



*Simplicity. Serviceability. Durability.*



## Flush Glass Windows, Upper Opening Transom, Fixed Lower + Optional Window Guards

**40' Bus Length:** A minimum of 11,000 square inches of window area, including operator and door windows shall be required on each side of the standard configuration bus.

**35' Bus Length:** A minimum of 10,000 square inches of window area, including operator and door windows shall be required on each side of the standard configuration bus.

### OPERATOR'S SIDE WINDOW

The operator's side window shall be a full-height sliding type, requiring only the front half of the sash to open sufficiently to permit the seated operator to easily adjust the street side outside, side view mirror. This window section shall slide rearward in tracks or channels designed to last the service life of the bus. When in an open position, the window shall not rattle or close during vehicle braking or acceleration. The operator's side window shall be a frame within a frame design incorporating a flush outside frameless appearance that permits the removal and replacement of the outer frame assembly with glazing in four minutes or less. The operator's window design shall incorporate comparable window seals as the side window assemblies, including a dual vertical seal installed at the glazing joint. The glazing material shall be one-quarter inch or 6mm single density tempered safety glass, conforming to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

### SIDE WINDOWS

#### Design

All side windows shall be fixed in position using an internal clamp ring, except as necessary to meet the emergency escape requirements. All side windows except windows in passenger doors and those smaller than 500 square inches, shall be transom type, tip-in, flat glazed with the sash glazing comprising between 25% and 35% of the total window area. The destination sign window shall be a fixed over fixed design. The transom window panels shall be fit resulting in a flush outside appearance and shall open inward and be equipped with latches and gas cylinders to ensure smooth long term operation with replaceable mounting blocks that secure the window in a fully open and fully closed position. The side window assembly design shall incorporate a flush outside frameless appearance showing no outside exposed fasteners. The glazing portion of the side window assembly may not project more than one-half inch from the inside surface of the glazing to the outside surface of the bus body skin. The transom shall use a positive engagement mechanism that holds the transom in place when closed and minimizes sash rattle and air and water leakage. The transom window panel assembly shall be designed to permit the independent removal and replacement of the outer assembly within four minutes. The side window assembly shall be a frame within a frame design that permits the removal and replacement of the outer frame assembly including bonded glazing without

removing the complete window assembly from the bus structure. The glazing attached to the outer frame shall be designed so that it may be removed from the frame and replacement glazing installed according to the detailed bonding instructions provided by the window manufacturer. Side windows shall be mounted in the bus structure so that flexing or vibration from engine operation or normal road excitation is not apparent.

All side window glazing shall be replaceable in less than four (4) minutes by a 3M mechanic using a simple hex head wrench and without disturbing the adjacent windows. Emergency escape windows shall open for emergency escape by means of a durable, heavy-duty cast aluminum handle assembly located on one side of the window and below the window centerline, a decal with operating instructions clearly marked and imprinted is to be securely installed on each emergency egress window assembly. The window construction shall be designed using a "Water Management" system that incorporates a visible indirect water drainage system to the exterior of the window and will prevent the entrance or backup of water into the bus interior or sidewall. Drains of sufficient size shall be used at the bottom of each sash that allows drainage of interior condensation to the exterior of the bus. The window manufacturer shall perform a water test that assures the "Water Management System" is functioning properly and is equal to or greater than the following parameters: **12 gallons of water/minute @ 40 psi with multiple strategically placed nozzles for a duration of 10 minutes.**

## Materials

**Seals:** The window to bus structure exterior seal shall be a heavy EPDM exterior protective design combined with single-durometer EPDM foam to ensure maximum seal capacity. The outer frame assembly shall be sealed against the inner frame using a dual seal design that will ensure maximum sealing against water leakage.

**Frames:** Window assemblies shall be constructed using 6063-T4 and 6063-T6 aluminum as required for high strength components or suitable composite materials; all materials must be chemically compatible with the window frame and the bus body. Unless otherwise specified aluminum materials used to construct window frames shall be hard anodized per Aluminum Association AA-C22-A21 with hard coat additive. All fasteners and brackets required in the assembly of the window frame shall be stainless steel. Whenever possible window elements not designed for disassembly shall be bonded together to reduce the potential for vandalism and enhance durability. Such bonding must be stronger than the fasteners it replaces.

**Glazing:** All glazing materials, including the transom and lower glazing shall be one quarter-inch or 6mm nominal thickness tempered (heat treated) safety glass with a #1 SAE edge finish, strictly conforming to applicable sections of FMVSS 205 and ANSI Z26.1 – 1997 standard for Type AS-3 Safety Glazing Material. Glazing color shall be neutral, complementary to the bus exterior and consistent from window to window. The maximum solar energy transmittance shall not exceed 42% as measured by ASTM-424, except on the upper destination glazing, which shall be clear.

**Window Guards/Graffiti Protection:** All side window assemblies shall be designed to accommodate all available graffiti protection options. Window assemblies shall be provided with "G3 Rapid Replacement Window Guard" system or approved equal and shall not require the use of fasteners or retaining rings to secure the window guards to the window assembly. The window guard material shall conform to the requirements of FMVSS 205 (ANSI/SAE Z26.1) AS-5, 0.125 (1/8") clear acrylic or polycarbonate to meet the requirements of specification Sections 2.4.1, 2.4.2, 2.4.3, and 2.4.4. Window guards shall be installed with a visible air space between the main glazing and glazing shield to permit moisture and condensation to dissipate. Window guards shall be removable using nothing more than standard, ammonia-free window cleaner and two standard suction cups. Window guard removal shall not disturb the integrity of the primary glazing.

**Warranty:** All Window assemblies including frames, rubber seals, and glass shall be warranted covering the integrity and deterioration or delamination of the glazing for a period of two years, in normal city service. Warranties shall cover all material, labor and workmanship, excluding damage caused by vandalism, bus accidents, poor care and maintenance.

**DOT and Manufacturer Identification:** Each glazing component and or window guard shall have the manufactures Department of Transportation (DOT) registered identification "bug" permanently applied according to the DOT requirement, the "bug" shall include the date (month and year) of manufacture applied in the same location.