape.*

1. 3M™ VHB™ Structural Glazing Tape [B23F] or [G23F], as manufactured by 3M.
2. Composition: Conformable acrylic closed cell foam
3. Color: Black (B), Gray (G).
4. Thickness: 0.090 inches (2.3 mm) ±10 percentage
5. Density: 45 pcf (720 kg per cubic meter)
6. Volatile Organic Compound (VOC) Content: Less than 5 grams per liter.
7. Product Shelf Life: 24 months from Date of Manufacture when properly stored.
8. Performance Capacities: Tests performed at 70 degrees F (21 degrees C).
  - a. Peel Adhesion (ASTM D3330): Minimum 35 lbs per inch of width (44N/100 mm) and cohesive failure mode.
  - b. Tensile Strength (ASTM D897): Minimum 70 psi @ 2 in/min (480 kPa @ 50 mm/min).
  - c. Dynamic Overlap Shear Strength (ASTM D1002): Minimum 65 psi @ 0.5 in per min. (450 kPa @ 12.7 mm per min).
  - d. Static Shear Adhesion (ASTM D3645): 2.2 lbs per 0.5 sq. inch (1000 g per 3.2 sq. cm).
  - e. Temperature Resistances
    - 1) Short Term: 300 degrees F (149 degrees C).
    - 2) Long Term: 200 degrees F (93 degrees C)



*Note to Specifier: Retain subparagraph below if required for LEED-NC, LEED-CI, LEED-CS when used to adhere glass panels to metal substrates.*

9. To obtain Credit IEQ 4.1 for Low-Emitting Materials: Adhesives and Sealants, laminating adhesive shall have a VOC content of 5 grams per Liter or less when calculated in accordance with 40 CFR 59, Subpart D (EPA Method 24).

## 2.4 WEATHERPROOFING SILICONE SEALANT

- A. Type: One-part or two-part neutral cure silicone sealant; [*insert product name*], as manufactured by [*insert manufacturer's name*].
- B. Compliance: Sealant shall meet or exceed requirements of these standards:
  1. ASTM C920, Type [\_\_\_\_], Grade [\_\_\_\_], Class [\_\_\_\_], Use [\_\_\_\_].
- C. Color: [\_\_\_\_].
- D. Shelf Life: [\_\_\_\_] months.
- E. Application Temperature Range: [\_\_\_\_] to [\_\_\_\_] degrees [F] [C].
- F. Volatile Organic Compound (VOC) Content: [\_\_\_\_] grams/liter.

## 2.5 ACCESSORIES

- A. Cleaning Solvents: A blend of isopropyl alcohol and water (50 to 70 percent isopropyl alcohol) as recommended by structural glazing tape manufacturer to be compatible with tape and not adversely affect substrate. MEK or acetone as required to remove silicone and other difficult surface contaminants but must always be followed with an IPA wipe.
  - B. Cleaning Towels: Clean, soft, absorbent, lint-free disposable towels, e.g., Kimberly-Clark WypAll® X60 Wipers.
  - C. Abrasion Pads: General purpose abrasion pads or wheels, 3M™ Scotch-Brite™ Hand Pad 7447, as required and manufactured by 3M. Abrasive material must be same as that used to prepare adhesion test samples (see Paragraph 1.8.B).
  - D. Substrate Primer: One part solvent based primer for painted metal and opaque coated glass, as recommended for project conditions by 3M Technical Support; 3M™ Primer 94, as manufactured by 3M.
    1. Composition: Clear liquid solution.
    2. Color: Clear to light yellow.
    3. Flash Point: -4 degrees F (-20 degrees C).
    4. Volatile Organic Compound (VOC) Content: Greater than 250 grams per liter.
    5. Shelf Life: 18 months when properly stored.
  - E. Substrate Adhesion Promoter: One part solvent based adhesion promoter for glazing tapes as recommended for project conditions by 3M Technical Support; 3M™ Adhesion Promoter 111, as manufactured by 3M.
    1. Composition: Isopropyl alcohol solution.
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2. Color: Clear.
  3. Flash Point: 52 degrees F (11 degrees C).
  4. Volatile Organic Compound (VOC) Content: 780 grams per liter.
  5. Shelf Life: 12 months when properly stored.
- F. Glass Coupling Agent: One part solvent based coupling agent for glass, as recommended for project conditions by 3M Technical Support; 3M™ Silane Glass Treatment AP 115, as manufactured by 3M.
1. Composition: 3-glycidoxypropyl trimethoxysilane in isopropyl alcohol/water solution.
  2. Color: Clear liquid solution.
  3. Flash Point: 53 degrees F (12 degrees C).
  4. Volatile Organic Compound (VOC) Content: 728 grams per liter.
  5. Shelf Life: 12 months when properly stored.
- G. Glazing Setting Blocks and Spacers: Compatible with silicone sealant and recommended by sealant manufacturer.
1. Acceptable Materials: Silicone, [\_\_\_\_\_]
  2. Prior to installation, setting blocks and spacers shall be tested for compatibility if not previously tested.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Factory install glass panels specified in Section 08 80 00 -Glazing into [aluminum] [stainless steel] [\_\_\_\_\_] [curtain wall framing specified in Section 08 44 13 - Glazed Aluminum Curtain Walls.] [storefront specified in Section 08 44 13 - Aluminum-Framed Entrances and Storefronts.] [\_\_\_\_\_] Bond glass to metal support members with structural glazing tape using [2-sided] [4-sided] method as detailed on Drawings and indicated in reviewed shop drawings. Factory-installed 2-sided and 4-sided structural tape glazing is required, except when allowed for deglazing/reglazing procedures as needed.
  - B. To ensure compatibility and correct sizes, coordinate provision of glass, support framing, and sealants.
  - C. The process steps involving surface preparation, application of structural glazing tape and final bonding of glass into metal frame must be completed in a controlled environment at a minimum temperature of 60°F (15 C).
  - D. Prepare substrates and apply structural glazing tape in accordance with manufacturer's instructions (Standard Operating Procedure) and reviewed shop drawings. Material changes or deviation of process requirements must first be approved by the structural glazing tape manufacturer.
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- E. Handle, store, and apply materials in compliance with applicable Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), volatile organic compound (VOC), and other regulations and manufacturer's material safety data sheets (MSDSs).
- F. Do not apply weatherproofing sealants in totally confined spaces without ventilation for curing.

