2.4.1.2.5. Latch - The emergency door shall be equipped with a slide bar rack and pinion (cam) operated latch. The slide bar shall be approximately 1-1/4 inches wide and 3/8-inch thick and shall have a minimum stroke of 1-1/8 inches. The slide bar shall be spring loaded so as to retain the bar in the closed position and have a minimum of one inch of horizontal bearing surface beyond the edge of the door frame when the door lock is in a latched position.

2.4.1.2.6. Latch Handle - The movement of the latch handle through its full arc of operation shall not be obstructed by, or extended into the area behind the rear seats at the emergency door. The handle, when in the closed position, shall meet the requirements of FMVSS No. 217. The design of the latch handle shall allow quick release, but shall offer protection against accidental release. Control of the fastening devices from the driver's seat shall not be permitted. A pull handle shall be installed on the inside of the emergency door so that the door can be securely closed for positive fastening. Provisions for opening from the outside shall consist of a handle (device) designed to prevent "hitching a ride" yet allowing the door to be opened when necessary. The outside handle, when in the closed position, shall extend vertically downward from its pivot center.

2.4.1.2.7. Switch - The emergency door latch shall be equipped with a heavy-duty electric plunger type switch connected to a warning buzzer located in the driver's compartment. The switch shall be enclosed in an adequately protected case, and wires leading from switch shall be concealed in the walls. The switch shall be installed so that the buzzer will sound before the door handle is turned far enough to permit the door to open. The switch shall be Cole-Hersee's No. 9118 having an upset end (knob) on the plunger head.

2.4.2. Side Emergency Exits and Roof Hatches - Texas school buses shall be provided with side emergency exits and roof hatches. These side emergency exits may be either side emergency doors meeting the requirements of Par. C.2.4.1. above (except that they shall be hinged on the forward side) or they may be push-out type side windows meeting the requirements of Par. C.2.19.1.2. and FMVSS No. 217. Single emergency exits shall be installed near the center of each side. **When so specified in the Invitation for Bids, (see Option 43)** additional push-out side windows shall be installed (quantity shall be specified by school district). If more than one emergency exit per side is provided, they shall be as "equally spaced" as practical. Roof hatches shall be the body manufacturer's standard. They shall be equipped with an external and internal handle. Texas school buses shall be provided with <u>minimum</u> side emergency exits and roof hatches as follows:

BUS CAPACITY	**MINIMUM REQUIRED EXITS/HATCHES**
Up to 22-passengers	1 emergency exit per side and 1 roof hatch
23- thru 65-passengers	1 emergency exit per side and 2 roof hatches
Larger than 66-passengers	2 emergency exits per side and 2 roof hatches

2.5. **FLOORS** - The standard floor construction of the bus body manufacturer shall be used if a steel floor is not furnished with the bus chassis. If the floor is furnished with the chassis, then the floor shall be covered with material as described below:

2.5.1. Installation - Plywood shall be installed in the areas under all seats including the driver's seat. It may be cut to fit around any permanently-attached driver's seat provided by the chassis manufacturer.

2.5.2. Material - The floor shall be covered with plywood securely attached to the existing steel floor. The plywood shall be 5/8-inch nominal thickness, A-C or B-B Exterior grade manufactured in conformance with U.S. Product Standard PS 1-83. CDX interior grade plywood with exterior glue is acceptable when all surfaces including the edges of the wood are covered or sealed against the exterior environment.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

2.6. FLOOR COVERING -

2.6.1. Aisle Material - Floor covering in the aisle shall be the aisle-type, fire-resistant rubber or equivalent, and shall be nonskid, wear-resistant, and ribbed. Minimum overall thickness shall be 3/16 inch measured from tops of ribs. Rubber aisle floor covering shall meet Federal Specification ZZ-M-71D.

2.6.2. Installation - Floor covering (except that on the toe board) shall be permanently bonded to the floor with waterproof adhesive material and shall not crack when subjected to sudden temperature changes. All seams shall be sealed with waterproof sealer.

2.6.3. Trim - Seams shall be covered with the bus body manufacturer's standard aluminum trim using countersunk flat or oval screws.

2.6.4. Underseat Material - The floor in the underseat area (including wheelwells, and the areas under the driver's seat and wheelchairs) shall be covered with fire-resistant, rubber floor covering or equivalent having minimum overall thickness of 1/8 inch.

2.7. PANELS, EXTERIOR - Exterior panels shall be steel; however, front door farings and front and rear end-caps only may be fiberglass or heavy-duty plastic.

2.7.1. Attachment and Installation - All exterior panels shall be attached to bow frames and strainers so as to act as an integral part of the structural frame. They shall be installed by lapping and riveting, lapping and bolting, or by flanging and bolting and in such a manner as to form watertight joints.

2.7.2. Joints - Joints shall meet the requirements of FMVSS No. 221.

2.8. PANELS, INTERIOR - All interior wall and ceiling panels shall be steel and of the body manufacturer's standard design except the panels beneath the windows shall be clear-coated galvanized embossed steel meeting ASTM A 446. Also the stepwell and riser panels in the service door entryway shall be clear-coated galvanized steel (embossing not required). Galvalume, aluminized steel, and aluminum over steel panels are acceptable for use beneath the windows and in the entryway. Interior panels made of 0.032-inch, 3105-H14 aluminum may be used in 15- and 18- passenger buses only.

2.8.1. Attachment - All interior panels shall be attached to the frame structure by bolts, rivets, or by any well-designed method utilizing self-locking panels, or locking panel strips. Regardless of the method used, the panels shall be attached so that vibration, rumbling, and popping shall be at a minimum.

2.8.2. Design - Front and rear panels shall be formed to present a smooth, pleasing appearance. If the ceiling is constructed so as to contain lapped joints, the forward panel shall be lapped by the rear panel and all exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2.9. RUB RAILS - Two separate, one-piece continuous rub rails of the type, grade, and thickness of steel specified in Table No. 9 (or approved equal), shall be installed on the body as described below. The minimum finished width of all rub rails shall be 4 inches:

2.9.1. Construction - The rub rails shall be of ample strength to resist impact and to prevent crushing of the bus body and shall be a flanged-formed channel, longitudinally fluted, or corrugated rib surface. Ends shall be (1) smoothly closed, or (2) closed by a rounded or beveled metal end cap which shall be butt- or flash-welded to the rub rail, or (3) closed by a rounded or beveled metal end cap inserted with an approximate one-inch sleeve inside of the rub rail and riveted in position at the top and bottom of the rub rail, or riveted in position at the top and bottom of the rub rail flange, or riveted in the center of the end cap, and sealed in the same manner as the top flange of the rub rails.

C. **15- THROUGH 20-PASSENGER BODY SPECIFICATIONS**

2.17. **VENTILATION** - The bus body shall be equipped with a suitable, controlled ventilation system of sufficient capacity to maintain a satisfactory ratio of outside to inside air under normal operating conditions without opening windows except in warm weather.

2.18. **WHEELHOUSING** - The wheelhousing shall be the manufacturer's standard design. (See Par. C.11.10. for undercoating requirements.)

2.19. **WINDSHIELD AND WINDOWS** -

2.19.1. General Design -

2.19.1.1. Side Windows, Passenger, Standard - There shall be either a standard or a push-out type window for each passenger seat except where it is not possible because of the installation of side emergency exits (see paragraphs C.2.4.2. and C.2.19.1.2.). Standard side windows shall open from the top only and shall operate freely. All side windows except the driver's and the service door window, shall be the split sash type with positive latch. **Side windows that can be latched in an uneven position are not acceptable.** They shall be furnished with a latching mechanism which will allow each window to be latched in a position not more than six inches from the top. The passenger side windows shall provide an unobstructed opening 22 inches wide and between 9 and 10 inches high.

2.19.1.2. Side Windows, Passenger, Push-out Type - At the manufacturer's option, 15- through 20-passenger buses may be provides with one push-out side window **in lieu of** an emergency exit on each side (see paragraphs C.2.4.1. and C.2.4.2. and Option 3). These windows shall be hinged at the top and shall be positioned for ease of egress. These push-out windows shall be the body manufacturer's standard push-out passenger windows meeting or exceeding Federal Standards.

NOTE: Push-out windows shall be equipped with an electrical switch connected to an audible signal automatically operated and located in the driver's compartment which shall indicate when the window is pushed out in excess of 1/2 inch. The switch shall be enclosed to prevent tampering. Wires leading from the switch shall be concealed in the walls. No cut-off switch shall be installed in the circuit.

2.19.1.3. Service Door and Emergency Door Windows - The windows of either style emergency door and Style 2 service doors (see Par. C.2.4.1.) shall be furnished with upper glass panels permanently closed and set in rubber or sealed in rubber.

2.19.1.4. Windshield - The maximum width of the windshield center post shall not exceed 2-1/2 inches. There shall be at least 2 inches of clearance between the steering wheel and the windshield, cowl, instrument panel, or any other surface.

2.19.2. Glazing - Glass shall be installed in rubber channel gasket material or approved equivalent material. The glass shall be mounted so that the permanent identification mark is visible from either inside or outside of the bus. **All safety glazing materials shall be approved by the Department of Public Safety.** All exposed edges of glass shall be banded. The glass shall be as follows:

2.19.2.1. Rear and Other Windows - The glass in the rear (side) windows, and **all** other windows including the driver's side windows and the emergency door windows, shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better as specified in ANSI Safety Code Z26.1.

2.19.2.2. Safety Plate Glass, Optional - **When so specified in the Invitations for Bids** (see Option 26), all windows shall be AS-2 grade or better laminated safety plate glass.

2.19.2.3. Side Windows, Passenger - The glass in all passenger side windows (including push-out type emergency windows) shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better, as specified in ANSI Safety Code Z26.1.

2.19.2.4. Windshield - The windshield shall be minimum 7/32-inch thick safety plate glass and shall be heat-absorbent, laminated AS-1 safety glass meeting ANSI Standard Z26.1, as amended.

C. **15- THROUGH 20-PASSENGER BODY SPECIFICATIONS**

2.19.3. Tinting -

2.19.3.1. Side Windows, Passenger - **When so specified in the Invitation for Bids** (see Option No. 10), passenger side windows and push-out type emergency windows only shall be tinted to minimum 30%, maximum 40% light transmittance using AS-3 grade glass or better. This is defined as **"dark tinting"** and is not permitted on the windshield or any window used for driving purposes.

Note: All safety glazing materials must be approved by the Department of Public Safety.

2.19.3.2. Windshield - The windshield shall have a horizontal gradient band (tinted) starting slightly above the driver's line of vision with approximately 90% light transmittance and gradually decreasing to a minimum of 70% light transmittance at the top of the windshield, or the entire windshield shall be tinted to meet the requirements of FMVSS No. 205.

C.3. ACCESSORIES, REQUIRED AND OPTIONAL -

3.1. **BACKUP ALARM** - An automatic, audible backup warning alarm meeting the requirements of Type C, 97 dB(A), SAE J994b (except for 12-volt system) shall be installed behind the rear axle.

3.2. **DEFROSTERS** - Defrosting equipment shall keep the windshield, the window to the left of the driver, and the glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103. Any circulating fan used in defogging and installed on the curb side of the bus front shall be mounted on the windshield header so as to protect the fingers, hair, and clothing of entering and departing passengers.

3.3 **EMERGENCY EQUIPMENT** - 15- Through 20-passenger school buses shall be equipped with the following emergency equipment:

3.3.1. **Body Fluid Cleanup Kit** - Each bus shall be provided with a removable and moisture-proof body fluid cleanup kit. It shall be properly mounted and identified as a Body Fluid Cleanup Kit. This kit shall contain as a minimum, the following items mounted in a removable metal or hard plastic kit:

1 - 15 oz chlorine-type absorbent deodorant material (or equal)
1 - 12 oz germicidal spray disinfectant
2 - pair disposable latex gloves
4 - 18" x 18" absorbent towels
1 - plastic pick-up spatula
1 - plastic hand broom
1 - plastic dust pan
2 - 14" x 19" disposal bags and ties (waterproof)
2 - adhesive "BIO-HAZARD" labels
1 - 12 oz deodorant spray
4 - individually wrapped, cold sterilization wipes in foil-lined pouches
2 - paper respiratory masks
1 - metal or hard plastic container identified as "BIO-HAZARD" with black symbol and lettering on orange mountable case.

3.3.2. **Fire Extinguishers** - School buses shall be equipped with a fire extinguisher, as listed below:

3.3.2.1. Standard Fire Extinguisher - Each bus shall be equipped with at least one refillable stored pressure Multi-purpose Dry Chemical type (or approved equal) fire extinguisher of minimum 5-pounds capacity, mounted in extinguisher manufacturer's automotive type bracket, and located in driver's compartment in full view of and readily accessible to driver. The fire extinguisher shall bear the Underwriters Laboratory Listing Mark of no less than 2A 10-B:C rating. Extinguishers shall be furnished with a hose, pressure gauge, and metal head.

(Par. 3.3.2.2. - Halon Type Fire Extinguisher [deleted])

2.1.10.2. Grille - A sufficiently reinforced grille assembly.

2.1.10.3. Hood - Hood cover with latching mechanism providing access to the forward part of engine.

2.1.10.4. Lamps - Headlamps and parking/turn-signal lamps as required by FMVSS No. 108.

2.1.11. Fuel Filler Opening - The body manufacturer will provide an opening in the body panel of sufficient size to allow easy access and entry of fuel nozzle to the fuel tank filler neck opening. This opening in the panel must be so positioned that the filler neck, when viewed at right angles from the side, is approximately centered in the cut-out. This opening shall be provided with a hinged cover so designed and constructed to remain open when fueling is in progress and remain in a totally closed position at all other times (see Par. E.2.10.3.1.).

2.1.12. Identification Plate - Each body shall bear in a prominent place a permanently attached plate showing the name of the manufacturer and the body serial number (see Par. A.6.4.2.).

2.1.13. Steering Wheel Placement - There shall be at least 2 inches clearance between the steering wheel and the cowl, instrument panel, or any other surface.

2.1.14. Wood - The use of wood shall be limited to the construction of passenger seats, seat backs, or header pads, and the bottom of any tool compartment or to insulate floors.

2.2. **ACCESS PANELS** - Any panel used for access to the engine radiator or radiator overflow container and installed in the passenger compartment shall have a keyed lock. (This does not include the engine cover.)

2.3 **BATTERY COMPARTMENT** - If the battery is mounted on the chassis frame (which is required on diesel-powered buses), the bus body manufacturer shall provide a battery compartment beneath the floor of the bus body. This compartment shall be a skirt type container, reinforced and equipped with a pullout receptacle and an outside access door. The battery compartment shall provide complete weather protection for the battery as well as total access for servicing (see Par. F.4.2.4.). **Battery cables of sufficient length shall be provided to accommodate the mounting of the battery in this compartment, and the body manufacturer shall mount the battery in the compartment. This compartment is not available on rear engine buses.**

2.4. **BODY FRAME** - The complete body frame shall be formed, welded, riveted, or lock bolted, assembled and constructed in accordance with recognized engineering practices within the bus body industry.

2.4.1. Design - The frame shall have a formed shape with a minimum cross sectional depth of 1-1/8 inches. Frame members, running from one side main cross member to the other side main cross member, may be continuous bow frames, or they may consist of side posts and roof bows. If side posts and roof bows are used, every pair of side posts must be connected by a roof bow to form the equivalent of a continuous bow frame. The side posts shall be set on not more than 30-inch centers, except that one side post and bow or one bow frame may be set on a maximum of 38-3/4 center, or three bow frame sections not exceeding 36-1/2 inches may be used in any one body (up to four 38-3/4 inch body frame sections may be used for Forward Control Rear Engine buses ONLY). Each of the side posts or bow frames shall be securely welded, riveted, or lock bolted to the floor system at each main cross member or to the longitudinal frame member which is located at the floor line. Each side post and/or bow frame must also be attached, as specified above, to the remaining longitudinal frame members.

2.4.2. Front Frame Section - The front frame shall be a unitized framework of formed sections designed with the necessary stress members required to withstand the torsional stresses set up by or in the chassis. The corner posts shall extend from the bottom of the body to the windshield header and shall not cause or produce a "blind spot" for the driver. The front assembly shall be securely attached to the floor system by lock bolting, welding, or riveting and shall be securely bolted to the chassis cowl in such a manner as to not to cause undue strain (see E.2.4.1.).

