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**SECTION 08 88 53**  
**SECURITY GLAZING****PART 1 GENERAL****1.1 SUMMARY**

- A. Section includes: Glass-clad polycarbonate, fire-rated glass clad polycarbonate, laminated polycarbonate, and Low-E insulating security glazing for the following applications:
  - 1. Detention Windows.
  - 2. Doors.
  - 3. Interior sidelights and borrowed lites.

**1.2 DEFINITIONS**

- A. Glazing Manufacturers: Firms that produce primary glass, monolithic plastic glazing, or fabricated security glazing, as defined in referenced glazing publications.
- B. Interspace: Space between lites of air-gap security glazing or insulating security glazing.

**1.3 COORDINATION**

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

**1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- C. Review temporary protection requirements for security glazing during and after installation.

**1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

**1.6 SECURITY GLAZING SAMPLES: TWO (2) FOR EACH TYPE OF SECURITY GLAZING; 12-INCHES SQUARE.****1.7 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For installers.
- B. Product Certificates: For each type of product indicated, from manufacturer.
- C. Product Test Reports: For each type of security glazing accessory not listed on the Security Glazing manufactures approved list.
  - 1. Provide test reports based on testing current sealant formulations within previous 36-month period.
- D. Preconstruction adhesion and compatibility test reports.
- E. Security Glazing Schedule: List security glazing types and thicknesses for each size opening and location. Use same designations indicated on Drawings. Indicate coordinated dimensions of security glazing and construction that receives security glazing, including clearances and glazing channel dimensions.
- F. Sample Warranties: For special warranties.
- G. Glazing Detail: Submit drawing showing intended installation method, list all tapes, caulks, setting blocks with documentation from Security Glazing manufacturer that all are compatible with the specified glazing material.

**1.8 QUALITY ASSURANCE**

- A. Manufacture Qualifications: A company specializing in the manufacture of security glass, types as specified, with minimum documented (10) years' experience.
- B. Installer Qualifications: A qualified installer with a minimum of 5 years' experience in the installation of security glazing in correctional facilities or a glazier that is certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- C. Security Glazing Testing Agency Qualifications: Subject to compliance with requirements, testing agency is one of the following:
  - 1. H. P. White Laboratory, Inc.
  - 2. Underwriters Laboratories, Inc.
  - 3. Intertek
  - 4. Wiss, Janney, Eistner Associates, Inc.
- D. Sealant Testing Agency Qualifications: Qualified according to ASTM C 1021 for testing indicated.

**1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with insulating security glazing and with air-gap security glazing manufacturers' written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.
- B. Intumescent fire rated security glazing shall not be allowed to freeze at any time – shipping, storage, or post installation, follow manufacturer instructions.

**1.10 FIELD CONDITIONS**

- A. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

**1.11 WARRANTY**

- A. Manufacturer's Special Warranty for Coated Glass: Manufacturer agrees to replace coated glass that deteriorates within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - B. 1. Warranty Period: Five years from date of Manufacture.
  - C. Manufacturer's Special Warranty for Glass-Clad Polycarbonate: Manufacturer agrees to replace glass-clad polycarbonate that deteriorates within specified warranty period. Deterioration of glass-clad polycarbonate is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning glass-clad polycarbonate contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.
    - 1. Warranty Period: Five years from date of Manufacture.
  - D. Manufacturer's Special Warranty on Insulating Security Glazing: Manufacturer agrees to replace insulating security glazing that deteriorates within specified warranty period. Deterioration of insulating security glazing is defined as defects in individual lites developed from normal use or failure of hermetic seal under normal use. Deterioration does not include defects in individual lites or failure of hermetic seal that is attributed to glass breakage or to maintaining and cleaning insulating security glazing
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contrary to manufacturer's written instructions.

1. Defects in coated glass lites include peeling, cracking, and other indications of deterioration in coating.
2. Defects in laminated-glass lites include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
3. Defects in glass-clad polycarbonate lites include edge separation, delamination materially obstructing vision through glazing, blemishes exceeding those allowed by referenced glass-clad polycarbonate standard, yellowing, and loss of light transmission.
4. Evidence of hermetic seal failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glazing.
5. Warranty Period: Five years from date of Manufacture.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Source Limitations for Security Glazing: Obtain security glazing from single source from single manufacturer using the same types of lites, plies, interlayers, and spacers for each security glazing type indicated.
- B. Source Limitations for Tinted Glass: Obtain from single source from single primary glass manufacturer for each tint color indicated.
- C. Source Limitations for Glazing, Sealants and Gaskets: Obtain from single source from single manufacturer for each product and installation method.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. Installed security glazing shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing; or other defects in construction.
- B. Installed security glazing shall withstand security-related loads and forces without damage to the glazing beyond that allowed by referenced standards.
- C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated.
  1. Design Procedure for Glass: ASTM E 1300 and ICC's International Building Code.
  2. Design Wind Pressures: As indicated on Drawings.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.
  1. Temperature Change: 120 deg F, ambient; 180 deg F, material
  2. surfaces.
- E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

### **2.3 SECURITY GLAZING, GENERAL**

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

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Retain publications in four subparagraphs below that apply to glazing products specified.

