

**SECTION 08 88 36**

**LC PRIVACY GLASS**

1. GENERAL

1. Summary

- A. Section includes switchable privacy glass, glazing accessories and supplementary items necessary to complete the work required for their installation.
- B. Related Sections:
  - 1. Division 01 General Conditions
  - 2. Division 07 Section "Joint Sealants" for glazing sealants. (optional)
  - 3. Division 08 Section "Insulating Glass Units" for exterior applications. (optional)
  - 4. Division 08 Section "Security Glazing" for security applications. (optional)
  - 5. Division 26 Electrical: Electrical connection to switchable privacy glass
  - 6. Any other related section per project requirements. (optional)

2. REFERENCE STANDARDS

- A. ASTM C 1036 - Standard Specification for Flat Glass.
- B. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- C. ASTM C 1172 - Standard Specification for Laminated Architectural Flat Glass.
- D. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units. (Insulated Units Only)
- E. CPSC 16CFR-1201 - Safety Standard for Architectural Glazing Materials.
- F. GANA Glazing Manual.
- G. GANA Laminated Glazing Reference Manual
- H. GANA Glass Information Bulletins

### 3. DEFINITIONS

- A. Connection Nipple: Fitting attached to the edge of the glass that wires pass through to provide strain relief for wires
- B. Lay Flat Wiring Bar: Alternate to Connection Nipple; Used to run wires parallel with the edge of the glass
- C. Greenfield: A metallic flexible conduit used to shield the wires coming from the glass
- D. Busbar: Copper foil tape which supplies power to switchable liquid crystal film
- E. Frosted State: The default state of switchable privacy glass; no power running to the glass
- F. Transparent State: The powered state of the glass, with its highest level of clarity.
- G. Off-Axis: When the line of sight to the glass is at an angle; not straight on.

### 4. SUBMITTALS

- A. Comply with Division 01 Section "Submittal Procedures."
- B. Product Data: Submit manufacturer's product data, including performance characteristics and installation instructions.
- C. Shop Drawings: Submit manufacturer's or fabricator's shop drawings, including plans, elevations, sections, and details, indicating glass dimensions, tolerances, types, thicknesses, and coatings.
- D. Samples: Submit 8" x 11" functioning manufacturer's samples of each type, thickness, and coating.
- E. Warranty: Submit manufacturer's standard warranty for switchable privacy glass units.

### 5. QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Minimum of 5 years' experience manufacturing switchable glass.
- B. Installer's Qualifications:
  - 1. Minimum of 5 years' experience in installing and handling laminated glass meeting ASTM C 1172 and CPSC 16CFR-1201.
- C. Mock-Ups:
  - 1. Comply with Division 01 Section "Quality Control."
  - 2. Obtain acceptance of mock-ups by Architect before proceeding with work.
  - 3. Mock-ups will be considered a chargeable item and are not considered part of the regular job costs.

### 6. DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
  - 1. Deliver glass to site in accordance with manufacturer's instructions.

2. Deliver glass in manufacturers or fabricator's original containers and packaging with labels clearly identifying product name and manufacturer.
- B. Storage:
1. Store glass in accordance with manufacturer's instructions.
  2. Store glass in clean, dry area indoors.
  3. Protect from exposure to direct sunlight and freezing temperatures.
  4. Apply temporary coverings loosely to allow adequate ventilation.
  5. Protect from contact with corrosive chemicals.
  6. Avoid placement of glass edge on concrete, metal, and other hard objects.
  7. Rest glass on clean, cushioned pads at 1/4-points.
- C. Handling:
1. Handle glass in accordance with manufacturer's instructions.
  2. Protect glass from damage during handling and installation.
  3. Do not slide lites of glass against one another.
  4. Do not use sharp objects near unprotected glass.

## 7. WARRANTY

- A. Manufacturer's Warranty on Switchable Privacy Glass: Manufacturer's standard form in which Switchable Privacy Glass manufacturer agrees to replace Switchable Privacy Glass units that fail within specified warranty period.
1. Warranty Period on the function of the Switchable Privacy Glass Unit: 5 years from date of receipt by purchaser
    - a. Defects in material or workmanship causing material obstruction of vision as a result of electrical failure of the switchable film.
    - b. Defects in material or workmanship causing the switchable film to no longer switch from frosted to translucent.
  2. Warranty Period on the lamination of Switchable Privacy Glass: 5 years from date of shipment
    - a. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard of ASTM.