2.4.3. Longitudinal Frame Members - The body frame shall have not less than four individual side longitudinal frame members extending the full length of the body (except as interrupted by side posts or when cut for an opening for the wheelhousing). **One each shall be located at the floor line, the seat line, the belt line, and at the window header line.** The belt line longitudinal member may be replaced by an exterior rub rail, i.e., an extra rub rail in the belt line area. This rub rail shall meet requirements specified under **RUB RAILS, Par. E.2.10.**

2.4.4. Material - The body frame system (see Par. E.2.1.1.) shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal, and shall meet the requirements of FMVSS No. 220.

2.4.5. Rear Frame Section - The rear frame shall consist of a formed sill, two posts (one on either side of the emergency door, extending from the sill to the roof bow and intersected by a rear header at the proper point), and suitable strainers to form a rigid framework. This framework shall be assembled and attached to the floor system by welding, riveting, or lock bolting.

2.5. **EMERGENCY EXITS** - Texas school buses shall be provided with emergency exits as listed below:

2.5.1. **EMERGENCY DOORS** - The emergency door shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal. Emergency doors on buses furnished to this specification shall be equipped with doors meeting the requirements below. Emergency doors shall be furnished with upper glass panels, permanently closed, set in rubber or sealed against rubber. (See Par. E.2.19.2. for glazing requirements and Par. E.1.4.8. for lettering.) No seat or other object shall be placed in the body that restricts the passageway to the emergency door to less than 12 inches. There shall be no steps leading to the emergency door.

2.5.1.1. Attachment - The hinges for the emergency doors shall be attached with rivets or bolts, nuts, and lock washers. **Metal screws or self-tapping bolts are not acceptable.** Metal screws **may be used** for alignment of doors **while installing rivets.** Self-tapping bolts may be used for alignment **if** the bolts heads are **tack-welded** to the hinges (see Par. E.2.1.9.1.).

2.5.1.2. Design - The emergency door on all except rear-engine buses* shall be located in the center of the rear of the body and shall have a minimum horizontal opening of 30 inches and a minimum vertical opening of 48 inches measured from the floor level. The door shall be hinged on the right side of the body **(forward side for rear engine buses)**, shall open outward, and shall be designed to permit opening from both inside and outside of the bus. It shall be properly sealed against moisture and dust.

*A left rear emergency door meeting the requirements of FMVSS No. 217, shall be provided on rear engine buses.

2.5.1.3. Door Holding Device - A means (device) shall be provided to hold the swing-out type door(s) in the fully opened position (90° minimum).

2.5.1.4. Glass Panels - The glass in the emergency door shall have an area of not less that 299 square inches and shall be set solid in a waterproof manner (see Par. E.2.19.1.1.). The installation of glass in the lower portion of the door is required and shall meet the same requirements (lower glass panels **not** required in the emergency doors of rear engine buses). The lower glass panels shall be the body manufacturer's standard size. These glass panels shall be installed securely to prevent removal by hand.

2.5.1.5. Header Board - The head impact area on the inside at the top of the emergency door shall be protected by an energy-absorbing, padded header board, 3 inches wide and one inch thick, extending the full width of the emergency door to prevent injury when accidentally impacted.

2.8.5. Undercoating - All exterior panels shall be completely sprayed on the inside of the main exposed surfaces, and shall featheredge to the edge of the attaching members, with 1/16-inch thick material conforming to that specified in Par. E.1.11. The spraying shall be done after the panels are installed.

2.9. **PANELS, INTERIOR** - All interior wall and ceiling panels shall be steel and of the body manufacturer's standard design except the panels beneath the windows shall be clear-coated galvanized embossed steel meeting ASTM A446. Also the stepwell and riser panels in the service door entryway shall be clear-coated galvanized steel (embossing not required). Galvalume, aluminized steel, and aluminum over steel panels are acceptable for use beneath the windows and in the entryway.

2.9.1. Attachment - All interior panels shall be attached to the frame structure by bolts, rivets, or by any well-designed method utilizing self-locking panels or locking panel strips. Regardless of the method used, the panels shall be attached so that vibration, rumbling, and popping will be at a minimum.

2.9.2. Design - Front and rear panels shall be formed to present a smooth, pleasing appearance. If the ceiling is constructed so as to contain lapped joints, the forward panel shall be lapped by the rear panel and all exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2.10. **RUB RAILS** - Four separate, one-piece, continuous rub rails of the type, grade, and thickness of steel specified in Table No. 9 or approved equal, shall be installed on the body as described below. The minimum finished width of all rub rails shall be 4 inches:

2.10.1. Construction - The rub rails shall be of ample strength to resist impact and to prevent crushing of the bus body and shall be a flanged-formed channel, longitudinally fluted or corrugated rib surface. Ends shall be (1) smoothly closed, or (2) closed by a rounded end cap which shall be butt- or flash-welded to the rub rail, or (3) closed by a rounded end cap inserted with an approximate one-inch sleeve inside of the rub rail, riveted in position at the top and bottom of the rub rail flange, and sealed in the same manner as the top flange of the rub rails.

2.10.2. Drainage - The bottom edge of each rub rail (except the pressed-in-type which may be used near the window line) shall have provisions for drainage of accumulated moisture. One of the following drainage methods shall be used:

2.10.2.1. Slots - The bottom flange of the rub rail shall have a minimum of one inch by 0.32 inch formed slots spaced on not more than 12-inch centers, or

2.10.2.2. Slots or Slots - One 1/4-inch diameter slot or hole per foot in the lowest part of the rub rail **drilled prior to the priming, painting, and installation of the rub rail shall be provided.** Holes drilled after rub rail installation or after priming and painting are **not** acceptable. **Formed slots are preferred over drilled or cut holes.**

2.10.3. Installation - All rub rails shall be bolted or riveted on top and bottom to each side post and riveted on top and bottom to the exterior paneling between the side posts (see Exception in Par. E.2.1.8.5.). Provisions for one-piece rails may be accomplished by butt- or flash-welding. All welds, including those for the end caps, shall be dressed, sanded, and buffed. These rub rails shall be installed on both sides of the bus body as follows:

2.10.3.1. Floor and Skirt Level - The floor and skirt level rub rails and the additional rub rail furnished in lieu of one longitudinal frame member shall be installed the full outside length of the body (except at wheelhousings) on the right side from the service door to the rear corner radius and on the left side from the point of curvature near the outside cowl to the rear corner radius. One of the floor level rails **may be cut** to provide an opening for the gas tank filler neck **only** if fuel tank furnished to meet FMVSS No. 301-75 requires the opening to be enlarged, or to meet the requirements in E.2.1.10.

2.10.3.2. Seat Level - The seat level rub rail shall be installed from the service door completely around the bus body (except for emergency door and rear engine bus) to the point of curvature near the outside cowl on left side. The rails may be two-piece with the joint being near the rear side of the bus body. The rail extension shall be joined to the continuous side rail by one of the following (1) butt welding, (2) jogged lapped by not less than one inch and riveted, or (3) butted with a sleeve riveted over the joint. When joining is by lapping or fastening with a sleeve, the joint must be made at the rearmost body side post or **preferably**, the second post from the rear.

2.10.3.3. Window Level - The window level rub rail shall be installed the full outside length of the body on the right side from the service door to the rear corner radius and on the left side from the point of curvature near the outside cowl to the rear corner radius. The splice, if necessary, shall be located at the body post behind the rear wheelhouse, by lapping the full width of the supporting part of the post.

2.10.4. Location - One rub rail shall be installed at the skirt level, one at or near the floor, one at or near the seat level, and one near the window line. One additional rub rail may be furnished in lieu of one longitudinal frame member (see Par. E.2.4.3.).

2.10.5. Sealing - The top joint of the rub rail shall be sealed with a caulking compound or adhesive as specified in Par. E.2.1.4.

2.11. **SEAT BARRIERS** - Seat barriers shall be furnished and installed in accordance with FMVSS No. 222. The front barriers shall not infringe upon the area required for safety and operating equipment.

2.11.1. Handrail - A grab handle or handrail of sufficient length to assist entering and exiting passengers shall be installed on the forward side of the right barrier. The outside surface of this handle shall be stainless steel, polished aluminum, or chrome-plated steel.

2.11.2. Knee Space - Knee space between these barriers and the front of each front passenger seat shall be at least 24 inches for 24-passenger bus, at least 24-3/4 inches for the 71S- and 83-passenger buses, and at least 25 inches for all other 35- through 77-passenger buses when measured from the modesty panel to the front of the seat back at the center of the seat approximately 4 inches above the seat cushion.

2.11.3. Upholstery - Barriers shall be covered with upholstery meeting the requirements of Par. C.2.12.3.6.

2.12. **SEATING REQUIREMENTS, DRIVER** -

2.12.1. Design - The base of the driver's seat shall be of the adjustable pedestal type or the platform type having an adjustment range of approximately 4 inches "Fore and Aft," and a separate minimum one-inch vertical adjustment. The back of the driver's seat shall be heavily padded and form-fitted.

2.12.2. Driver's High Back Seat, Optional - **When so specified in the Invitation for Bids**, a high back driver's seat shall be provided with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (as defined in FMVSS No. 208) and shall meet all of the applicable requirements of Par. E.2.12.1. above.

2.12.3. Driver's Seat Access - There shall be unrestricted access to the driver's seated position from either the aisle or the right service door without the operator having to climb over the engine cover or any other object. The minimum space between the driver's seat (in the rearmost position) and the engine cover or other object (except seat belt anchorage) at the floor and at the seat level shall be not less than 6 inches.

2.12.4. Installation - The pedestal or platform shall be mounted with bolts, flat washers, lock washers, and nuts except where it is impossible to use bolts and nuts at certain floor points due to main cross members or floor sill interference. Thread-forming or cutting bolts and lock washers may be used at these points.

NOTE: Push-out windows shall be equipped with an electrical switch connected to an audible signal automatically operated and located in the driver's compartment which shall indicate when the window is pushed out in excess of 1/2-inch. The switch shall be enclosed to prevent tampering. Wires leading from the switch shall be concealed in the walls. No cut-off switch shall be installed in the circuit.

2.19.1.6. Windshield - The maximum width of the windshield center post shall not exceed 2-1/2 inches. There shall be at least 2 inches of clearance between the steering wheel and the windshield, cowl, instrument panel, or any other surface.

2.19.2. Glazing - Glass shall be installed in rubber channel gasket material or approved equivalent material. The glass shall be mounted so that the permanent identification mark is visible from either inside or outside of the bus. **All safety glazing materials shall be approved by the Department of Public Safety.** All exposed edges of glass shall be banded. The glass shall be as follows:

2.19.2.1. Rear and Other Windows - The glass in all other window including the driver's side windows, emergency door windows, and rear (side) windows shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better as specified in ANSI Safety Code Z26.1.

2.19.2.2. Safety Plate Glass - **When so specified in the Invitation for Bids** (see Option 26), all windows shall have AS-2 grade or better grade **laminated** safety plate glass.

2.19.2.3. Side Windows, Passenger - The glass in all passenger side windows shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better, as specified in ANSI Safety Code Z26.1 (see Par. E.2.19.2.4.).

2.19.2.4. Windshield - The windshield shall be minimum 7/32-inch thick safety plate glass and shall be heat-absorbent, laminated AS-1 safety glass meeting ANSI Standard Z26.1, as amended.

2.19.3. Tinting -

2.19.3.1. Side Windows, Passenger - **When so specified in the Invitation for Bids** (see Option 10), passenger side windows only shall be tinted to minimum 30%, maximum 40% light transmittance using AS-3 grade glass or better. This is defined as **"dark tinting"** and is not permitted on the windshield or any window used for driving purposes. **NOTE:** All safety glazing materials must be approved by the Department of Public Safety.

2.19.3.2. Windshield - The windshield shall have a horizontal gradient band (tinted) starting slightly above the driver's line of vision with approximately 90% light transmittance and gradually decreasing to a minimum of 70% light transmittance at the top of the windshield, or the entire windshield shall be tinted to meet the requirements of FMVSS No. 205.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

E.3. ACCESSORIES, REQUIRED AND OPTIONAL -

3.1. **ACCESS PORT** - An access port with cover plate shall be installed above the fuel sending unit. It shall be of sufficient size to service fuel sending units and fuel pumps installed in the fuel tank. An access port is not required on the 24-passenger bus or on buses with front-mounted wheelchair lifts (see G.1.8.3.).

3.2. **BACKUP ALARM** - An automatic, audible backup warning alarm meeting the requirements of Type C, 97 dB(A), SAE J994 (except for 12-volt system) shall be installed behind the rear axle.

3.3. **DEFROSTERS** - Defrosting equipment shall keep the windshield, the window to the left of the driver, and the glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103. Any circulating fan used in defogging and installed on the curb side of the bus front shall be mounted on the windshield header so as to protect the fingers, hair, and clothing of entering and departing passengers.

3.4. **EMERGENCY EQUIPMENT** - 24- through 83-passenger school buses shall be equipped with the following emergency equipment:

3.4.1. Body Fluid Cleanup Kit - Each bus shall be provided with a removable and moisture-proof body fluid cleanup kit. It shall be properly mounted and identified as a body fluid cleanup kit. This kit shall contain as a minimum, the following items mounted in a removable metal or hard plastic kit:

1 - 15 oz chlorine-type absorbent deodorant material (or equal)
1 - 12 oz germicidal spray disinfectant
2 - pair disposable latex gloves
4 - 18" x 18" absorbent towels
1 - plastic pick-up spatula
1 - plastic hand broom
1 - plastic dust pan
2 - 14" x 19" disposal bags and ties (waterproof)
2 - adhesive "BIO-HAZARD" labels
1 - 12 oz. deodorant spray
4 - individually wrapped, cold sterilization wipes in foil-lined pouches
2 - paper respiratory masks
1 - metal or hard plastic container identified as "BIO-HAZARD" with black symbol and lettering on orange mountable case

3.4.2. Fire Extinguishers - School buses shall be equipped with a fire extinguisher, as listed below:

3.4.2.1. Standard Fire Extinguishers - Each bus shall be equipped with at least one refillable stored pressure Multipurpose Dry Chemical type (or approved equal) fire extinguisher of minimum 5-pounds capacity, mounted in an extinguisher manufacturer's automotive type bracket, and located in the driver's compartment in full view of and readily accessible to the driver. The fire extinguisher shall bear the Underwriters Laboratory Listing Mark of not less than 2A 20-B:C rating. Extinguishers shall be furnished with a hose, pressure gauge, and metal head.

(Par. 3.4.2.2. - Halon Type Fire Extinguisher [deleted])

H. AIR CONDITIONING SPECIFICATIONS

2.1. **CONTROLS** - A control box or panel, which shall be located in the driver's compartment, shall be permanently installed to house inside temperature and fan speed(s) controls. The control box or panel shall be positioned so that the driver shall be able to operate the air conditioning controls while seated in the driver's seat and operating the bus. The fan(s) (blower) shall have a minimum of two operating speeds ("off" is not considered an operating speed).

2.2. **INSTALLATION** -

2.2.1. Installing Dealer - Installation of the air conditioning system(s) shall be by the bus body company or by an authorized factory air conditioning dealer who normally stocks, sells, installs, and services a unit of the type being furnished.

2.2.2. Workmanship - Poor, shoddy installation will be grounds for immediate rejection of the complete bus.

2.2.3. Protection of Components - Any skirt-mounted air conditioning component or component mounted underneath the bus shall be provided with means of protecting these components from mud or road debris.

NOTE: NO INSTALLATION OF ANY AIR CONDITIONING UNITS OR SYSTEMS SHALL, UNDER ANY CIRCUMSTANCES VOID THE CHASSIS MANUFACTURER'S ENGINE WARRANTY.

H.3. **COMPONENTS** - The following is a list of components required for air conditioning systems (see Par. H.2. above). Any parts or components not specifically mentioned below, but which are required to provide a complete operating unit, or which are standard for the model offered, shall be included:

3.1. **BLOWER UNIT** - The blower unit shall be of heavy-duty, commercial design and shall circulate air over the evaporator(s) to cool the passenger compartment. Fans shall be of the centrifugal or axial type and quiet in operation. Unless they are self-contained, fan motor(s) shall have bearings of the permanent lubrication type and designed to operate on the 12V-DC system of the school bus. The blower unit(s) shall not increase the ambient noise level of the unloaded school bus while parked with the engine idling more than 5 dB. when measured in the center of the bus.