### 3.2 PREPARATION

- A. Inspect substrates to receive structural glazing tape. Ensure that:
  - 1. Metal framing surfaces to receive glazing are flat and smooth without slots, serrations, and other irregularities. Mis-match of frame joinery shall not exceed 0.02 inches (0.5mm). Do not use warped or bowed frame profiles as this will limit the ability of the tape to make contact to both bonding surfaces.
  - 2. Verify aluminum framing finish is compatible with structural glazing tape (alodine, anodized, fluorocarbon based paint, or polyester powder coat finish). Do not apply structural glazing tapes to other finishes unless special approval has been received in writing from the tape manufacturer.
  - 3. Ensure surfaces are clean, dry, and free of frost/moisture, dust, dirt, grease, oil, mildew, and other contaminants that might affect adhesion. For insulated glass units, remove cured silicone from bonding area of glass (if present) and along edge at points where setting blocks will be placed. Refer to structural glazing tape or sealant manufacturer for instructions on proper removal.
- B. Clean glass substrates with two-cloth solvent wipe in accordance with ASTM C1193 and in accordance with project specific requirements from the 3M Technical Report and Standard Operating Procedure (SOP).
  - 1. Pour cleaning solution onto a clean, absorbent, lint-free disposable towel (Towel). Remove contaminants wiping in one direction only. Alternatively, spray cleaning solution onto bonding area followed by wiping in only one direction. Repeat this step if dirt/residue is visible in the bond area or on Towel surface. Do not re-use Towels.
  - 2. Immediately wipe cleaned area with a separate clean and dry Towel before cleaning solution has evaporated wiping only in one direction.
  - 3. Pour or spray silane glass treatment solution onto a clean Towel wiping in one direction ensuring entire bond area (width) is wetted. Immediately follow with a clean dry Towel to remove excess solution and to dry the surface (two-cloth method). Alternatively, the glass treatment solution may applied to the bonding area of the IGU panel with a Designetics dauber bottle followed with a clean dry Towel to remove excess solution.
  - 4. Remove any haze from the bonding area with additional dry wiping if necessary.
- C. Prepare metal surfaces in accordance with results of pre-installation testing. Refer to 3M Technical Report and project-specific SOP guidelines. Basic surface preparation may include:

*Note to Specifier: Retain the following 2 subparagraphs if required in accordance with 3M SOP guidelines.*

- [1. Abrade the bonding area of the frame using 3M™ Scotch-Brite™ 7447 abrasion pad, if required per 3M requirements.]
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- [2. After abrading surface clean the metal substrate to ensure removal of all loose particles using the “two cloth” method involving wetted Towel followed immediately with a clean, dry Towel.]
3. Pour cleaning solvent onto a clean Towel. Remove contaminants by wiping in one direction only. Alternatively, spray cleaning solvent onto bonding area followed by wiping in only one direction with clean, dry Towel.
4. Immediately wipe cleaned area with a separate Towel before solvent has evaporated wiping only in one direction.
5. If heavy oils or grease are present, use degreasing solvent followed by a second two-cloth cleaning to remove any solvent residue.
6. Apply primer or adhesion promoter if required in accordance with the 3M Technical Report and project-specific SOP.
  - a. Apply primer (as required) using clean Towel or dauber bottle. Allow to dry as a thin coat to avoiding puddling leaving a tack free film. Begin tape bonding immediately to avoid recontamination.
  - b. Apply adhesion promoter (as required) using a two cloth cleaning method leaving no visible residue on the surface. Begin tape bonding immediately to avoid recontamination of the bond area.