## 2.PRODUCTS

### 1. MANUFACTURER

- A. Basis of design is LC Privacy Glass by Innovative Glass Corp., 120 Commercial Street, Plainview, New York 11803. Phone 516-777-1100. Fax 516.777.1106. Web Site [www.innovativeglasscorp.com](http://www.innovativeglasscorp.com) , other manufacturers may be allowed provided that all performance requirements and design intent are met.
- B. Substitutions:

1. [Not permitted] or [Requests for substitutions must be approved in writing or by addendum no later than ten (10) days prior to bid due date and in keeping with Division 1 Substitutions of the specifications (Section 012500).]

## 2. FABRICATORS

- A. Sealed Insulating Glass Units, Laminated Glass Units, Heat-Strengthened Glass, Tempered Glass, and Spandrel Glass:
- B. Acceptable Fabricators: All must be certified by glass manufacturer.

## 2.3 LAMINATED SWITCHABLE PRIVACY GLASS MATERIALS

- A. Switchable Privacy film: Approx. [0.012 inch] [0.40 mm] thick film
- B. Interlayers: .060 total interlayer thickness typical
- C. Glass Components:
  1. Annealed clear OR low iron glass: Clear, transparent, flat, annealed, float glass, conforming to ASTM C1036, Type I, Class 1, Quality q3.
  2. Color tinted glass: Blue, Green, Gray, Bronze, tinted, annealed, float glass conforming to ASTM C1036, Type I, Class 2, Quality q3. (Optional)
  3. Reflective coated tinted glass: Color tinted float glass with metallic oxide coating deposited during production and conforming to ASTM C1036, Type I, Class 2, Quality q3. (Optional)
  4. Low emissivity (low-E) glass: Hardcoat or Softcoat to be specified (Optional)
  5. Heat strengthened glass: Provide heat strengthened, annealed glass components where indicated or required to adequately support imposed loads, to allow for large glass size, and resist anticipated thermal stresses in accordance with ASTM C1048, Kind HS.
  6. Fully tempered glass:
    - a. Provide heat tempered, annealed glass components where required to adequately resist loading conditions, size of units, and anticipated thermal stresses in accordance with ASTM C1048, Kind FT.
    - b. Fully tempered glass shall meet requirements of ANSI Z97.1 and CPSC 16 CFR to qualify as safety glass.
  7. Plastic glazing: Transparent, flat, impact resistant polycarbonate plastic sheet with abrasion resistant coating.
  8. Standard Switchable Glass thickness make-ups (Specifier to select):  
 $5/16'' (8\text{mm}) = 1/8'' \text{ Glass} / \text{LC Interlayer} / 1/8'' \text{ Glass}$   
 $7/16'' (11\text{mm}) = 3/16'' \text{ Glass} / \text{LC Interlayer} / 3/16'' \text{ Glass}$   
 $9/16'' (14\text{mm}) = 1/4'' \text{ Glass} / \text{LC Interlayer} / 1/4'' \text{ Glass}$
  9. Edge treatment of glass to be (Specifier to select one):
    1. Ground Verticals – *Use this for butt glazed glass panels where no vertical edges are exposed.*

2. Polished Verticals – *Use this for butt glazed panels where vertical edges will be exposed. All glass doors will also use this option.*
  3. Edge Seal – *Use this when panels are captured on all sides.*
10. Bus bars used to terminate switchable film will be made of copper foil conductive tape and will be positioned on the top of the panel unless otherwise specified.