3.2. **COMPRESSORS** - Compressors shall be of the air conditioning or chassis manufacturer's standard design. Lubrication of all moving parts shall be accomplished automatically. An automatic (electric) clutch shall be provided on each compressor. The compressor size shall be as required to meet the performance requirements above. Compressor(s) shall be compatible with the engine speed.

NOTE: Compressors shall be geared so that their speed does not exceed the manufacturer's maximum recommended sustained speeds at a road speed of 60 mph in high gear.

3.3. **CONDENSERS** - The condenser(s) shall be as recommended by the manufacturer of the unit. The air conditioning manufacturers shall use their standard condenser fabrication and installation practices.

3.4. **DASH OUTLETS - Unless otherwise specified in the Invitation for Bids,** air conditioners on 16- through 19-passenger school buses will not have in-dash air outlets. In-dash outlets are requiared on 15-passenger buses equipped with air conditioning.

3.5. **EVAPORATOR (COOLING COIL)** - Air conditioning manufacturers shall use their standard cooling coil, fabrication and installation practices.

3.6. **REFRIGERANT DRYER** - A dryer with a minimum of 10 oz of desiccant shall be installed in the refrigerating circuit. The system shall be designed and installed in accordance with the manufacturer's standard practice to insure optimum performance and ease of service/replacement.

H.4. **TESTING** - Testing shall be done by, or a the discretion of, the State Purchasing and General Services Commission and/or the receiving School District. Tests shall be performed on buses furnished. In the event the bus air conditioning system fails to meet or exceed all conditions and requirements of this specification, the cost of the test shall be borne by the supplier.

E. AIR CONDITIONING SPECIFICATIONS

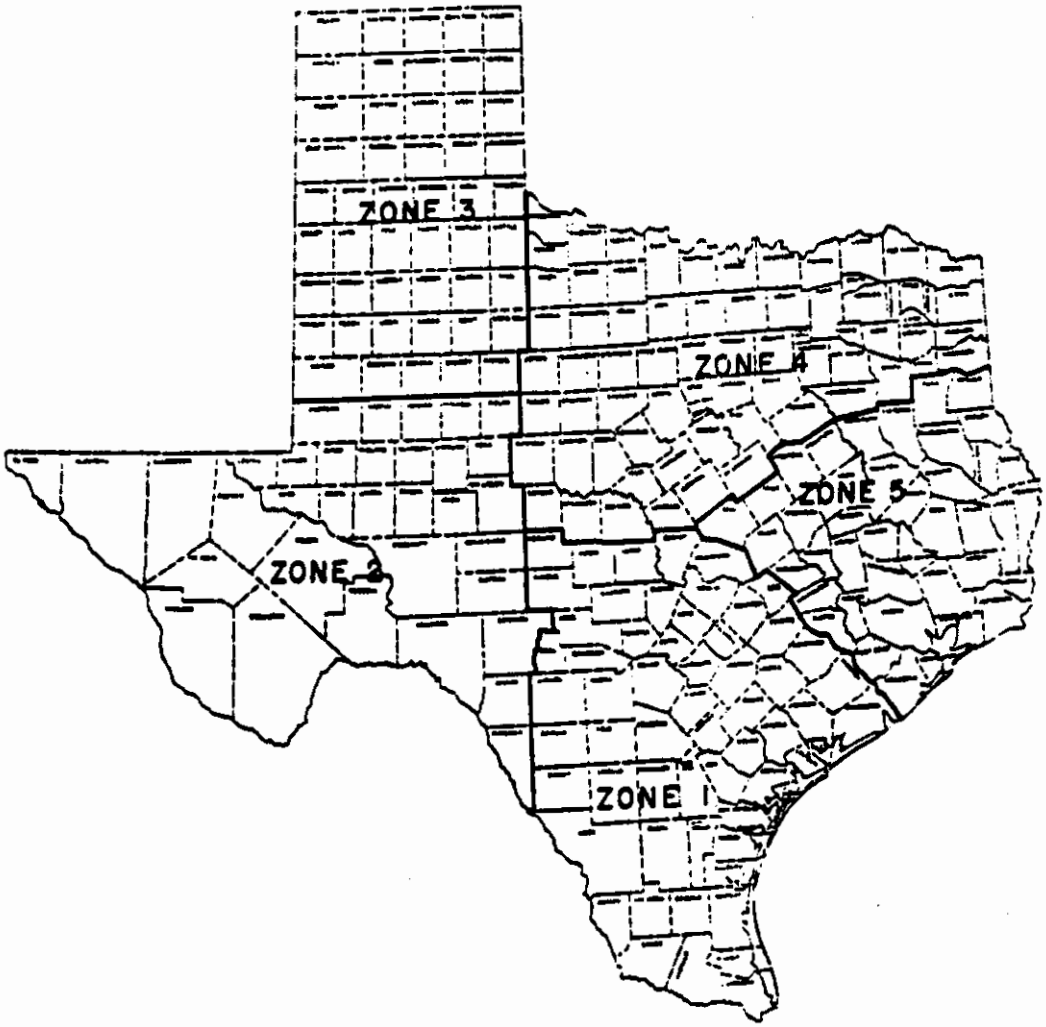
E.5. OTHER REQUIREMENTS -

5.1. **AVAILABILITY OF SERVICE AND REPAIR PARTS** - An adequate supply of repair parts normally required for most maintenance and warranty repair shall be carried in stock within the State of Texas. **Bidder shall include with each bid, or have on file with the Purchasing Division of this Commission,** a list of factory-authorized companies or individuals, and their addresses, who stock repair parts and who can perform service on the products furnished.

NOTE REQUIREMENT IN PAR. A.10.4.1. THE AIR CONDITIONING MANUFACTURER SHALL HAVE SERVICE FACILITIES AVAILABLE IN EACH OF THE 5 ZONES WITHIN THE STATE OF TEXAS THAT STOCK REPAIR PARTS NORMALLY REQUIRED FOR WARRANTY SERVICE AND REGULAR REPAIR (SEE FIG.3)

FIGURE 3

REQUIRED SERVICE FACILITY ZONES WITHIN THE STATE OF TEXAS



STATE OF TEXAS

State Purchasing and General Services Commission
1711 San Jacinto P.O. Box 13047
Austin, Texas 78711-3047
(512) 463-3445

April 22, 1991

TO: HOLDERS OF TEXAS SPECIFICATION NO. 070-SB-91
(1991 SCHOOL BUSES)

RE: Amendment # 2

Please remove the following pages from your copy of this Texas Specification: **1-2, 61-64,** and **69-74,** and replace them with the attached sheets correspondingly numbered.

Please note that at the bottom left of the attached pages appear the words (for example):

"04/22/91 - Changed by Am. # 2"

A vertical bar [|] has been inserted in the left margin to indicate changes from the last issue.

Thank you for your cooperation.

Sincerely,

Troy C. Martin

Troy C. Martin
Specifications/Inspection Chief

TCM:RCD

Enclosures

c: Ray Brewer
Pat Martin
Ralph Simonson
School Bus Committee

EFFECTIVE DATE:
January 1, 1991

TEXAS SPECIFICATION
No. 070-SB-91
(Supersedes 070-SB-90)

TEXAS SCHOOL BUSES

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.1. SCOPE -

1.1 BUS SIZES - This school bus specification includes the minimum requirements for fourteen sizes of school buses used by Texas Schools participating in the Foundation School Program. This specification covers the purchase of bus bodies and chassis separately as well as the purchase of complete school buses. The bus sizes shall be designated in terms of passenger capacity (exclusive of the driver) as listed below for regular seating:

15* Passenger	19* Passenger	35* Passenger	59* Passenger	71* Passenger (Long WB)
16* Passenger	20* Passenger	47* Passenger	65* Passenger	77*Passenger
18* Passenger	24* Passenger	53* Passenger	71* Passenger (Short WB)	83* Passenger

***NOTE:** Seating capacity may necessarily be reduced from the above whenever wheelchair positions and/or maximum seat spacing are specified for a given size bus (see Par. A.1.3 and Par. B.1.).

1.2. BUS TYPES - Each bus shall have seating arrangements for the capacities designated:

1.2.1. **15-passenger** bus shall be the van conversion or commercial cutaway semi-forward control type.
1.2.2. **16-passenger** bus shall be the commercial cutaway semi-forward control type.
1.2.3. **18-passenger** bus shall be the van conversion type.
1.2.4. **19-passenger** bus shall be the commercial cutaway semi-forward control type.
1.2.5. **20-passenger** bus shall be the stripped chassis semi-forward control type.
1.2.6. **24-passenger** bus shall be the stripped chassis semi-forward control type.
1.2.7. **35-passenger** bus shall be the conventional or semi-forward control type.
1.2.8. **47-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.9. **53-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.10. **59-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.11. **65-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.12. **71-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.13. **77-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.14. **83-passenger** bus shall be the forward control* transit type.

*Diesel only.

1.3. SPECIAL EDUCATION BUSES - Special education buses for impaired passengers may contain less than 15 passenger and wheelchair positions combined, but not less than 10 passenger positions combined or they cannot be certified as school buses. These vehicles, used for transporting special education school children, that contain fewer than 10 passenger positions are classified as Multipurpose Passenger Vehicles (MPVs) by the Federal Government. They will be designated by the State of Texas as "school buses" for the purposes of this specification. We require that MPVs used as school buses here shall meet the same standards they would meet if built to accommodate 10 or more passengers even though they must be certified as Multipurpose Passenger Vehicles.

03/20/91 - Am. # 1 - Issued new pages 1-2, 13-18, 27-28, 31-36, 39-40, 79-80, 89-90, 93-96, 99-100, 103-108, 113-116, 121-122
04/22/91 - Am. # 2 - Issued new pages 1-2, 61-64, 69-74

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.2. DEFINITIONS -

2.1. **ASHRAE** means American Society of Heating, Refrigeration and Air Conditioning Engineers.
2.2. **ANSI** means American National Standards Institute.
2.3. **ASTM** means American Society for Testing and Materials.
2.4. **BCI** means Battery Council International.
2.5. **Commission** and **SPGSC** mean Texas State Purchasing and General Services Commission.
2.6. **Conventional Bus** means a school bus with all of the engine in front of the windshield and the service or entrance door behind the front wheels.
2.7. **Department of Public Safety** and **DPS** mean Texas Department of Public Safety.
2.8. **Education Agency** and **TEA** mean Texas Education Agency.
2.9. **EPA** means United States Environmental Protection Agency.
2.10. **FMVSS** means Federal Motor Vehicle Safety Standards.
2.11. **Federal Standard No. 17** means Federal Highway Safety Program Standard Number 17.
2.12. **Forward Control Bus** means a school bus with the steering wheel, pedals, instruments, and other driver controls mounted as far forward as possible, usually just behind the windshield. All of the engine is located behind the windshield, either at the front of the bus, or at the rear of the bus, or in between these positions. The service door is located forward of the front axle.
2.13. **Knee Space** means the horizontal distance from the front center of a seat back to the rear center of the seat back (or barrier) immediately ahead, measured at approximately 4 inches above the seat cushion.
2.14. **Manufacturer** means a fabricator of school buses, bodies, chassis, or components.
2.15. **MPV** means a multipurpose passenger vehicle accommodating ten or less people.
2.16. **NSSB** means National Standards for School Buses (formerly National Minimum Standards).
2.17. **SAE** means Society of Automotive Engineers.
2.18. **SBMI** means School Bus Manufacturer's Institute.
2.19. **Semi-forward Control Bus** means a bus in which part of the engine is beneath and/or behind the windshield and beside the driver's seat.
2.20. **Vendor** means a manufacturer's representative or dealer authorized to make sales and supply parts and services in Texas.
2.21. **VESC** means **Vehicle Equipment Safety Commission.**

A.3. APPLICABLE SPECIFICATIONS AND STANDARDS -

3.1 **FEDERAL HIGHWAY SAFETY PROGRAM STANDARD** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the Highway Safety Program Standard No. 17. All requirements of this specification must be met unless they are in conflict with Standard No. 17 as it applies to school buses:

3.1.1. **Federal Highway Safety Program Standard No. 17, Pupil Transportation Safety** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

3.2. **FEDERAL MOTOR VEHICLE SAFETY STANDARDS** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the **Federal Motor Vehicle Safety Standards (FMVSS)**. All requirements of this specification must be met unless they are in conflict with the FMVSS as they apply to school buses:

3.2.1. **Federal Motor Vehicle Safety Standards (Public Law 89-563)** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402:

(1) FMVSS No. 103 - **Windshield Defrosting and Defogging Systems.**
(2) FMVSS No. 105 - **Brakes, Hydraulic Service, Emergency and Parking.**
(3) FMVSS No. 108 - **Lamps, Reflective Devices, and Associated Equipment.**
(4) FMVSS No. 111 - **Rearview Mirrors - Passenger Cars and Multipurpose Passenger Vehicles.**
(5) FMVSS No. 121 - **Air Brake Systems - Buses and Trailers.**
(6) FMVSS No. 125 - **Warning Devices.**
(7) FMVSS No. 205 - **Glazing Materials.**
(8) FMVSS No. 208 - **Occupant Crash Protection.**
(9) FMVSS No. 209 - **Seat Belt Assemblies - Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses.**
(10) FMVSS No. 210 - **Seat Belt Assembly Anchorages.**
(11) FMVSS No. 217 - **Bus Window Retention and Release.**
(12) FMVSS No. 220 - **School Bus Rollover Protection.**
(13) FMVSS No. 221 - **School Bus Body Joint Strength.**
(14) FMVSS No. 222 - **School Bus Seating and Crash Protection.**
(15) FMVSS No. 301 - **Fuel System Integrity.**
(16) FMVSS No. 302 - **Flammability of Interior Materials - Passenger Cars, Multipurpose Passenger Vehicles, Trucks, and Buses.**

2.5.1.6. Latch - The emergency door shall be equipped with a slide bar rack and pinion (cam) operated latch. The slide bar shall be approximately 1.25 inches wide and 0.375 inch thick and shall have a minimum stroke of 1.125 inches. The slide bar shall be spring loaded so as to retain the bar in the closed position and have a minimum of one inch of horizontal bearing surface beyond the edge of the door frame when the door lock is in a latched position.

2.5.1.7. Latch Handle - The movement of the lock handle through its full arc of operation shall not be obstructed by, or extended into the area behind the rear seats at the emergency door. The handle, when in the closed position, shall meet the requirements of FMVSS No. 217. The design of the latch handle shall allow quick release, but shall offer protection against accidental release. Control of the fastening devices from the driver's seat shall not be permitted. A pull handle shall be installed on the inside of the emergency door so that the door can be securely closed for positive fastening. Provisions for opening from the outside shall consist of a handle (device) designed to prevent "hitching a ride" yet allowing the door to be opened when necessary. The outside handle, when in the closed position, shall extend vertically downward from its pivot center.

2.5.1.8. Switch - The emergency door latch shall be equipped with a heavy-duty electric plunger-type switch connected to a warning buzzer located in the driver's compartment. The switch shall be enclosed in an adequately protected case, and wires leading from the switch shall be concealed in the walls. The switch shall be mounted plumb, parallel, and perpendicular to the striker plate of the lock slide bar. The switch shall be installed so that the buzzer will sound before the door handle is turned far enough to permit the door to open. The switch shall be Cole-Hersee's No. 9118, having an upset end (knob) on the plunger head.

