

## **5.4.6.4 OPERATOR'S SEAT – RECARO ERGO METRO 8H0.31.222.CC11**

### **5.4.6.4.1 Dimensions**

The operator's seat shall be comfortable and adjustable so that persons ranging in size from the 95th-percentile male to the 5th-percentile female may operate the bus. While seated, the operator shall be able to make all of these adjustments by hand without complexity, excessive effort, or being pinched. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes. Graphical Symbols shall conform to SAE Recommended Practice (Proposed) J1458, Universal Symbols for Seat and Suspension Adjustments.

#### **5.4.6.4.1.1. Seat Pan Cushion Length and width**

Measurement is from the front edge of the seat pan to the rear at its intersection with the seat back. The seat pan length shall be no less than 16" at its minimum length and no less than 20" at its maximum length adjustment. 2" of seat cushion adjustment is required. The seat cushion pan should be a minimum of 19" wide.

#### **5.4.6.4.1.2 Seat Pan Cushion Height**

Measurement is from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from no more than a minimum of 13" and no less than a maximum of 19", with at least a 6" range of adjustment.

Alternative Measurements: The reference point for the seat height shall be determined by establishing the H-point.

Alternative Specifications: The seat shall have a minimum height adjustment range of 6".

#### **5.4.6.4.1.3 Seat Pan Cushion Slope**

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 degrees). The seat pan shall adjust in its slope from no less than plus 10-degrees (rearward "bucket seat" incline), to no less than minus 5-degrees (forward slope), total of 15-degrees.

#### **5.4.6.4.1.4 Seat Base Fore/Aft Adjustment**

Measurement is the horizontal distance from the heel-point to the rear front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (around 16"). On all low-floor buses, the seat-base shall travel horizontally a minimum of 11". It shall adjust no closer to the heel-point than 6". On all high/low-floor buses, the seat-base shall travel a minimum of 11" and adjust no closer to the heel-point than 6". Seat must have dual locking seat tracks with a manual release and an automatic release.

#### **5.4.6.4.1.5 Seat Pan Cushion Width**

Measurement is the horizontal distance from the heel-point to the rear front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (around 16"). Seat pan width should be a minimum of 19" wide with a fore/aft distance of 15" to 19" in length.

#### **5.4.6.4.1.6 Seat Suspension**

The operator's seat shall be appropriately dampened with dual shocks and one shock must be adjustable. Suspension must be able to support a 100-400 lb. Driver.

#### **5.4.6.4.1.7 Cab Depth**

The measurement is the horizontal distance from the heel-point to the barrier at the height at which the top of the seat back reclines. For all low floor buses, the cab depth shall be a minimum of 45% and be able to accommodate the full range of seat adjustment and travel (for a seat with the specifications as described in these guidelines). For all high-floor buses, the cab depth shall be a minimum of 43".

#### **5.4.6.4.1.8 Seat Back Width**

Measurement is the distance between the outer-most points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 21". A solid stamped steel back must support the seat back foam.

#### **5.4.6.4.1.9 Seat Back Lumbar Support**

Measurement is from the bottom of the seat back at its intersection with the seat pan, to the top of the lumbar cushioning. The seat back shall provide adjustable depth lumbar back support in at least 3 air bags located between 3" – 10", minimum.

#### **5.4.6.4.1.10 Seat Back Angle Adjustment**

The seat back angle shall be measured relative to a level seat pan, whereas 90 degrees is the upright position and 90 degrees-plus represents the amount of recline. The angle can be measured using a protractor (or its equivalent) with the X-axis being the horizontal plane of a level seat pan, and the Y-axis the upright plane of the seat back. The angle is created by the intersection of the two planes, with the upright plane parallel to the frame of the seat back.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 115 degrees (reclined), with infinite adjustment in between.