### 3.3 APPLICATION

- A. Spacers and Setting Blocks: Install as indicated on reviewed shop drawings. Ensure joint openings and recesses are accurately sized and corner joints are flush.
  - B. Tape Application: Handling only at edges, apply tape to substrate aligning with edge from one corner along entire length. Alternatively, tape applicators may also be used for more precise application of tape. Overlap tape at corners. Apply light pressure on first application to avoid trapping bubbles between tape and substrate.
  - C. Tape Splicing: Cut overlapped corner tape tabs to create 90 degree butt joint or a 45 degree mitre joint. Lift tape with knife blade to remove cut pieces. Allow tape to relax into place. Apply finger pressure to tape ends to ensure complete contact at splice joint.
  - D. Apply final roll down pressure of at least 15 psi (1 kg per square cm) over entire tape area to ensure good contact to the first substrate surface. Inspect tape surface for air bubbles (entrapped air). If bubbles are present, take a sharp blade and pierce through the tape followed by pressure application towards the slit to remove air.
  - E. Assembly: Remove protective tape liner and bring frame and glass together to bond in accordance with manufacturer’s recommendations and SOP. Apply minimum pressure of 15 psi (1 kg per square cm) to bonded surface using pressure roller tool, clamps, vacuum table or other pressure application methods approved by tape manufacturer.
  - F. Weather Sealant: Apply weather proofing silicone sealant specified in this Section at the tape edge over the corner seams and around the glass edge between the glass and metal profile, 1 to 2 inches both directions from the tape joint.. Install primary weather seal as per system design.
  - G. Frame Movement: Frames can be moved immediately after final pressure and weather proofing sealant application only if tape manufacturer’s specific requirements are followed.
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1. Horizontal movement and stacking is acceptable when setting blocks are in place.
2. Provide setting blocks along the vertical edge of the glass to support dead load of the glass lite when stacking/crating frames on that edge. Provide sufficient quantity of setting blocks and spaced in accordance with glass and glazing tape manufacturers' requirements.
3. When exterior temperatures is less than 60 degrees F (15 degrees C), store glazed units for a minimum of 24 hours and at a minimum temperature of 60 degrees F (15 degrees C) prior to application of live loads or field installation.

### 3.4 FIELD QUALITY CONTROL

- A. Along with the requirements for factory/shop glazing specified above, comply with the following field installation requirements:
1. Keep glazed units at a temperature of at least 60 degrees F (15 degrees C) for a minimum of 24 hours prior to installation and prior to application of live loads, when exterior temperatures are less than 60 degrees F (15 degrees C).
  2. When shipping or storing glazed units in a vertical position and on non-bearing edge of glass,, provide setting blocks along that specific edge of the glass to support the dead load during storage or transit. Provide sufficient quantity of setting blocks and spaced in accordance with glass and glazing tape manufacturers' requirements.
  3. Maintain temperature of minimum 60 degrees F (15 Degrees C) of glazing materials (glass, metal, tape, sealants, primers and adhesion promoters) 12 hours prior to the beginning of the glazing process.

### 3.5 FIELD REGLAZING

- A. Perform reglazing in accordance with 3M Technical Report and SOP and as follows:
1. Cut through structural glazing tape using automatic sealant cutter, razor blade, or piano wire to release glass.
  2. Remove tape residue from framing using an automatic sealant cutter, solvent and razor blade, or 3M Stripe Off Wheel as required. Tape residue may also be removed by a stretch release technique.
  3. Clean and prepare glass and frame surfaces as defined in the 3M Technical Report and project-specific SOP.
  4. Apply tape as described in Article 3.3.
  5. Install glass in frame.
  6. Apply perimeter pressure of 15 psi (1.0kg per square cm or 103 kPa) to bonded surface.
  7. Install temporary fasteners to hold reglazed lite for minimum of 24 hours at 60 degrees F (15 degrees C) if reglazing is done in the field.
  8. Remove temporary fasteners and apply perimeter silicone weather seal.
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### **3.6 CLEANING AND PROTECTION**

- A. Protect structural glazing tapes and sealants from damage immediately after installation in accordance with manufacturer's written instructions for protection. Do not apply markers or other protection products to glazing materials.
- B. Protect structural glazing tapes and sealants from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with structural glazing tapes and sealant materials, remove substances immediately as recommended in writing by structural glazing tape and sealant materials manufacturer.
- C. Where possible examine structural glazing tapes and sealants 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; remove as recommended in writing by manufacturer.
- D. Remove and replace structural glazing tapes and sealants that are broken, dried, shrunk, cracked, abraded or damaged from natural causes, accidents, and vandalism, during construction period.

**END OF SECTION 08 85 13 aa**

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