2.5.2. Side Emergency Exits and Roof Hatches - Texas school buses shall be provided with side emergency exits and roof hatches. These side emergency exits may be either side emergency doors meeting the requirements of Par. E.2.5.1. above (except that they shall be hinged on the forward side) or they may be push-out type side windows meeting the requirements of Par. E.2.19.1.5. and FMVSS No. 217. Single emergency exits shall be installed near the center of each side, except that on Type D buses, they shall be installed near the center of each side, but in the rear portion in accordance with Federal Standards. **When so specified in the Invitation for Bids (see Option 43)**, additional push-out windows shall be furnished (quantity shall be specified by school district). Two or more emergency exits per side shall be as "equally spaced" as practical. Roof hatches shall be the body manufacturer's standard. They shall be equipped with an external and internal handle. Texas school buses shall be provided with <u>minimum</u> side emergency exits and roof hatches as follows:

<u>BUS CAPACITY</u>	<u>MINIMUM REQUIRED EXITS/HATCHES</u>
Up to 22-passengers	1 emergency exit per side and 1 roof hatch
23- thru 65-passengers	1 emergency exit per side and 2 roof hatches
Larger than 66-passengers	2 emergency exits per side and 2 roof hatches

2.6. **FLOORS** - The floor system (see Par. E.2.1.6.3.) shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal (see Par. E.3.1. for requirements for access port to fuel sending unit).

2.6.1. Construction and Installation - The floor panels shall run the full width of the floor and shall be supported on all outside edges by a longitudinal frame member. The floor panels shall be welded, riveted, or bolted to the main and auxiliary cross members and shall be joined so as to form a leakproof and dustproof floor. The main and auxiliary cross members shall extend the full interior width of the floor panels. The side posts or bow frames shall be securely welded, riveted, or bolted to the floor system and to the longitudinal frame members or gussets.

2.6.2. Cross Members - The cross members shall be spaced not more than 10 inches center-to-center. The floor panels and cross members shall be designed so as to completely and adequately support all fixed and changeable loads under all operating conditions without deformation of the underbody structure, strains to body, or fractures of member joints. The design and strength of the understructure shall be sufficient to eliminate the necessity of installing outriggers attached to the chassis except at the front entrance. The undersurface of the entire floor structure, including wheelhousing and stepwell, shall be sprayed with material at least 1/8-inch thick conforming to that specified in Par. E.1.10.

2.6.3. Insulation - When air conditioning is ordered (see Option No. 1 and Par. H.1.2.) the floor shall be covered with 5/8-inch nominal thickness A-C or B-B exterior grade plywood manufactured in accordance with U.S. Product Standard PS 1-83. CDX interior grade plywood with exterior glue is acceptable when all surfaces including the edges of the wood are covered or sealed against the exterior environment. See Par. C.2.5.2. for plywood installation requirements.

2.7. FLOOR COVERING -

2.7.1. Aisle Material - Floor covering in the aisle shall be the aisle type, fire-resistant rubber or equivalent, and shall be nonskid, wear-resistant, and ribbed. Minimum overall thickness shall be 3/16 inches when measured from the top of the ribs. Rubber aisle floor covering shall meet Federal Specification ZZ-M-71D.

2.7.2. Installation - Floor covering (except that on the toeboard) shall be permanently bonded to the floor with waterproof adhesive material and shall not crack when subjected to sudden temperature changes. All seams shall be sealed with waterproof sealer.

2.7.3. Trim - Seams shall be covered with extruded aluminum metal strips of a minimum 3/16 inches high and 1 inch wide that shall be installed on each side of the aisle, the full length of the aisle, so as to secure both the edges of the aisle covering and adjoining edges of the underseat covering. Each aisle strip shall consist of not more than three pieces of the metal stripping. The strips shall be secured to the flooring with flush-mounted flat or low profile oval head screws; holes for the screws shall be countersunk. The screws shall be placed not more than 9-inches apart for the full length of the metal strips except that the ends of each piece of stripping shall have screws placed at not more than 3/4 inches from each end. Screws may be placed 9-1/2 inches apart only to avoid interference with floor sill members.

2.7.4. Underseat Material - The floor in the underseat area (including wheelwells, and the areas under the driver's seat, wheelchairs, and toeboard except transmission inspection plate) shall be covered with fire-resistant rubber floor covering or equivalent having minimum overall thickness of 1/8 inches. Floor covering on toeboard shall be held in place by trim strip or molding.

2.8. PANELS, EXTERIOR -

2.8.1. Attachment and Installation - All exterior panels shall be attached to bow frames and strainers so as to act as an integral part of the structural frame. They shall be installed by lapping and riveting, lapping and bolting, or by flanging and bolting and in such a manner as to form watertight joints. The exterior side panels shall be installed either vertically or longitudinally. Vertical panels shall be one-piece and shall extend from the window line to or below the floor line. Longitudinal panels shall be installed starting at or below the floor line and extending upward to the window line with each ascending panel overlapping the preceding panel. Rub rails shall not be considered as part of the paneling for covering the side except for pressed-in window rails.

2.8.2. Design - The front and rear exterior panels shall be formed into the desired contours to give a smooth, pleasing appearance to the bus. The front and rear exterior roof panels shall be of not more than three pieces welded or riveted together to form a continuous piece over the front and rear frame.

2.8.3. Joints - Joints shall meet the requirements of FMVSS No. 221.

2.8.4. Material - All exterior panels (see Par E.2.1.6.2.) shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal.

2.8.5. Undercoating - All exterior panels shall be completely sprayed on the inside of the main exposed surfaces, and shall featheredge to the edge of the attaching members, with 1/16-inch thick material conforming to that specified in Par. E.1.11. The spraying shall be done after the panels are installed.

2.9. **PANELS, INTERIOR** - All interior wall and ceiling panels shall be steel and of the body manufacturer's standard design except the panels beneath the windows shall be clear-coated galvanized embossed steel meeting ASTM A446. Also the stepwell and riser panels in the service door entryway shall be clear-coated galvanized steel (embossing not required). Galvalume, aluminized steel, and aluminum over steel panels are acceptable for use beneath the windows and in the entryway.

2.9.1. Attachment - All interior panels shall be attached to the frame structure by bolts, rivets, or by any well-designed method utilizing self-locking panels, locking panel strips, or clips. Regardless of the method used, the panels shall be attached so that vibration, rumbling, and popping will be at a minimum.

2.9.2. Design - Front and rear panels shall be formed to present a smooth, pleasing appearance. Roof panels shall be continuous from header to header. If the ceiling is constructed so as to contain lapped joints, the forward panel shall be lapped by the rear panel and all exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2.10. **RUB RAILS** - Four separate, one-piece, continuous rub rails of the type, grade, and thickness of steel specified in Table No. 9 or approved equal, shall be installed on the body as described below. The minimum finished width of all rub rails shall be 4 inches:

2.10.1. Construction - The rub rails shall be of ample strength to resist impact and to prevent crushing of the bus body and shall be a flanged-formed channel, longitudinally fluted or corrugated rib surface. Ends shall be (1) smoothly closed, or (2) closed by a rounded end cap which shall be butt- or flash-welded to the rub rail, or (3) closed by a rounded end cap inserted with an approximate one-inch sleeve inside of the rub rail, riveted in position at the top and bottom of the rub rail flange, and sealed in the same manner as the top flange of the rub rails.

2.10.2. Drainage - The bottom edge of each rub rail (except the pressed-in-type which may be used near the window line) shall have provisions for drainage of accumulated moisture. One of the following drainage methods shall be used:

2.10.2.1. Slots - The bottom flange of the rub rail shall have a minimum of one inch by 0.32 inch formed slots spaced on not more than 12-inch centers, or

2.10.2.2. Slots or Slots - One 1/4-inch diameter slot or hole per foot in the lowest part of the rub rail **drilled prior to the priming, painting, and installation of the rub rail shall be provided.** Holes drilled after rub rail installation or after priming and painting are **not** acceptable. **Formed slots are preferred over drilled or cut holes.**

2.10.3. Installation - All rub rails shall be bolted or riveted on top and bottom to each side post and riveted on top and bottom to the exterior paneling between the side posts (see Exception in Par. E.2.1.8.5.). Provisions for one-piece rails may be accomplished by butt- or flash-welding. All welds, including those for the end caps, shall be dressed, sanded, and buffed. These rub rails shall be installed on both sides of the bus body as follows:

2.10.3.1. Floor and Skirt Level - The floor and skirt level rub rails and the additional rub rail furnished in lieu of one longitudinal frame member shall be installed the full outside length of the body (except at wheelhousings) on the right side from the service door to the rear corner radius and on the left side from the point of curvature near the outside cowl to the rear corner radius. One of the floor level rails **may be cut** to provide an opening for the gas tank filler neck **only if** fuel tank furnished to meet FMVSS No. 301-75 requires the opening to be enlarged, or to meet the requirements in E.2.1.10.

2.10.3.2. Seat Level - The seat level rub rail shall be installed from the service door completely around the bus body (except for emergency door and rear engine bus) to the point of curvature near the outside cowl on left side. The rails may be two-piece with the joint being near the rear side of the bus body. The rail extension shall be joined to the continuous side rail by one of the following (1) butt welding, (2) jogged lapped by not less than one inch and riveted, or (3) butted with a sleeve riveted over the joint. When joining is by lapping or fastening with a sleeve, the joint must be made at the rearmost body side post or preferably, the second post from the rear.

2.10.3.3. Window Level - The window level rub rail shall be installed the full outside length of the body on the right side from the service door to the rear corner radius and on the left side from the point of curvature near the outside cowl to the rear corner radius. The splice, if necessary, shall be located at the body post behind the rear wheelhouse, by lapping the full width of the supporting part of the post.

2.10.4. Location - One rub rail shall be installed at the skirt level, one at or near the floor, one at or near the seat level, and one near the window line. One additional rub rail may be furnished in lieu of one longitudinal frame member (see Par. E.2.4.3.).

2.10.5. Sealing - The top joint of the rub rail shall be sealed with a caulking compound or adhesive as specified in Par. E.2.1.4.

2.11. **SEAT BARRIERS** - Seat barriers shall be furnished and installed in accordance with FMVSS No. 222. The front barriers shall not infringe upon the area required for safety and operating equipment.

2.11.1. Handrail - A grab handle or handrail of sufficient length to assist entering and exiting passengers shall be installed on the forward side of the right barrier. The outside surface of this handle shall be stainless steel, polished aluminum, or chrome-plated steel.

2.11.2. Knee Space - Knee space between these barriers and the front of each front passenger seat shall be at least 24 inches for 24-passenger bus, at least 24-3/4 inches for the 71S- and 83-passenger buses, and at least 25 inches for all other 35- through 77-passenger buses when measured from the modesty panel to the front of the seat back at the center of the seat approximately 4 inches above the seat cushion.

2.11.3. Upholstery - Barriers shall be covered with upholstery meeting the requirements of Par. C.2.12.3.6.

2.12. **SEATING REQUIREMENTS, DRIVER** -

2.12.1. Design - The base of the driver's seat shall be of the adjustable pedestal type or the platform type having an adjustment range of approximately 4 inches "Fore and Aft," and a separate minimum one-inch vertical adjustment. The back of the driver's seat shall be heavily padded and form-fitted.

2.12.2. Driver's High Back Seat, Optional - **When so specified in the Invitation for Bids**, a high back driver's seat shall be provided with a minimum seat back adjustment of 15 degrees and with a head restraint to accommodate a 95 percentile adult male (as defined in FMVSS No. 208) and shall meet all of the applicable requirements of Par. E.2.12.1. above.

2.12.3. Driver's Seat Access - There shall be unrestricted access to the driver's seated position from either the aisle or the right service door without the operator having to climb over the engine cover or any other object. The minimum space between the driver's seat (in the rearmost position) and the engine cover or other object (except seat belt anchorage) at the floor and at the seat level shall be not less than 6 inches.

2.12.4. Installation - The pedestal or platform shall be mounted with bolts, flat washers, lock washers, and nuts except where it is impossible to use bolts and nuts at certain floor points due to main cross members or floor sill interference. Thread-forming or cutting bolts and lock washers may be used at these points.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

2.15.2. Design - The service doors may be the folding type (i.e., open in the middle) or the folding (or jackknife) type. These doors shall have a minimum horizontal opening of approximately 24 inches and a minimum vertical opening of about 68 inches. The service door shall have upper and lower glass panels (see Par. E.2.15.3. below) to permit the driver to see entering passengers as well as the passenger landing area. These glass panels shall be set in rubber. Vertical closing edge or edges of these doors shall be equipped with rubber or rubberized material to protect passengers' fingers. There shall be no door on the left of the driver. This door shall have a positive latching mechanism to eliminate the possibility of an inadvertent door opening during a frontal or roll-over crash.

2.15.3. Glass Panels - Service or entrance doors shall have glass panels of approved safety glass (see Par. E.2.19.2. for installation requirements). Bottom of each lower glass panel shall be not more than 10 inches from the the top surface of the bottom step. The top of each upper glass panel shall be not more than 6 inches from the top of the door.

2.15.4. Header Board - The head impact area on the inside top of the service or entrance door shall be protected by an energy-absorbing, padded header board, 3-inches high and 1 inch thick, extending the full width of the opening, to prevent injury when accidentally impacted.

2.15.5. Location and Operation -

2.15.5.1. Conventional Bus Doors - The entrance door for conventional buses shall be operated manually, or **when so specified in the Invitation for Bids (see Option 27)**, actuated electrically, or by air pressure or vacuum and shall allow manual opening in case of an emergency. The door control shall be the hand lever type, driver-operated, and shall be designed to afford easy release and to prevent accidental opening. The two-piece or folding type service door shall be located on the right side near the front of the bus in direct view of the driver.

2.15.5.2. Forward Control Bus Doors - The doors on forward control buses shall be operated either manually or actuated electrically or by air pressure or vacuum, and shall allow manual opening in case of an emergency. If manually operated, the door control shall be the hand lever type, driver-operated, and shall be designed to afford easy release and to prevent accidental opening. The service door shall be located on the right side near the front of the bus. At least two-thirds of its opening width shall be ahead of the point opposite the back of the driver's seat. **When so specified in the Invitation for Bids (see Option 27)**, doors shall be operated by means of electric, air pressure or vacuum, at the manufacturer's option.

2.15.5.3. Semi-forward Control Bus Doors - On semi-forward control buses, the entrance door shall be operated from controls at or near the bus driver's seated position. The doors shall be operated manually, or actuated electrically or by air pressure or vacuum and shall allow manual opening in case of an emergency. To prevent accidental opening while the bus is in motion, the system shall require at least a 125-pound force applied to its center in order to manually open the door. **When so specified in the Invitation for Bids (see Option 27)**, doors shall be operated by means of electric, air pressure or vacuum, at the manufacturer's option.

NOTE: Powered Service Doors shall be clearly and concisely marked with operating instructions in case of a power failure.

2.16. **SKIRT REINFORCEMENTS** - Side skirts shall be gusseted or braced on not more than 30-inch centers and wherever required for rigidity and to prevent vibration. **If the body sections are authorized to be longer than 30 inches, no more than three sections of skirt reinforcement shall be on centers up to a maximum of 36 inches, or no more than one section shall be on centers up to a maximum of 38-3/4 inches.**

2.17. **VENTILATION** - The bus shall be equipped with a suitable, controlled ventilation system of sufficient capacity to maintain a satisfactory ratio of outside to inside air under normal operating conditions without opening windows except in warm weather. A static-type, nonclosable exhaust ventilator shall be installed in the low-pressure area of roof.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

2.18. WHEELHOUSING - The wheelhousing shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal. The wheelhousing shall be constructed of a maximum of three pieces and of arched design and shall be attached in such a manner so as to form a waterproof and dustproof seam. The size of the wheelhousing shall be such that tire chains will have proper clearance. The edges inside the bus shall be rounded to prevent injury to the passengers. The wheelhousing shall be such that when attached to the body, the strength of the resulting structure shall be equivalent to or greater than that section of body that has been removed to receive the wheelhousing. (See Par. E.1.11. for undercoating requirements.)

2.19. WINDSHIELD AND WINDOWS -

2.19.1. General Design -

2.19.1.1. Emergency Door Windows - The emergency door shall be furnished with an upper and lower glass panels (see Par. E.2.5.1.4.) permanently closed, and set in rubber or sealed against rubber.

2.19.1.2. Rear Window - Rear windows **(not emergency door windows)*** shall be installed on each side of the rear emergency door. Each rear window glass shall have a minimum area of 140 square inches and shall be set solid in a waterproof manner. These windows shall be installed securely to prevent removal by hand.

*A rear "push-out" window, meeting the requirements of FMVSS No. 217, shall be provided on rear engine buses.