#### **5.4.6.4.1.11 Seat Belt Adjustment**

The Type I seat belt shall attach at a point that moves with the assembly. Minimum length of 72". Buckle to have a top release mechanism. Seats belts shall be extended length to a

accommodate operators of all within the 5<sup>th</sup>-95<sup>th</sup> % male/female. The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

*Baseline: Standard (lap only) seat belt.*

Required Type I seat belts shall be fastened to the seat so that the operator may adjust the seat without resetting the seat belt. Seat belts shall be stored in automatic retractors.

*Alternative: Three-point (lap and shoulder) seat belt. – Type II Retractor - ELR*

Seat belts shall be provided across the operator’s lap and diagonally across the operator’s chest. The operator shall be able to use both belts by connecting a single buckle on the right side of the seat cushion. The belts shall be fastened to the seat and/or the bus structure so that the operator may adjust the seat without resetting the seat belt. Seat belts shall be stored in automatic retractors. Seats belts shall be extended length to a accommodate operators of all within the 5<sup>th</sup>-95<sup>th</sup> % male/female. The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

#### 5.4.6.4.2 Seat Structure and Materials

The operator's seat shall be contoured to provide maximum comfort for extended period of time. Cushions shall be fully padded with at least 3 inches of closed-cell foam or material with equal properties, in the seating areas at the bottom and back. Upholstery shall be ventilated, transportation grade black Craftex clothe tested to:

**CRAFTEX** Upholstery Fabric  
TRANSPORTATION INTERNATIONAL

FIBER	<i>100% Nylon</i>
WEIGHT	<i>15.0 +/- 1. Oz. Per linear yard</i>
WIDTH	<i>54”</i>
REPEAT	<i>None</i>
BACKING	<i>Acrylic</i>
ABRASION	<i>1,000,000+ double rubs (Wyzenbeek ASTM-D-4157)</i>
LIGHTFASTNESS	<i>500 hours, Class 5 (AATCC Test Method 16E)</i>
COLORFASTNESS	<i>Wet – Class 5; Dry – Class 5 (AATCC Test Method 8)</i>
STAIN RELEASE	<i>Grade 5 (AATCC 130)</i>
FLAME RESISTANCE	<i>California Technical Bulletin 117, Section E; CS-191-53, Class 1; BIFMA FF1-78; NFPA 260-1989; UFAC, Class 1; B.S. 5852 Part 1: 1979 Ignition Source 0; Smoldering</i>

## *Cigarettes*

All visually exposed metal on the operator's seat, including the pedestal, shall be powder-coated steel.

*Alternative: SS Riser*

The seat shall withstand 10,000 impacts of a 40-pound sandbags dropped from a height of 12 inches without visible deterioration. The seat shall be tested in the lowest vertical position and repeated with the seat in the top vertical position.

The 40-pound sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times from distances of 6, 8, 10, and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3-1/2-inch drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering.

At the request of the Procuring Agency, the Contractor shall provide a certified test report fully documenting compliance with all the requirements defined above upon request. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformation of the seat assembly. The report shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications.

Color of the operator's seat is defined in the attachments to Part 5: Technical Specifications.

### **5.4.6.4.2.a Additional Requirements:**

- Seat must include a 2-year parts and labor warranty
- Seat back must have dual recliner gears for added support.
- Seat back must include a stamped steel back to fully support the foam
- Seat must include a quick release riser that one mechanic can remove in 5-minutes.
- Seat must include a 4-way adjustable headrest
- Seat back must be protected with a full seat back protector.
- Seat must meet all applicable FMVSS and CMVSS standards.

### **5.4.6.4.2.b Foam Requirements:**

Seat to be manufactured with a closed cell foam tested to meet:  
DIN Standards: Density – 53420; Compression Hardness – 53577; Coefficient Hardness/  
Compression Force – 53579; Compression Set – EN ISO1856; Tensile Stregnth – 53571;  
Tear Strength – 53356; Heat Aging – 53578; Must meet all FMVSS/CMVSS requirements.

*Alternative: Docket 90A for Foam and Fabric – FR Treated Fabric and Foam*