- B. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
- C. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
- D. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
- E. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- F. Plastic Glazing Labeling: Identify plastic sheets with appropriate markings of applicable testing and inspecting agency, indicating compliance with required fire-test-response characteristics.
- G. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the Safety Glazing Certification Council. Label shall indicate manufacturer's name, type of glazing, glass thickness and safety glazing standard with which glazing complies.
- H. Ballistics Resistance: Provide glazing materials capable of resisting ballistic impact at levels indicated as determined from testing identical materials according to UL 752.
- I. Attack Resistance: Provide glazing materials capable of resisting attack of type and at security-grade levels indicated as determined from testing identical materials according to ASTM F 1915-05.
- J. Human Impact Load Resistance: Provide Category II glazing materials based on complying and testing requirements in 16 CFR 1201.
- K. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glazing framing members and glazing components.
  - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- L. Insulating Glazing Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council.
- M. Fire-Test-Response Characteristics of Polycarbonate Sheets: As determined by testing polycarbonate sheets identical to those used in security glazing products by a qualified testing agency acceptable to authorities having jurisdiction.
  - 1. Self-ignition temperature of 650 deg F or more when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.
  - 2. Smoke-Developed Index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
  - 3. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work.
- N. Thermal and Optical Performance Properties: Provide security glazing with performance properties specified, as indicated in manufacturer's published test data, based on construction products indicated and on procedures indicated below:
  - a. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  - b. Solar-Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
    - 1) Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## **2.4 GLASS PRODUCTS**

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
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- B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.
  - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
  - 2. For heat-strengthened float glass, comply with requirements for Kind HS.
  - 3. For fully tempered float glass, comply with requirements for Kind FT.
  - 4. For uncoated glass, comply with requirements for Condition A.
  - 5. For coated vision glass, comply with requirements for Condition C (other coated glass).

**2.5 CHEMICALLY STRENGTHENED GLASS: ANNEALED FLOAT GLASS IS CHEMICALLY STRENGTHENED TO COMPLY WITH ASTM C 1422, SURFACE COMPRESSION LEVEL 1.**

**2.6 LAMINATED GLASS: ASTM C 1172. USE MATERIALS THAT HAVE A PROVEN RECORD OF NO TENDENCY TO BUBBLE, DISCOLOR, OR LOSE PHYSICAL AND MECHANICAL PROPERTIES AFTER FABRICATION AND INSTALLATION.**

- A. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
- B. Interlayer Color: Clear unless otherwise indicated.

**2.7 POLYCARBONATE SECURITY GLAZING**

- A. Polycarbonate Sheet: ASTM C 1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on exposed surfaces and Type I, standard, UV-stabilized polycarbonate where no surfaces are exposed.
- B. Laminated Polycarbonate: Polycarbonate sheets laminated with clear urethane interlayer that complies with ASTM C 1349, Appendix X2, and has a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation. Provide laminated units that comply with requirements of ASTM C 1349 for maximum allowable laminating process blemishes and haze.
- C. Glass-Clad Polycarbonate: ASTM C 1349.

**2.8 INSULATING SECURITY GLAZING**

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Insulating Security Glazing: Factory-assembled units, consisting of sealed lites of glazing material indicated separated by a dehydrated interspace, qualified according to ASTM E 2190
    - a. Sealing System: Dual seal, with manufacturer's standard.
  - 2. Spacer: Manufacturer's standard spacer material and construction in color selected by Architect.
  - 3. Desiccant: Molecular sieve or silica gel, or blend of both.

**2.9 GLAZING SEALANTS**

- A. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they contact, including security glazing, seals of insulating security glazing and air-gap security glazing, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Suitability: Comply with sealant and security glazing manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
- C. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

- D. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
  - 1. Manufacturers: Subject to compliance with requirements, and compatible with glazing materials; provide products by one of the following:
    - a. Dow Corning Corporation.
    - b. GE Construction Sealants; Momentive Performance Materials Inc.
- E. Security Sealant: Manufacturer's standard, nonsag, tamper-resistant sealant for joints with low movement complying with ASTM C 920, Grade NS, Class 12.5 or 25, Use NT, and with a Shore A hardness of at least 45 when tested according to ASTM C 661.
  - 1. Manufacturers: Subject to compliance with requirements, and compatible with glazing materials.