2.19.1.3. Side Window, Driver's - The driver's window shall be a 2-piece window of either of the following types:

(i) Two-piece sliding-sash type - This type will be acceptable only when the bus is equipped with an adequate air scoop to draw outside air into the driver's compartment. When the driver's ventilation is drawn through the heater system, this air shall be shielded from the heat sources and a hot water cut-off valve shall be provided in the driver's compartment.

(ii) Other Type - This type of window shall have the front part opening either in or out and rear part lowering and raising by use of a regulating handle.

2.19.1.4. Side Windows, Passenger, Standard - There shall be either a standard or a push-out type window for each passenger seat except where it is not possible because of the installation of side emergency exits (see paragraphs E.2.5.2. and E.2.19.1.5.). Standard side windows shall open from the top only and shall operate freely. All side windows except the driver's and the service door window, shall be the split sash type with positive latch. **Side windows that can be latched in an uneven position are not acceptable.** They shall be furnished with a latching mechanism which will allow each window to be latched in a position not more than six inches from the top. The passenger side windows shall provide an unobstructed opening 22 inches wide and between 9 and 10 inches high.

NOTE: 77-passenger and 83-passenger rear-engine buses may have one less set of passenger windows than rows of seats.

2.19.1.5. Side Windows, Passenger, Push-out Type - At the manufacturer's option, 24-passenger buses may be provided with one push-out side window in lieu of an emergency exit on each side and 35- through 83-passenger buses may be provided with two push-out side windows in lieu of two emergency exits on each side (see paragraphs E.2.5.1. and E.2.5.2. and Option 43). These windows shall be hinged at the top and shall be positioned for ease of egress. These push-out windows shall be the body manufacturer's standard push-out passenger windows meeting or exceeding Federal Standards.

NOTE: Push-out windows shall be equipped with an electrical switch connected to an audible signal automatically operated and located in the driver's compartment which shall indicate when the window is pushed out in excess of 1/2-inch. The switch shall be enclosed to prevent tampering. Wires leading from the switch shall be concealed in the walls. No cut-off switch shall be installed in the circuit.

2.19.1.6. Windshield - The maximum width of the windshield center post shall not exceed 2-1/2 inches. There shall be at least 2 inches of clearance between the steering wheel and the windshield, cowl, instrument panel, or any other surface.

2.19.2. Glazing - Glass shall be installed in rubber channel gasket material or approved equivalent material. The glass shall be mounted so that the permanent identification mark is visible from either inside or outside of the bus. **All safety glazing materials shall be approved by the Department of Public Safety.** All exposed edges of glass shall be banded. The glass shall be as follows:

2.19.2.1. Rear and Other Windows - The glass in all other window including the driver's side windows, emergency door windows, and rear (side) windows shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better as specified in ANSI Safety Code Z26.1.

2.19.2.2. Safety Plate Glass - **When so specified in the Invitation for Bids** (see Option 26), all windows shall have AS-2 grade or better grade **laminated** safety plate glass.

2.19.2.3. Side Windows, Passenger - The glass in all passenger side windows shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better, as specified in ANSI Safety Code Z26.1 (see Par. E.2.19.2.4.).

2.19.2.4. Windshield - The windshield shall be minimum 7/32-inch thick safety plate glass and shall be heat-absorbent, laminated AS-1 safety glass meeting ANSI Standard Z26.1, as amended.

2.19.3. Tinting -

2.19.3.1. Side Windows, Passenger - **When so specified in the Invitation for Bids** (see Option 10), passenger side windows only shall be tinted to minimum 30%, maximum 40% light transmittance using AS-3 grade glass or better. This is defined as "**dark tinting**" and is not permitted on the windshield or any window used for driving purposes. **NOTE:** All safety glazing materials must be approved by the Department of Public Safety.

2.19.3.2. Windshield - The windshield shall have a horizontal gradient band (tinted) starting slightly above the driver's line of vision with approximately 90% light transmittance and gradually decreasing to a minimum of 70% light transmittance at the top of the windshield, or the entire windshield shall be tinted to meet the requirements of FMVSS No. 205.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

E.3. ACCESSORIES, REQUIRED AND OPTIONAL -

3.1. **ACCESS PORT** - An access port with cover plate shall be installed above the fuel sending unit. It shall be of sufficient size to service fuel sending units and fuel pumps installed in the fuel tank. An access port is not required on the 24-passenger bus or on buses with front-mounted wheelchair lifts (see G.1.8.3.).

3.2. **BACKUP ALARM** - An automatic, audible backup warning alarm meeting the requirements of Type C, 97 dB(A), SAE J994 (except for 12-volt system) shall be installed behind the rear axle.

3.3. **DEFROSTERS** - Defrosting equipment shall keep the windshield, the window to the left of the driver, and the glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103. Any circulating fan used in defogging and installed on the curb side of the bus front shall be mounted on the windshield header so as to protect the fingers, hair, and clothing of entering and departing passengers.

3.4. **EMERGENCY EQUIPMENT** - 24- through 83-passenger school buses shall be equipped with the following emergency equipment:

3.4.1. Body Fluid Cleanup Kit - Each bus shall be provided with a removable and moisture-proof body fluid cleanup kit. It shall be properly mounted and identified as a body fluid cleanup kit. This kit shall contain as a minimum, the following items mounted in a removable metal or hard plastic kit:

- 1 - 15 oz chlorine-type absorbent deodorant material (or equal)
- 1 - 12 oz germicidal spray disinfectant
- 2 - pair disposable latex gloves
- 4 - 18" x 18" absorbent towels
- 1 - plastic pick-up spatula
- 1 - plastic hand broom
- 1 - plastic dust pan
- 2 - 14" x 19" disposal bags and ties (waterproof)
- 2 - adhesive "BIO-HAZARD" labels
- 1 - 12 oz. deodorant spray
- 4 - individually wrapped, cold sterilization wipes in foil-lined pouches
- 2 - paper respiratory masks
- 1 - metal or hard plastic container identified as "BIO-HAZARD" with black symbol and lettering on orange mountable case

3.4.2. Fire Extinguishers - School buses shall be equipped with one of the fire extinguishers listed below:

3.4.2.1. Standard Fire Extinguishers - Each bus shall be equipped with at least one refillable stored pressure Multipurpose Dry Chemical type (or approved equal) fire extinguisher of minimum 5-pounds capacity, mounted in an extinguisher manufacturer's automotive type bracket, and located in the driver's compartment in full view of and readily accessible to the driver. The fire extinguisher shall bear the Underwriters Laboratory Listing Mark of not less than 2A 20-B:C rating. Extinguishers shall be furnished with a hose, pressure gauge, and metal head.

3.4.2.2. Halon type Fire Extinguisher - An approved equal fire extinguisher is the American Safety Products (ASP) Model 13000, 2A 40-B:C Rating. (For those who prefer this type, this fire extinguisher is available with a 13-pound charge of combined halon gas. It is not permissible to transport these units after refilling; therefore, the manufacturer offers a five-year warranty and replacement of discharged units with a new unit at half price.)

3.4.3. First Aid Kit - Buses shall have a removable metal first aid kit container mounted in an accessible place within the driver's compartment. The compartment shall be marked to indicate the location of the kit. Number of units and contents for each kit shall be as follows:

2 - 1 in x 2 1/2 yds. adhesive tape rolls
24 - sterile gauze pads 3 in x 3 in
100 - 3/4 in x 3 in adhesive bandages
8 - 2 in bandage compress
10 - 3 in bandage compress
2 - 2 in x 6 yds. sterile gauze roller bandages
2 - nonsterile triangular bandage approx. 40 in x 54 in, 2 safety pins
3 - sterile gauze pads 36 in x 36 in
3 - sterile eye pads
1 - rounded end scissors
1 - pair latex gloves
1 - mouth-to-mouth airway

3.6. **HEATERS AND RELATED COMPONENTS -**

3.6.1. Bleeder Valves - Any heater(s) installed by the body manufacturer shall have accessible air bleeder valves installed in the return lines.

3.6.2. Heater, Standard - Each bus shall be equipped with a heavy-duty combination fresh air and recirculating air heater(s). The heater(s) shall be a hot water type. The BTU/hr rating shall be in accordance with Standard SBMI No. 001. These standard heaters shall have minimum free flow output ratings as follows:

3.6.2.1. 24- and 35-passenger Buses - 45,000 Btu/hr.

3.6.2.2. 47-passenger and Larger Buses - 80,000 Btu/hr.

3.6.3. Heater, Auxiliary - **When so specified in the Invitation for Bids** (see Option 11), a second recirculating heater shall be furnished. It shall be mounted near the rear of the bus and in such a manner so as not to interfere with the securing of seats to the floor, as specified in Par. E.2.13.2.2. . The BTU/hr rating shall be in accordance with SBMI Standard No. 001. Heated conduits inside the buses shall be insulated or shielded to prevent injury to the driver or passengers. The heater shall have a minimum output rating (recirculating air rating - not fresh air intake rating) as follows:

3.6.3.1. 24- and 35-passenger Buses - 40,000 Btu/hr.

3.6.3.2. 47-passenger and Larger Buses - 60,000 Btu/hr.

NOTE: Auxiliary heaters on diesel-powered buses shall be furnished with a water circulating pump.

3.6.4. Installation - The standard heater shall be installed near the front of the bus body with the controls readily accessible to the driver; the auxiliary heater shall be installed near the rear of the bus. Heater hose connections shall be installed above the floor of the bus body and through the firewall to the engine compartment. Heated conduits inside the bus shall be insulated or shielded to prevent injury to the driver or passengers. The length of the hot water hoses shall be as short as possible consistent with good installation practices; however, the hoses shall not be installed in such a manner so as to interfere with normal engine maintenance operations, such as the removal of the engine air cleaner. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any motor function, such as the spark advance of an automatic distributor. Heater hose shall conform to SAE 20R3, Class C, as defined in SAE Standard J20e. Each heater installation shall include two **all brass** shutoff valves or cocks. Installation of the shutoff valves or cocks shall be as close as possible to the water pump and motor block outlets. The hoses shall be adequately supported to guard against excessive wear due to vibration. These cutoff valves or cocks shall be installed as follows:

3.6.4.1. One between the heater hose connection and the water pump outlet, and

3.6.4.2. One between the heater hose connection and the engine block.

3.6.5. Service Accessibility - Heater motors, cores, and fans shall be readily accessible for service. Access panels (removable without removing driver's seat) shall be provided as required for maintenance.

3.7. **LUGGAGE RACK - When so specified in the Invitation for Bids** (see Option 12), a luggage rack shall be mounted on top of the bus meeting the following requirements:

3.7.1. Design and Material - The floor or bottom of the luggage rack shall consist of minimum 19-gauge steel stiffened by the application of spot-welded pressed channels or pressed-in panels. The bottom shall be flat and shall be adequately perforated for water drainage. The side rails shall be a minimum of 3/4 inches O.D. steel tubing having a wall thickness of at least 5/8 inches or channels of equal strength. The rack shall have a minimum of three side rails on all four sides. The top rail shall be approximately 12 inches above the flat bottom floor of the rack. The right and left sides of the rack shall have a minimum of four footman loops each to accommodate tarpaulin tie downs straps. The vertical posts shall not extend above the top rail. The ends and sides from the flat bottom floor to the roof of the bus shall be enclosed with metal flashing. The rack shall have no sharp or rough edges to cause excessive tarpaulin wear. A metal ladder mounted at the rear of the bus shall provide access to the luggage rack. **(Folding steps are not acceptable.)** The minimum width shall be 60 inches and the length dimensions of the rack furnished for the various sizes of buses shall be:

3.7.1.1. 53-passenger Bus or Less - Minimum of 81 inches, and

3.7.1.2. 59-passenger Bus and Larger - Minimum of 135 inches.

3.7.2. Installation - The luggage rack shall be mounted to the roof with rivets or bolts, nuts, and lock washers attached to each roof bow under the rack and where required by standard industry practices.

3.7.3. Paint Color - The complete luggage rack shall be painted either black or yellow in accordance with the manufacturer's standard practice.

3.8. **MIRRORS, EXTERIOR** - Exterior mirrors shall conform to the requirements of FMVSS No. 111. Each school bus shall be provided with exterior mirrors and brackets as described below:

3.8.1. Mirror System, Crossover - The crossview mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The crossview system shall also provide the driver with indirect vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system.

3.8.2. Mirror Backing and Mounting, Stainless Steel, Optional - **When so specified in the Invitation for Bids**, exterior rearview mirror backs and mounting brackets shall meet or exceed all of the applicable requirements of Par. E.3.8.3. below except the mirror backing and mounting shall be made of stainless steel.

3.8.3. Mounting and Mounting Brackets, Standard - Mirror mounting and backing shall be of steel or a high-impact plastic such as a polycarbonate/polyethylene terephthalate blend, or approved equal. Mounting of all exterior mirrors to the bus body shall be by means of bolts, nuts, and lock washers, where possible; otherwise No. 10 hexagon head sheet metal bolts with star lock washers or No. 10 hexagon head sheet metal screws with serrated surface shall be used. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration. Each exterior rear vision mirror shall be mounted in the brackets and assemblies shown on Texas State Purchasing and General Services Commission Drawings Numbered 040-35(a), 040-35(3), 040-35(4), 040-35(5), 040-35(6) and 040-35(7), dated November 15, 1968. The brackets shall be mounted on the left front and right front of the bus body and cowl. The parts, as shown on Drawings Numbered 040-35(2) and 040-35(3), must be formed to fit the individual configuration of each manufacturer's body and cowl design. Long dimensions of Texas mirror brackets may be adjusted as required to fit the configurations of buses.

3.8.4. Painting - Brackets and assemblies of all exterior rearview and crossover mirrors shall be cleaned and prepared for painting in accordance with Federal Specification TT-C-490B, Type I or II. The metal backs of stainless steel, aluminum, and chrome-plated exterior and crossover mirrors, if painted, and the backs of all other metal-backed exterior and crossover mirrors shall be finished in black (Color No. 37038 of Federal Standard No. 595a).

STATE OF TEXAS

State Purchasing and General Services Commission
1711 San Jacinto P.O. Box 13047 Capitol Station
Austin, Texas 78711-3047
(512) 463-3445

March 20, 1991

TO: HOLDERS OF TEXAS SPECIFICATION NO. 070-SB-91
(1991 SCHOOL BUSES)

RE: Amendment # 1

Please remove the following pages from your copy of this Texas Specification: **1-2, 13-18, 27-28, 31-36, 39-40, 79-80, 89-90, 93-96, 99-100, 103-108, 113-114, and 121-122,** and replace them with the attached sheets correspondingly numbered.

Please note that at the bottom left of the attached pages appear the words (for example):

"03/20/91 - Changed by Am. # 1"

A vertical bar [|] has been inserted in the left margin to indicate changes from the last issue.

Thank you for your cooperation.

Sincerely,

Troy C. Martin

Troy C. Martin
Specifications/Inspection Chief

TCM:RCD

Enclosures

c: Ray Brewer
Pat Martin
Ralph Simonson
School Bus Committee

EFFECTIVE DATE:
January 1, 1991

TEXAS SPECIFICATION
No. 070-SB-91
(Supersedes 070-SB-90)

TEXAS SCHOOL BUSES

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.1. SCOPE -

1.1 BUS SIZES - This school bus specification includes the minimum requirements for fourteen sizes of school buses used by Texas Schools participating in the Foundation School Program. This specification covers the purchase of bus bodies and chassis separately as well as the purchase of complete school buses. The bus sizes shall be designated in terms of passenger capacity (exclusive of the driver) as listed below for regular seating:

15* Passenger	19* Passenger	35* Passenger	59* Passenger	71* Passenger(Long WB)
16* Passenger	20* Passenger	47* Passenger	65* Passenger	77*Passenger
18* Passenger	24* Passenger	53* Passenger	71* Passenger (Short WB)	83* Passenger

***NOTE:** Seating capacity may necessarily be reduced from the above whenever wheelchair positions and/or maximum seat spacing are specified for a given size bus (see Par. A.1.3 and Par. B.1.).