**Special Note to Specifier:** *LC Privacy Glass maximum standard glass panel width is 55 inches x 144 inches. For larger sizing specifier should consult with Innovative Glass representative.*

## 2.4 ELECTRICAL REQUIREMENTS

- A. Operating Voltage: 110 – 120 VAC / 50 – 60 Hz
- B. Operating Current: .012 Amps (12mA per SqFt.)
- C. Power consumption: Less than 1 watt per sq ft of privacy glass.
- D. One LCPS-1 Surge Protection Power Module required per independently controlled zone
- E. Bus bars will be visible for 5/8” in from the edge of the glass and installer should account for adequate frame coverage to hide them during installation.
- F. Panels shall be fabricated with 2-Conductor 18Ga Wires; 15-20ft long through Connection Nipple or Lay Flat Wiring Bar.
- G. Wires should be captured in 3/8” Trade Size Greenfield Conduit or “other” suitable conduit for job conditions and routed back to approved junction box that is in accordance with local electrical codes.
- H. Power from the building, the LCPS-1 Power Module and Wires from the glass shall be spliced together at Junction Box.
- I. All wiring to be completed in accordance with manufacturer’s wiring instructions.
- J. Electrical controllers used must be capable of controlling 120VAC On/Off
- K. Glass may be integrated into building automation system for automated and remote control. System must have prior approval of glass manufacturer.

## 2.5 PERFORMANCE

A. Visible haze is expected when Switchable Privacy Glass is in the transparent state. Noticeable haze will be 7-10% depending on substrates used in the glass make-up. Haze will be more noticeable when glass is viewed off-axis (at an angle) and less noticeable when viewed straight on. (Refer to manufacturer's Application Note LC-101)

B. Operating Temperature Range (installed environment):

Range = 14°F to +122°F

C. Specular Light Transmittance

1. T (On) – 75%
2. T (Off) - .01%

D. Parallel Light Transmittance:

1. T (On) – 70%
2. T (Off) – 5%

E. Total Light Transmittance:

1. T (On) – 75%
2. T (Off) – 51%

F. Switchable Glass must be UL Listed

G. Switching Speed ON/OFF:

<15ms/50ms

## 2.6 SPECIAL APPLICATIONS

A. Projection Screen: *In the frosted state Switchable Privacy Glass can be used as a projection screen. Images will appear clearest when a rear projector is used.*

B. Interactive Whiteboard: *Switchable Privacy Glass is a writable surface when a Dry Erase Marker is used. Writing will be visible from both sides.*

C. Curved Glass: *Switchable Privacy Glass can be made using curved glass. Please consult Innovative Representative for limitations.*

### 3. EXECUTION

#### 1. EXAMINATION

- A. Examine areas to receive glass. Notify Architect of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

#### 2. PREPARATION

- A. Verify glazing openings are correct size and within tolerance.
- B. Verify glazing channels, recesses, and weeps are clean and free of obstructions.

#### 3. GLAZING

- A. Install glass in accordance with manufacturer's instructions, except where local codes or GANA Glazing Manual indicate more stringent requirements.
- B. Acceptable glazing silicones for field glazing into frames.
  - 1. Only DOW995 shall be used in any enclosed glazing pocket
  - 2. DOW1199 Silicone should be used to fill butt joints

#### 4. FIELD QUALITY CONTROL

- A. Coated glass, when viewed from minimum of 10 feet, exhibiting slightly different hue or color not apparent in hand samples, will not be cause of rejection of glass units, as determined by Architect.
- B. Verify glass is free of chips, cracks, and other inclusions that could inhibit structural or aesthetic integrity PRIOR TO INSTALLATION.
- C. All glass panels to be electrically tested before and after installation.
- D. Glass shall be demonstrated to Owner after installation.

#### 5. CLEANING

- A. Clean glass promptly after installation in accordance with manufacturer's instructions.
- B. Remove labels from glass surface.
- C. Do not use harsh cleaning materials or methods that would damage glass.
  - 1. Refer to the following GANA Glass Information Bulletins:
    - a. GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
    - b. GANA TD-02-0402 - Heat-Treated Glass Surfaces Are Different.
    - c. Innovative Glass eGlass Cleaning Guide (Optional)
- D. Do not use scrapers or other metal tools to clean glass.

6. PROTECTION

- A. Protect installed glass from damage during construction.
- B. Protect installed glass from contact with contaminating substances resulting from construction operations.
- C. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

**END OF SECTION**