## **2.10 GLAZING TAPES**

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; non-staining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and security glazing manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## **2.11 MISCELLANEOUS GLAZING MATERIALS**

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of security glazing and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by security glazing manufacturer to maintain security glazing lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit security glazing lateral movement (side walking).

## **2.12 FABRICATION OF SECURITY GLAZING**

- A. Fabricate security glazing in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine framing for security glazing, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep system.

3. Minimum required face or edge clearances.
  4. Minimum required bite.
  5. Effective sealing between joints of framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean glazing channels and other framing members receiving security glazing immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

### **3.3 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of security glazing, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect edges of security glazing from damage during handling and installation. Damaged security glazing includes units with edge or face damage or other imperfections that, when installed, could weaken security glazing, and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glazing unit manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by security glazing manufacturers for installing lites.
- F. Provide spacers for security glazing lites where the length plus width is larger than 50 inches.
1. Locate spacers directly opposite each other on both inside and outside faces of security glazing. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with performance requirements.
  2. Provide 1/8-inch minimum bite of spacers on glazing lites and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent security glazing from moving sideways in glazing channel, as recommended in writing by security glazing manufacturer and according to requirements in referenced glazing publications.
- H. Set security glazing in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Set coated security glazing with proper orientation so that coatings and films face exterior or interior as specified.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.
- L. For fire-rated material, follow manufacturers UL approved "as tested" installation.

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**3.4 TAPE GLAZING**

- A. Position tapes on fixed stops so that, when compressed by security glazing, their exposed edges are flush with or slightly below sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.

**3.5 APPLY HEEL BEAD OF ELASTOMERIC SEALANT.**

- A. Center security glazing in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- B. Apply cap bead of elastomeric sealant over exposed edge of tape. Verify if areas with inmates are required to be included.

**3.6 CLEANING AND PROTECTION**

- A. Immediately after installation remove non-permanent labels and clean surfaces.
  - 1. Protect security glazing from contact with contaminating substances resulting from construction operations, including weld splatter. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 2. If, despite such protection, contaminating substances do come into contact with security glazing, remove substances immediately as recommended in writing by security glazing manufacturer. Remove and replace security glazing that cannot be cleaned without damage.
- B. To be completed at time of building final cleaning per Div 01 - Wash security glazing on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash security glazing as recommended in writing by security glazing manufacturer.

**3.7 SECURITY GLAZING SCHEDULE**

- A. SG-1: Clear symmetrical glass-clad polycarbonate; (ASTM F1915-05 Grade 2, 40min. Attack)
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; "3/4" Secur-Tem + Poly® SP019" clear or comparable product by one of the following:
    - a. Oldcastle Building Envelope® - ArmorProtect® Glass-Clad Polycarbonate.
    - b. LTI Smart Glass

**3.8 FIRE RESISTANT GLAZING**

- A. SG-2: Clear Intumescent Fire Rated for 45 minutes (ASTM F1915-05 Grade 2, 40min Attack)
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide "1-9/16" INFERNOGARD® 45-SP019" as manufactured by Global Security Glazing or a comparable product.
- B. SG-3: Clear Intumescent Fire Rated for 90 minutes (ASTM F1915-05 Grade 2, 40min Attack)

1. Basis-of-Design Product: Subject to compliance with requirements, provide "2-5/16" INFERNOGARD® 90-SP019" as manufactured by Global Security Glazing or a comparable product.

### **3.9 SECURITY INSULATED GLASS UNITS**

- A. ISIG-1: Exterior insulated glass-clad polycarbonate (UL Level III)

### **3.10 BASIS-OF-DESIGN PRODUCT: 1-13/16" SB60VT (#2) ON CLEAR TEMPERED IG, 1/2" AIR SPACE AND GLOBAL SECURITY GLAZING; "1-1/8" SECUR-TEM + POLY® SP311" CLEAR OR COMPARABLE PRODUCT BY ONE OF THE FOLLOWING:**

- A. Oldcastle Building Envelope® - ArmorProtect® Glass-Clad Polycarbonate.
- B. LTI Smart Galss

### **3.11 BULLET RESISTANT GLASS UNITS**

- A. BRG-1: Clear non-symmetrical glass-clad polycarbonate (UL Level III)
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing; 1-1/8" Secur-Tem + Poly® SP311 clear or comparable product by one of the following:
  1. Oldcastle Building Envelope® - ArmorProtect® Glass-Clad Polycarbonate.
  2. LTI Smart Glass

### **3.12 IMPACT TEST CRITERIA**

- A. ASTM F 1915 Standard Test Methods for Glazing for Detention Facilities.
- B. Security Grade 1: 60 minutes
  1. Security Grade 2: 40 minutes
  2. Security Grade 3: 20 minutes
  3. Security Grade 4: 10 minutes
- C. Glass Stop Height: Provide 1/4-inch edge plus 1" bite

**END OF SECTION 08 88 53**