1.2. BUS TYPES - Each bus shall have seating arrangements for the capacities designated:

1.2.1. **15-passenger** bus shall be the van conversion or commercial cutaway semi-forward control type.
1.2.2. **16-passenger** bus shall be the commercial cutaway semi-forward control type.
1.2.3. **18-passenger** bus shall be the van conversion type.
1.2.4. **19-passenger** bus shall be the commercial cutaway semi-forward control type.
1.2.5. **20-passenger** bus shall be the stripped chassis semi-forward control type.
1.2.6. **24-passenger** bus shall be the stripped chassis semi-forward control type.
1.2.7. **35-passenger** bus shall be the conventional or semi-forward control type.
1.2.8. **47-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.9. **53-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.10. **59-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.11. **65-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.12. **71-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.13. **77-passenger** bus shall be the conventional, forward*, or semi-forward control type.
1.2.14. **83-passenger** bus shall be the forward control* transit type.

***Diesel only.**

1.3. SPECIAL EDUCATION BUSES - Special education buses for impaired passengers may contain less than 15 passenger and wheelchair positions combined, but not less than 10 passenger positions combined or they cannot be certified as school buses. These vehicles, used for transporting special education school children, that contain fewer than 10 passenger positions are classified as Multipurpose Passenger Vehicles (MPVs) by the Federal Government. They will be designated by the State of Texas as "school buses" for the purposes of this specification. We require that MPVs used as school buses here shall meet the same standards they would meet if built to accommodate 10 or more passengers even though they must be certified as Multipurpose Passenger Vehicles.

03/20/91 - Am. # 1 - Issued new pages 1-2, 13-18, 27-28, 31-36, 39-40, 79-80, 89-90, 93-96, 99-100, 103-108, 113-116, 121-122

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.2. DEFINITIONS -

2.1. **ASHRAE** means American Society of Heating, Refrigeration and Air Conditioning Engineers.
2.2. **ANSI** means American National Standards Institute.
2.3. **ASTM** means American Society for Testing and Materials.
2.4. **BCI** means Battery Council International.
2.5. **Commission** and **SPGSC** mean Texas State Purchasing and General Services Commission.
2.6. **Conventional Bus** means a school bus with all of the engine in front of the windshield and the service or entrance door behind the front wheels.
2.7. **Department of Public Safety** and **DPS** mean Texas Department of Public Safety.
2.8. **Education Agency** and **TEA** mean Texas Education Agency.
2.9. **EPA** means United States Environmental Protection Agency.
2.10. **FMVSS** means Federal Motor Vehicle Safety Standards.
2.11. **Federal Standard No. 17** means Federal Highway Safety Program Standard Number 17.
2.12. **Forward Control Bus** means a school bus with the steering wheel, pedals, instruments, and other driver controls mounted as far forward as possible, usually just behind the windshield. All of the engine is located behind the windshield, either at the front of the bus, or at the rear of the bus, or in between these positions. The service door is located forward of the front axle.
2.13. **Knee Space** means the horizontal distance from the front center of a seat back to the rear center of the seat back (or barrier) immediately ahead, measured at approximately 4 inches above the seat cushion.
2.14. **Manufacturer** means a fabricator of school buses, bodies, chassis, or components.
2.15. **MPV** means a multipurpose passenger vehicle accommodating ten or less people.
2.16. **NSSB** means National Standards for School Buses (formerly National Minimum Standards).
2.17. **SAE** means Society of Automotive Engineers.
2.18. **SBMI** means School Bus Manufacturer's Institute.
2.19. **Semi-forward Control Bus** means a bus in which part of the engine is beneath and/or behind the windshield and beside the driver's seat.
2.20. **Vendor** means a manufacturer's representative or dealer authorized to make sales and supply parts and services in Texas.
2.21. **VESC** means **Vehicle Equipment Safety Commission.**

A.3. APPLICABLE SPECIFICATIONS AND STANDARDS -

3.1 **FEDERAL HIGHWAY SAFETY PROGRAM STANDARD** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the Highway Safety Program Standard No. 17. All requirements of this specification must be met unless they are in conflict with Standard No. 17 as it applies to school buses:

3.1.1. **Federal Highway Safety Program Standard No. 17, Pupil Transportation Safety** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

3.2. **FEDERAL MOTOR VEHICLE SAFETY STANDARDS** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the **Federal Motor Vehicle Safety Standards (FMVSS)**. All requirements of this specification must be met unless they are in conflict with the FMVSS as they apply to school buses:

3.2.1. **Federal Motor Vehicle Safety Standards (Public Law 89-563)** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402:

(1) FMVSS No. 103 - **Windshield Defrosting and Defogging Systems.**
(2) FMVSS No. 105 - **Brakes, Hydraulic Service, Emergency and Parking.**
(3) FMVSS No. 108 - **Lamps, Reflective Devices, and Associated Equipment.**
(4) FMVSS No. 111 - **Rearview Mirrors - Passenger Cars and Multipurpose Passenger Vehicles.**
(5) FMVSS No. 121 - **Air Brake Systems - Buses and Trailers.**
(6) FMVSS No. 125 - **Warning Devices.**
(7) FMVSS No. 205 - **Glazing Materials.**
(8) FMVSS No. 208 - **Occupant Crash Protection.**
(9) FMVSS No. 209 - **Seat Belt Assemblies - Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses.**
(10) FMVSS No. 210 - **Seat Belt Assembly Anchorages.**
(11) FMVSS No. 217 - **Bus Window Retention and Release.**
(12) FMVSS No. 220 - **School Bus Rollover Protection.**
(13) FMVSS No. 221 - **School Bus Body Joint Strength.**
(14) FMVSS No. 222 - **School Bus Seating and Crash Protection.**
(15) FMVSS No. 301 - **Fuel System Integrity.**
(16) FMVSS No. 302 - **Flammability of Interior Materials - Passenger Cars, Multipurpose Passenger Vehicles, Trucks, and Buses.**

B. ORDERING INFORMATION

B.5. REGULAR OPTIONS -

15- THROUGH 20-PASSENGER BUSES

REGULAR OPTION NO.	DESCRIPTION
1.	**Air Conditioning**, Standard Cooling (see Par. H.).
2.	**Air Conditioning, extra cooling** (see Par. H.1.5.)
3.	**Alternator**, 100 ampere minimum for Type A buses and minimum 130 ampere for Type B buses. (Required with Option 1 or 34.)
7.	**Diesel Engine** (see Tables 3 through 7).
9.	**Fuel Tank, Increased Capacity** (30-gallon minimum capacity; see Par. D.3.3.).
10.	**Glazing, Dark Tint, Passenger Side Windows**, Minimum Light Transmittance of 30% and maximum Light Transmittance of 40% (see Option 42 and Par. C.2.19.3.1).
11.	**Heater, Auxiliary** (see Par. C.3.4. for size and installation requirements).
15.	**Door, Service**, Automotive Sedan Type (for 18- and 19-passenger buses only; see Fig. 1 and Tables 5 and 6).
16.	**Knee Spacing** (maximum allowed by FMVSS No. 222; requires deleting some seats which will reduce seating capacity.

Regular Seating Capacity	15	16	18	19	20
Rows of Seats	3	3	4/5	3	3
Minimum Knee Space, inches	27	27	27	28	28

17.	**School Name Lettering**, both sides of bus (see Par. C.1.4.10.).
20.	**Sound Abatement Insulation** (shall reduce interior noise 4 dB(A), minimum; see Par. C.1.5).
21.	**Stop Arm**, left side of bus (see Par. C.3.8.).
	Note: Reflectorized surface must be specified, if required (see Par. 3.8.1.).
22.	**Strobe Light, Roof-mounted** (see Par. C.3.7.).
23.	**System, Security Lock**, All doors (requires ignition disconnect on emergency door).
24.	**Tachograph**, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/speedometer/recorder; see Par. D.5.6.).
26.	**Laminated Safety Plate Glass**, AS-2 or better (see Par. C.2.19.2.2.).
27	**Powered Service Door**, manufacturer's standard (N/A on Sedan type door) (see Par. C.2.14.3.)
31.	**Tool Compartment** (see Par. C.3.10.).
32.	**Wheel, Spare** (without carrier, tire, or tube; see Par. D.2.6.2.).
34.	**Wheelchair Lift, Folding Platform Type** (floor-mounted on curb side of bus in front of or behind the rear wheelwell, at manufacturer's option; see Par. G.).
	NOTE: For Option 34, the school district must specify number of wheelchair positions required on bus.
37.	**Wheelchair Restraints, Webbed-belt Type** (for unusual wheelchairs which cannot otherwise be restrained; see Par. G.3.)
42.	**White Roof** (see Par. C.1.4.2.)
43.	**Windows, push-out**, additional (for emergency exit), (indicate quantity per side) (see Par. C.2.19.1.2.)

REGULAR OPTIONS

24- THROUGH 77-PASSENGER BUSES

REGULAR OPTION NO. — **DESCRIPTION**

1. **Air Conditioning**, Standard Cooling (see Par. H.).

   NOTE: Special Requirements - Option 1 requires a minimum 130 ampere alternator and 5/8" nominal thickness plywood installed over the steel floor.

2. **Air conditioning, extra cooling** (N/A on 77-passenger buses) (See Par. H.1.5.)

3. **Alternator**, 130 ampere minimum (required with option(s) 1, 35 or 36; see Par. F.4.1.2.)

4. **Axle, Rear, Two-speed.**

5. **Brakes, Hydraulic** (for 59-, 65-, 71-, and 77-passenger buses only).

6. **Chassis, Long Wheelbase** (requires minimum 274-inch wheelbase for 71-passenger conventional bus only; or 157-inch wheelbase for 24-passenger bus only).

7. **Diesel Engine** (for 24- through 77-passenger buses; see conventional buses in Tables 12 through 32).

8. **Differential, No-spin.**

9. **Fuel Tank, Increased Capacity** (for 24-passenger buses only; see Par. F.3.3.2.).

10. **Glazing, Dark Tint Passenger Side Windows**, Minimum Light Transmittance of 30% and maximum Light Transmittance of 40% (see Par. E.2.19.3.1.).

11. **Heater, Rear** (see Par. E.3.6. for size and installation requirements).

12. **Luggage Rack** (mounted on top of the bus; see Par. E.3.7.).

13. **Moisture Ejectors, Automatic** (for 59- through 77-passenger buses with air brakes only; see Par. F.2.2.1.3.).

14. **Mud Flaps, with Brackets, Mounted** (see Par. E.3.10.). **There shall be no advertisement on the mud flaps.**

16. **Knee Spacing** (maximum allowed by FMVSS no. 222; requires deleting some seats which will reduce seating capacity).

Regular Seating Capacity	24	35	47	53	59	65	71-S	71-L	77
Rows of Seats	4	5	7	8	9	10	11	11	12
Minimum Knee Space, inches	27	28		28	27.75	28 27.75	27.5	27.75	27.5

17. **School Name Lettering**, both sides of bus (see Par. E.1.4.8.).

18. **Seat Belts** (for each passenger seating position; see Par. E.3.12.).

19. **Slack Adjusters, Automatic**, Two at front and two at rear (for buses with air brakes only; see Par. F.2.2.1.4.).

20. **Sound Abatement Insulation** (shall reduce interior noise by 4 dB(A), minimum).

21. **Stop Arm**, left side of bus (see Par. E.3.14.).

    Note: Reflectorized surface must be specified, if required (see Par. 3.14.1.).

22. **Strobe Light, Roof-mounted** (see Par. E.3.11.).

23. **System, Security Lock, All Doors** (with ignition disconnect on emergency door).

24. **Tachograph**, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/speedometer/recorder; see Par. F.5.9.).

25. **Tachometer** (to indicate engine RPM).

26. **Laminated Safety Plate Glass**, AS-2 or better (see Par. E.2.19.2.2.).

27. **Powered Service Door, manufacturer's standard** (see Par. E.2.15.5.)

30. **Tires, Mud and Snow Tread** (for Rear Wheels only).

31. **Tool Compartment** (see Par. E.3.16.).

32. **Wheel, Spare** (without carrier, tire, or tube; see Par. F.2.6.2.3.).

33. **Wheel, Spare, Mounted** (with carrier but not tire and tube; carrier not available on 24-passenger bus; see Par. F.2.6.2.2.).

35. **Wheelchair Lift, Folding Platform Type, Front Curb Side Mounted** (for 24-through 71-passenger bus only; see Par. G.).

36. **Wheelchair Lift, Folding Platform Type, Rear Curb Side Mounted.** Same as Option 35 above except floor-mounted on rear curb side of bus (see Par. G.). This option is recommended only for buses which will have a regular attendant in addition to the driver.

NOTE: For Option Nos. 35 and 36, the school district must specify the number of wheelchair positions required on bus.

37. **Wheelchair Restraints, Webbed-belt Type** (for unusual wheelchairs which cannot otherwise be restrained; see Par. G.3.).

39. **Wheels, Cast Spoke, All Wheels** (see Par. F.2.6.2.1.) 35-77 passenger buses only.

41. **Seat Backs, Increased Height** (see Par. E.2.13.1.).

42. **White Roof** (see Par. E.1.4.1.)

43. **Windows, push-out, additional** (for emergency exit), (indicate quantity per side) (see Par. E.2.19.1.5.)

B. ORDERING INFORMATION

REGULAR OPTIONS

83-PASSENGER BUSES

REGULAR OPTION NO.	DESCRIPTION
1.	Air Conditioning, Standard Cooling (See Par. H.).
	NOTE: Special Requirements - Option 1 requires a minimum 130 ampere alternator and 5/8" nominal thickness plywood installed over the steel floor.
3.	Alternator, 130 ampere minimum (required with Option(s) 1, 35 or 36; see Par F.4.1.2.)
8.	Differential, No-Spin.
9.	Fuel Tank, Increased Capacity (90 gallon minimum capacity; see Par. F.3.3.2.).
10.	Glazing Dark Tint, Minimum Light Transmittance of 30% and maximum Light Transmittance of 40% (see Par. E.2.19.3.1.).
11.	Heater, Rear (see Par. E.3.6. for size and installation requirements).
12.	Luggage Rack (mounted on top of the bus; see Par. E.3.7.).
14.	Mud Flaps, with Brackets, Mounted (see Par. E.3.10.). There shall be no advertisement on the mud flaps.
16.	Knee spacing (maximum allowed by FMVSS No. 222; requires deleting some seats which will reduce seating capacity).

Regular Seating Capacity	83
Rows of seats	13
Minimum Knee Space, inches	27

17.	School Name Lettering, both sides of bus (see Par. E.1.4.8.).
18.	Seat Belts, Passenger (for each passenger seating position (see Par. E.3.12.).
19.	Slack Adjusters, Automatic, two at front and two at rear (see Par. F.2.2.1.4.).
20.	Sound Abatement Insulation (shall reduce interior noise by 4 dB(A), minimum).
21.	Stop Arm, left side of bus (see Par. E.3.14.).
	Note: Reflectorized surface must be specified, if required (see Par. 3.14.1.).
22.	Strobe Light, Roof-mounted (see Par. E.3.11.).
23.	System, Security Lock, All Doors (with ignition disconnect on emergency door).
24.	Tachograph, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/ speedometer/recorder; see Par. F.5.9.).
26.	Laminated Safety Plate Glass, AS-2 or better (see Par. E.2.9.2.2.)
27.	Powered Service Door, manufacturer's standard (see Par. E.2.15.5.)
30.	Tires, Mud and Snow Tread (for Rear Wheels only).
31.	Tool Compartment (see Par. E.3.16.).
33.	Wheel, Spare, Mounted (with carrier but not tire and tube (see Par. F.2.6.2.3.).
41.	Seat Backs, Increased Height (see Par. E.2.13.1.).
42.	White Roof (see Par. E.1.4.1.)
43.	Windows, push-out, additional (for emergency exit), (indicate quantity per side) (see Par. C.2.19.1.5.)

District Name ______________________

TEXAS EDUCATION AGENCY

Transportation Division

County-District No. ______________________

SCHOOL REQ. # ____________	
STATE REQ. # ____________	

School Bus Purchase Requisition

FY 19____-____

FOR TEA USE ONLY
Approved by: ____________
Date: ____________

Authority for Data Collection: TEC 11.12 and 21.165
Planned Use of Data: Required information necessary to purchase school buses.
Instructions: For information on bus options, see the current *Texas School Bus Specifications*. The completed form should be submitted as indicated below. For further information contact the Transportation Division at (512) 463-9165.

Section I—Bus Requirements

Quantity: ________
Size: ________ —Passenger School Bus

Automatic Transmission: ____ Yes ____ No
(For 24 thru 77 passengers)

Type: ____ Conventional
____ Semi-forward Control
____ Forward Control

Section II—Regular Bus Options: Check all regular bus options to be included.

_____ 1. Air conditioning, standard
_____ 2. Air conditioning, extra cooling (N/A for 77-83 passengers)
_____ 3. Alternator, increased capacity
_____ 4. Axle, rear, two-speed (24- thru 71-passenger only)
_____ 5. Brakes, hydraulic (59- thru 77-passenger only)
_____ 6. Chassis, long wheelbase (conventional 24- and 71-passenger only)
_____ 7. Diesel engine
_____ 8. Differential, no-spin (24- thru 71-passenger only)
_____ 9. Fuel tank, increased capacity (15- thru 24- and 83-passenger only)
_____ 10. Glazing material, deep tint (min. 30% max. 40% light transmittance.)
_____ 11. Heater, auxiliary
_____ 12. Luggage rack (24- thru 83-passenger only)
_____ 13. Moisture ejectors, automatic (with air brakes only)
_____ 14. Mud flaps, mounted (with brackets)
_____ 15. Door, Service-Automotive sedan-type manually operated (18- and 19-passenger only)
_____ 16. Knee spacing, maximum (reduces seating capacity)
_____ 17. School name lettering (type EXACTLY as required)
____
_____ 18. Seat belts (standard on all 15- thru 20-passenger)
_____ 19. Slack adjusters, automatic (with air brakes only)
_____ 20. Sound abatement insulation
_____ 21. Stop arm, left side
_____ 22. Strobe light, roof-mounted
_____ 23. Security lock system, all doors
_____ 24. Tachograph
_____ 25. Tachometer
_____ 26. Laminated safety plate glass
_____ 27. Powered Service Door (N/A with sedan-type door)
_____ 28. No option available
_____ 29. No option available
_____ 30. Tires, mud and snow tread, rear wheels
_____ 31. Tool compartment
_____ 32. Wheel, spare (without carrier, tire, or tube)
_____ 33. Wheel, spare, mounted (with carrier but not tire or tube; 35- thru 83-passenger only)
_____ 34. Wheelchair lift, folding platform type, right curb side mounted (15- thru 20-passenger only; with _____ wheelchair positions)
_____ 35. Wheelchair lift, folding platform type, front curb side mounted (24- thru 71-passenger only; with _____ wheelchair positions)
_____ 36. Wheelchair lift, folding platform type, rear curb side mounted (24- thru 71-passenger only; with _____ wheelchair positions)
_____ 37. Wheelchair restraints, webbed-belt type (15- thru 71-passenger only)
_____ 38. No option available
_____ 39. Wheels, cast spoke (all wheels)
_____ 40. No option available
_____ 41. Seat backs, increased height
_____ 42. White roof
_____ 43. Windows, additional push-out (for side emergency exits; indicate extra number requested per side _____)

NOTES: Discard all previous editions of this form. Use **only** this form to order 1991 school buses. NA means Not Available/Not Applicable.

Typed Name and Title of Contact Person	Mailing Address
	Bus Delivery Address if Different from Above
Telephone ______________________	

Typed Name of Superintendent	Date	Telephone	Signature

District Name _____ County-District No. _____

Section III—Special Options:
List any requested additional options that do not appear in current state specifications

A. _____ J. _____

B. _____ K. _____

C. _____ L. _____

D. _____ M. _____

E. _____ N. _____

F. _____ O. _____

G. _____ P. _____

H. _____ Q. _____

I. _____ R. _____

2.4.1.2.5. Latch - The emergency door shall be equipped with a slide bar rack and pinion (cam) operated latch. The slide bar shall be approximately 1-1/4 inches wide and 3/8-inch thick and shall have a minimum stroke of 1-1/8 inches. The slide bar shall be spring loaded so as to retain the bar in the closed position and have a minimum of one inch of horizontal bearing surface beyond the edge of the door frame when the door lock is in a latched position.

2.4.1.2.6. Latch Handle - The movement of the latch handle through its full arc of operation shall not be obstructed by, or extended into the area behind the rear seats at the emergency door. The handle, when in the closed position, shall meet the requirements of FMVSS No. 217. The design of the latch handle shall allow quick release, but shall offer protection against accidental release. Control of the fastening devices from the driver's seat shall not be permitted. A pull handle shall be installed on the inside of the emergency door so that the door can be securely closed for positive fastening. Provisions for opening from the outside shall consist of a handle (device) designed to prevent "hitching a ride" yet allowing the door to be opened when necessary. The outside handle, when in the closed position, shall extend vertically downward from its pivot center.

2.4.1.2.7. Switch - The emergency door latch shall be equipped with a heavy-duty electric plunger type switch connected to a warning buzzer located in the driver's compartment. The switch shall be enclosed in an adequately protected case, and wires leading from switch shall be concealed in the walls. The switch shall be installed so that the buzzer will sound before the door handle is turned far enough to permit the door to open. The switch shall be Cole-Hersee's No. 9118 having an upset end (knob) on the plunger head.

2.4.2. Side Emergency Exits and Roof Hatches - Texas school buses shall be provided with side emergency exits and roof hatches. These side emergency exits may be either side emergency doors meeting the requirements of Par. C.2.4.1. above (except that they shall be hinged on the forward side) or they may be push-out type side windows meeting the requirements of Par. C.2.19.1.2. and FMVSS No. 217. Single emergency exits shall be installed near the center of each side. When so specified in the Invitation for Bids, (see Option 43) additional push-out side windows shall be installed (quantity shall be specified by school district). If more than one emergency exit per side is provided, they shall be as "equally spaced" as practical. Roof hatches shall be the body manufacturer's standard. They shall be equipped with an external and internal handle. Texas school buses shall be provided with <u>minimum</u> side emergency exits and roof hatches as follows:

<u>BUS CAPACITY</u>	<u>MINIMUM REQUIRED EXITS/HATCHES</u>
Up to 22-passengers	1 emergency exit per side and 1 roof hatch
23- thru 65-passengers	1 emergency exit per side and 2 roof hatches
Larger than 66-passengers	2 emergency exits per side and 2 roof hatches

2.5. FLOORS - The standard floor construction of the bus body manufacturer shall be used if a steel floor is not furnished with the bus chassis. If the floor is furnished with the chassis, then the floor shall be covered with material as described below:

2.5.1. Installation - Plywood shall be installed in the areas under all seats including the driver's seat. It may be cut to fit around any permanently-attached driver's seat provided by the chassis manufacturer.

2.5.2. Material - The floor shall be covered with plywood securely attached to the existing steel floor. The plywood shall be 5/8-inch nominal thickness, A-C or B-B Exterior grade manufactured in conformance with U.S. Product Standard PS 1-83. CDX interior grade plywood with exterior glue is acceptable when all surfaces including the edges of the wood are covered or sealed against the exterior environment.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

2.6. **FLOOR COVERING** -

2.6.1. Aisle Material - Floor covering in the aisle shall be the aisle-type, fire-resistant rubber or equivalent, and shall be nonskid, wear-resistant, and ribbed. Minimum overall thickness shall be 3/16 inch measured from tops of ribs. Rubber aisle floor covering shall meet Federal Specification ZZ-M-71D.

2.6.2. Installation - Floor covering (except that on the toe board) shall be permanently bonded to the floor with waterproof adhesive material and shall not crack when subjected to sudden temperature changes. All seams shall be sealed with waterproof sealer.

2.6.3. Trim - Seams shall be covered with the bus body manufacturer's standard aluminum trim using countersunk flat or oval screws.

2.6.4. Underseat Material - The floor in the underseat area (including wheelwells, and the areas under the driver's seat and wheelchairs) shall be covered with fire-resistant, rubber floor covering or equivalent having minimum overall thickness of 1/8 inch.

2.7. **PANELS, EXTERIOR** - Exterior panels shall be steel; however, front door farings and front and rear end-caps only may be fiberglass or heavy-duty plastic.

2.7.1. Attachment and Installation - All exterior panels shall be attached to bow frames and strainers so as to act as an integral part of the structural frame. They shall be installed by lapping and riveting, lapping and bolting, or by flanging and bolting and in such a manner as to form watertight joints.

2.7.2. Joints - Joints shall meet the requirements of FMVSS No. 221.

2.8. **PANELS, INTERIOR** - All interior wall and ceiling panels shall be steel and of the body manufacturer's standard design except the panels beneath the windows shall be clear-coated galvanized embossed steel meeting ASTM A 446. Also the stepwell and riser panels in the service door entryway shall be clear-coated galvanized steel (embossing not required). Galvalume, aluminized steel, and aluminum over steel panels are acceptable for use beneath the windows and in the entryway. Interior panels made of 0.032-inch, 3105-H14 aluminum may be used in 15- and 18- passenger buses only.

2.8.1. Attachment - All interior panels shall be attached to the frame structure by bolts, rivets, or by any well-designed method utilizing self-locking panels, locking panel strips, or clips. Regardless of the method used, the panels shall be attached so that vibration, rumbling, and popping shall be at a minimum.

2.8.2. Design - Front and rear panels shall be formed to present a smooth, pleasing appearance. Roof panels shall be continuous from header to header. If the ceiling is constructed so as to contain lapped joints, the forward panel shall be lapped by the rear panel and all exposed edges shall be beaded, hemmed, flanged, or otherwise treated to minimize sharp edges.

2.9. **RUB RAILS** - Two separate, one-piece continuous rub rails of the type, grade, and thickness of steel specified in Table No. 9 (or approved equal), shall be installed on the body as described below. The minimum finished width of all rub rails shall be 4 inches:

2.9.1. Construction - The rub rails shall be of ample strength to resist impact and to prevent crushing of the bus body and shall be a flanged-formed channel, longitudinally fluted, or corrugated rib surface. Ends shall be (1) smoothly closed, or (2) closed by a rounded or beveled metal end cap which shall be butt- or flash-welded to the rub rail, or (3) closed by a rounded or beveled metal end cap inserted with an approximate one-inch sleeve inside of the rub rail and riveted in position at the top and bottom of the rub rail, or riveted in position at the top and bottom of the rub rail flange, or riveted in the center of the end cap, and sealed in the same manner as the top flange of the rub rails.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

2.12.3.2. Painting Requirements - The entire seat frame, except that section of the back frame which is padded and upholstered, shall be thoroughly cleaned, primed, and painted. The paint shall have adhesive qualities which will not permit the removal of the paint by means of the thumbnail-scratch method without first chipping a starting place (see also Par. C.1.4.3.).

2.12.4. Seat Installation -

2.12.4.1. Aisle Width - The minimum aisle width between rows of seats shall be 12 inches.

2.12.4.2. Attachment - Each leg shall be attached to the floor with at least 2 bolts, flat washers, lock washers, and nuts, or approved equal. Where it is impossible to use bolts and nuts at certain floor points due to main cross members or floor sill interference, thread-forming or cutting bolts and lock washers may be used.

2.12.4.3. Knee Spacing - The seats shall provide knee spacing as normally furnished by the manufacturer for this seating capacity but not less than 24 inches for the 15-passenger bus. (See Par. A.2.13. for the definition of knee space.) Knee spacing for the 16- through 20-passenger bus shall be not less than 25 inches (see Table No. 1 and Option No. 16).

2.12.5. Upholstery - The seat cushion and back units shall be covered on top and four sides with a vinyl resin-coated upholstering material as follows:

2.12.5.1. Material - These materials shall be fire-resistant and shall meet or exceed the Boston Fire Block Test in the National School Bus Standards. They shall be artificial leather.

2.12.5.2. Thread - The upholstery material shall be securely sewn with a thread meeting the requirements of Federal Specification V-T-295d. The thread in the needle and the thread in the looper (bobbin) of double thread machines shall be size F, Type II (Twisted Bonded Multiple Cord), and size E, Type I (Twisted Soft Multiple Cord), respectively. The thread used in the needle and through the looper shall be Size F (Monofilament), Type III, for single thread machines.

2.12.5.3. Welting - There shall be welting on exposed seams of the seat back and cushion.

2.13. **SERVICE ENTRYWAY** - The entrance door steps shall be designed so that the first step shall not be more than 10 to 14 inches from the ground when the bus is unloaded. Step risers shall not exceed a height of 10 inches. When plywood is used on a steel floor or step, the riser height may be increased by the thickness of the plywood. Steps of adequate width and length shall be fabricated and installed outside or inside the body to meet this requirement. Provisions shall be made to prevent road splash from the wheel from accumulating on steps installed outside the body. The surface of all entrance steps shall have a nonskid material applied. (See Par. C.2.10.1. for handrail installation requirement in the service entryway.)

2.14. **SERVICE OR ENTRANCE DOORS** - 15- through 20-passenger buses shall be equipped with a service or entrance door which shall be located on the right side near the front of the bus and in direct view of the driver.

Note: 15-passenger buses may have either a Style 1 or a Style 2 service door at the manufacturer's option. 16-passenger buses shall have a Style 2 (tall) service door (no option). 18- and 19-passenger buses shall have a Style 2 (tall) service door unless Option No. 15 (for sedan type door) is designated by the ordering school district. 20-passenger buses shall have a Style 2 (tall) service door (no option). (See Table 2 for a comparison of small buses.). This door shall have a positive latching mechanism to eliminate the possibility of an inadvertent door opening during a frontal or roll-over crash.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

2.14.1. Attachment - Style 1 doors shall be attached by the chassis manufacturer's standard method. The hinges for Style 2 service entrance doors shall be attached with rivets or bolts, nuts, and lock washers. Metal screws or self-tapping bolts are not acceptable. Metal screws may be used for alignment of Style 2 doors while installing rivets. Self-tapping bolts may be used for alignment if the bolt heads are tack-welded to the hinges (see Par. C.2.1.5.1.).

2.14.2. Design, Style 1 (Sedan Type) Service Door - This service or entrance door shall be of one piece and shall have a minimum horizontal opening of approximately 28 inches and a minimum vertical opening of approximately 54 inches. The door shall be manually operated. The door control must be the hand lever type, driver-operated, and shall be designed to afford easy release and to prevent accidental opening. When so specified in the Invitation for Bids (see Option 15), 18- and 19-passenger buses shall be furnished with (sedan type) style 1 service doors.

2.14.3. Design, Style 2 (Tall) Service Door - This service or entrance door shall be the two-piece or folding type and shall have a minimum horizontal opening of approximately 24 inches and a minimum vertical opening of approximately 68 inches. The doors shall be operated from controls at or near the bus driver's seated position. The doors shall be either operated manually or when so specified in the Invitation for Bids (see Option 27), actuated electrically or by air pressure or vacuum and shall allow manual opening in case of an emergency. To prevent accidental opening while the bus is in motion, the door opening system shall require at least a 125-pound force applied to its center in order to manually open the door. Both vertical closing edges of the door shall be equipped with rubber or rubberized materials to protect passenger's fingers.

NOTE: Powered Service Doors shall be clearly and concisely marked with operating instructions in case of power failure.

2.14.4. Driver's Visibility - Service or entrance doors shall have lower and upper glass panels (see Par. C.2.14.5.), or, if a Sedan-type door, a system of mirrors and glass panels to provide the driver a clear view of entering passengers as well as the passenger landing area. Whichever style of door is used, provision shall be made using either glass panels or mirrors to give the seated driver a view of at least the upper 7-1/2 inches of a 30-inch rod placed upright on the ground at any point along a line one foot outboard from the service door entrance and between the front and rear of the service door.

2.14.5. Glass Panels - Style 2 service or entrance doors shall have glass panels of approved safety glass (see Par. C.2.19.2. for installation requirements). Bottom of each lower glass panel shall be not more then 10 inches from the the top surface of the bottom step. The top of each upper glass panel shall be not more than 6 inches from the top of the door. Type A buses shall have upper glass panels (window) of safety glass with a minimum area of 350 sq. in.

2.14.6. Header Board - The head impact area on the inside top of the service or entrance door shall be protected by an energy-absorbing, padded header board, 3 inches high and 1 inch thick, extending the full width of the opening, to prevent injury when accidentally impacted.

2.15. SIDE DOORS OF CONVERTED VANS - The side doors of converted van shall be made inoperable by one of the following:

2.15.1. Removal - The cargo doors on the side of converted vans shall be removed and the area reinforced and covered with riveted-on exterior and interior paneling.

2.15.2. Side Reinforced - The doors may be left in place but shall be reinforced and made permanently inoperable by means other than the use of rub rails on the outside of the body.

2.16. SKIRT REINFORCEMENT - Side skirts of 15- through 20-passenger buses, if on commercial cutaway or stripped chassis, shall be gusseted or braced, where required, for rigidity and to prevent undue vibration.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

2.17. VENTILATION - The bus body shall be equipped with a suitable, controlled ventilation system of sufficient capacity to maintain a satisfactory ratio of outside to inside air under normal operating conditions without opening windows except in warm weather.

2.18. WHEELHOUSING - The wheelhousing shall be the manufacturer's standard design. (See Par. C.11.10. for undercoating requirements.)

2.19. WINDSHIELD AND WINDOWS -

2.19.1. General Design -

2.19.1.1. Side Windows, Passenger, Standard - There shall be either a standard or a push-out type window for each passenger seat except where it is not possible because of the installation of side emergency exits (see paragraphs C.2.4.2. and C.2.19.1.2.). Standard side windows shall open from the top only and shall operate freely. All side windows except the driver's and the service door window, shall be the split sash type with positive latch. **Side windows that can be latched in an uneven position are not acceptable.** They shall be furnished with a latching mechanism which will allow each window to be latched in a position not more than six inches from the top. The passenger side windows shall provide an unobstructed opening 22 inches wide and between 9 and 10 inches high.

2.19.1.2. Side Windows, Passenger, Push-out Type - At the manufacturer's option, 15- through 20-passenger buses may be provides with one push-out side window in lieu of an emergency exit on each side (see paragraphs C.2.4.1. and C.2.4.2. and Option 3). These windows shall be hinged at the top and shall be positioned for ease of egress. These push-out windows shall be the body manufacturer's standard push-out passenger windows meeting or exceeding Federal Standards.

NOTE: Push-out windows shall be equipped with an electrical switch connected to an audible signal automatically operated and located in the driver's compartment which shall indicate when the window is pushed out in excess of 1/2 inch. The switch shall be enclosed to prevent tampering. Wires leading from the switch shall be concealed in the walls. No cut-off switch shall be installed in the circuit.

2.19.1.3. Service Door and Emergency Door Windows - The windows of either style emergency door and Style 2 service doors (see Par. C.2.4.1.) shall be furnished with upper glass panels permanently closed and set in rubber or sealed in rubber.

2.19.1.4. Windshield - The maximum width of the windshield center post shall not exceed 2-1/2 inches. There shall be at least 2 inches of clearance between the steering wheel and the windshield, cowl, instrument panel, or any other surface.

2.19.2. Glazing - Glass shall be installed in rubber channel gasket material or approved equivalent material. The glass shall be mounted so that the permanent identification mark is visible from either inside or outside of the bus. **All safety glazing materials shall be approved by the Department of Public Safety.** All exposed edges of glass shall be banded. The glass shall be as follows:

2.19.2.1. Rear and Other Windows - The glass in the rear (side) windows, and all other windows including the driver's side windows and the emergency door windows, shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better as specified in ANSI Safety Code Z26.1.

2.19.2.2. Safety Plate Glass, Optional - **When so specified in the Invitations for Bids** (see Option 26), all windows shall be AS-2 grade or better laminated safety plate glass.

2.19.2.3. Side Windows, Passenger - The glass in all passenger side windows (including push-out type emergency windows) shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better, as specified in ANSI Safety Code Z26.1.

2.19.2.4. Windshield - The windshield shall be minimum 7/32-inch thick safety plate glass and shall be heat-absorbent, laminated AS-1 safety glass meeting ANSI Standard Z26.1, as amended.

C. **15- THROUGH 20-PASSENGER BODY SPECIFICATIONS**

2.19.3. Tinting -

2.19.3.1. Side Windows, Passenger - When so specified in the Invitation for Bids (see Option No. 10), passenger side windows and push-out type emergency windows only shall be tinted to minimum 30%, maximum 40% light transmittance using AS-3 grade glass or better. This is defined as "dark tinting" and is not permitted on the windshield or any window used for driving purposes.

Note: All safety glazing materials must be approved by the Department of Public Safety.

2.19.3.2. Windshield - The windshield shall have a horizontal gradient band (tinted) starting slightly above the driver's line of vision with approximately 90% light transmittance and gradually decreasing to a minimum of 70% light transmittance at the top of the windshield, or the entire windshield shall be tinted to meet the requirements of FMVSS No. 205.

C.3. **ACCESSORIES, REQUIRED AND OPTIONAL** -

3.1. **BACKUP ALARM** - An automatic, audible backup warning alarm meeting the requirements of Type C, 97 dB(A), SAE J994b (except for 12-volt system) shall be installed behind the rear axle.

3.2. **DEFROSTERS** - Defrosting equipment shall keep the windshield, the window to the left of the driver, and the glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103. Any circulating fan used in defogging and installed on the curb side of the bus front shall be mounted on the windshield header so as to protect the fingers, hair, and clothing of entering and departing passengers.

3.3 **EMERGENCY EQUIPMENT** - 15- Through 20-passenger school buses shall be equipped with the following emergency equipment:

3.3.1. **Body Fluid Cleanup Kit** - Each bus shall be provided with a removable and moisture-proof body fluid cleanup kit. It shall be properly mounted and identified as a Body Fluid Cleanup Kit. This kit shall contain as a minimum, the following items mounted in a removable metal or hard plastic kit:

1 - 15 oz chlorine-type absorbent deodorant material (or equal)
1 - 12 oz germicidal spray disinfectant
2 - pair disposable latex gloves
4 - 18" x 18" absorbent towels
1 - plastic pick-up spatula
1 - plastic hand broom
1 - plastic dust pan
2 - 14" x 19" disposal bags and ties (waterproof)
2 - adhesive "BIO-HAZARD" labels
1 - 12 oz deodorant spray
4 - individually wrapped, cold sterilization wipes in foil-lined pouches
2 - paper respiratory masks
1 - metal or hard plastic container identified as "BIO-HAZARD" with black symbol and lettering on orange mountable case.

3.3.2. **Fire Extinguishers** - School buses shall be equipped with one of the fire extinguishers listed below:

3.3.2.1. Standard Fire Extinguisher - Each bus shall be equipped with at least one refillable stored pressure Multi-purpose Dry Chemical type (or approved equal) fire extinguisher of minimum 5-pounds capacity, mounted in extinguisher manufacturer's automotive type bracket, and located in driver's compartment in full view of and readily accessible to driver. The fire extinguisher shall bear the Underwriters Laboratory Listing Mark of no less than 2A 10-B:C rating. Extinguishers shall be furnished with a hose, pressure gauge, and metal head.

3.3.2.2. Halon Type Fire Extinguisher - An approved equal fire extinguisher is the American Safety Products (ASP) Model 13000, 2A 40-B:C Rating. (For those who prefer this type, this fire extinguisher is available with a 13-pound charge of combined halon gas. It is not permissible to transport these units after refilling, therefore the manufacturer offers a five-year warranty and replacement of discharged units with a new unit at half price.)

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

3.3.3. **First Aid Kit** - Buses shall have a removable metal first aid kit container mounted in an accessible place within the driver's compartment. The compartment shall be marked to indicate the location of the kit. Number of units and contents for each kit shall be as follows:

2 - 1 in. x 2 1/2 yds. adhesive tape rolls
24 - sterile gauze pads 3 in. x 3 in.
100 - 3/4 in. x 3 in. adhesive bandages
8 - 2 in. bandage compress
10 - 3 in. bandage compress
2 - 2 in. x 6 yds. sterile gauze roller bandages
2 - nonsterile triangular bandage approx. 40 in. x 54 in., 2 safety pins
3 - sterile gauze pads 36 in. x 36 in.
3 - sterile eye pads
1 - rounded end scissors
1 - pair latex gloves
1 - mouth-to-mouth airway

3.4. **HEATERS AND ASSOCIATED COMPONENTS** -

3.4.1. Heater, Standard - Each bus shall be equipped with a factory-installed fresh air type heater regularly offered as standard vehicle manufacturer's accessory for this type of vehicle. Controls shall be mounted on the dash.

3.4.2. Heater, Auxiliary - When so specified in the Invitation for Bids (see Option No. 11), an auxiliary hot water type heater shall be furnished and installed in the passenger compartment of the bus. Heated conduits inside the bus shall be insulated or shielded to prevent injury to the driver or passengers.

3.4.3. Bleeder Valves - Any heater(s) installed by the body manufacturer shall have accessible air bleeder valves installed in the return lines.

3.4.4. Service Accessibility - Heater motors, cores, and fans shall be readily accessible for service. Access panels (removable without removing driver's seat) shall be provided as required for maintenance.

3.5. **MIRRORS, EXTERIOR** - Exterior mirrors shall conform to the requirements of FMVSS No. 111. Each 15- through 20-passenger school bus shall be provided with exterior mirrors and brackets as described below:

3.5.1. Mirror System, Crossover - The crossview mirror system shall provide the driver with indirect vision of an area at ground level from the front bumper forward and the entire width of the bus to a point where the driver can see by direct vision. The crossview system shall also provide the driver with indirect vision of the area at ground level around the left and right front corners of the bus to include the tires and service entrance on all types of buses to a point where it overlaps with the rear vision mirror system.

3.5.2. Mirror System, Rearview - The rearview mirror system shall be capable of providing a view along the left and right sides of the bus which will provide the driver with a view of the rear tires at ground level, a minimum of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at the rear axle line.

3.5.3. Mounting and Mounting Brackets, Standard - Mirror mounting and backing shall be of steel or a high-impact plastic such as a polycarbonate/polyethylene terephthalate blend, or approved equal. Mounting of all exterior mirrors to the bus body shall be by means of bolts, nuts, and lock washers, where possible; otherwise No. 10 hexagon head sheet metal bolts with star lock washers or No. 10 hexagon head sheet metal screws with serrated surface shall be used. This system of mirrors shall be easily adjustable but be rigidly braced so as to reduce vibration. Each exterior rear vision mirror shall be mounted in the brackets and assemblies shown on Texas State Purchasing and General Services Commission Drawings numbered 040-35(a), 040-35(3), 040-35(4), 040-35(5), 040-35(6) and 040-35(7), dated November 15, 1968. The brackets shall be mounted on the left front and right front of the bus body and cowl. The parts, as shown on drawings numbered 040-35(2) and 040-35(3), must be formed to fit the individual configuration of each manufacturer's body and cowl design. Long dimensions of Texas mirror brackets may be adjusted as required to fit the configurations of buses.

C. 15- THROUGH 20-PASSENGER BODY SPECIFICATIONS

3.5.4. Mirror Backing and Mounting, Stainless Steel, Optional - **When so specified in the Invitation for Bids**, exterior rearview mirror backs and mounting brackets shall meet or exceed all of the applicable requirements of Par C.,3.5.3.1; below except the mirror backing and mounting shall be made of stainless steel.

3.5.5. Painting - Brackets and assemblies of all exterior rearview and crossover mirrors shall be cleaned and prepared for painting in accordance with Federal Specification TT-C-490B, Type I or II. The metal backs of stainless steel, aluminum, and chrome-plated exterior and crossover mirrors, **if painted**, and the backs of all other metal-backed exterior and crossover mirrors shall be finished in black (Color No. 37038 of Federal Standard No. 595a).

3.6. **MIRRORS, INTERIOR** - A clear-vision interior rearview mirror conforming to FMVSS No. 111, with at least 6" x 16" size vision area, affording a good view of the road to the rear as well as of the passengers, shall be furnished and installed. The mirror shall be made of safety glass and have rounded corners and protected edges.

3.7. **REVOLVING STROBE LIGHT - When so specified on Invitation for Bids** (see Option No. 22), an optional white flashing strobe light meeting the following requirements shall be provided:

3.7.1. Design - The lamp shall have a single clear lens emitting light revolving 360 degrees around a vertical axis. The light source shall be minimum of 50 candlepower and flash 60-120 times per minute. The base of the lamp shall be metal or approved equal and installed by a method which seals out dust and moisture. A manual switch is required for operation and a pilot light to indicate when the light is in operation shall be included. Wiring shall be installed inside the bus walls.

3.7.2. Mounting - The strobe light shall be permanently installed near the centerline on the school bus roof and not more than one-third of the body length forward of the rear edge of the bus roof. It shall not extend above the roof more than approximately 6.5 inches.

3.8. **STOP ARM - When so specified on Invitation for Bids** (see Option 21), a school bus stop arm meeting SAE J1133 and the following requirements shall be provided:

3.8.1. Design - The sign shall be octagon-shaped, constructed of zinc-coated steel or aluminum and painted with a polyurethane finish. It shall have a minimum 1/2-inch wide white border and the word "**STOP**" in white letters at least 6 inches high against a red background on both sides. Double-faced red, alternately flashing lamps, one each at the top and bottom (visible from each side of the structure) shall be connected to, and flash with the required school bus red flashing signal lamp circuit when the arm is extended. The arm mechanism may be activated by air pressure, electricity, or by vacuum. **The school may specify a reflectorized surface if desired.**

3.8.2. Mounting - The stop arm shall be installed on the left side of the school bus near the front cowl section.

3.9. **SUN VISOR** - An adjustable sun visor with a minimum size of 5 inches by 16 inches shall be installed above the interior windshield on the driver's side. The sun visor shall not interfere with the driver's full view of the rearview mirrors. A right sun visor is manufacturer's option.

3.10. **TOOL COMPARTMENT - When so specified in the Invitation for Bids** (see Option No. 31), a metal container of adequate strength and capacity shall be provided for storage of tire chains, tow chains, and such tools as may be necessary for minor emergency repairs. This storage container shall be located either inside or outside the passenger compartment. However, if it is located inside the passenger compartment, it shall be provided with a separate cover; a seat cushion shall not be used as this cover. This tool compartment shall be capable of being securely latched and shall be fastened to the floor in the right front or the right rear of the bus.

D. CHASSIS SPECIFICATIONS

D.1. GENERAL REQUIREMENTS -

1.1. **GENERAL SPECIFICATIONS** - The requirements for gross vehicle weight ratings, gross axle weight ratings (front and rear) and tire sizes and load ranges, as specified in Table Nos. 3 through 7 for each size chassis are **minimum** requirements (see Par. A.4.5.). The requirements are for school buses with standard equipment. **The added weights of optional equipment, such as air conditioning, luggage racks, lifts for the physically impaired, or other heavy accessories were not considered in establishing the capacity ratings to be certified for the chassis.** If additional optional equipment is ordered which necessitates increased capacity ratings of either axles, springs or tires, it is the responsibility of the vendor to furnish them so that proper certification can be made on the vehicle.

1.2. COLOR - The chassis shall be painted black (Color 17038); cowl, fenders, and hood shall be painted school bus yellow (Color 13432); and bumpers and wheels shall be painted the chassis manufacturer's standard color.

D.2. AXLES, SUSPENSION, AND RELATED COMPONENTS -

2.1. **AXLE CAPACITIES** - Axle capacities and gross axle weight ratings (GAWR's) shall be as specified in Table Nos. 3 through 7 for each make of vehicle. Increased axle capacities shall be furnished to accommodate optional equipment such as diesel engines or other heavy accessories as required (see Paragraphs A.4.5., D.1.1., and G.1.7.2.).

2.2. **BRAKES AND RELATED COMPONENTS** -

2.2.1. Service Brakes - Service brakes shall be manufacturer's standard hydraulic front power disc brakes and rear disc or drum brakes meeting FMVSS No. 105 as applicable to school buses.

2.2.2. Warning, Low Fluid - Hydraulic assist-boosters shall audibly and visually warn of fluid or power loss.

2.3. **HUBODOMETERS** - Each chassis shall be equipped with one hubodometer with standard mounting bracket which shall be calibrated in miles and installed by the manufacturer. The preferred mounting location is on the right rear axle drive wheel. The hubodometer shall be one of the following:

2.3.1. Accu-Trak, Standard Car Truck, Park Ridge, IL 60068.
2.3.2. Engler Instruments, 250 Culver Ave., Jersey City, NJ 07305.
2.3.3. Veeder-Root, Hartford, CT 06102.

2.4. **SHOCK ABSORBERS** - Two front and two rear heavy-duty, double-acting shock absorbers shall be installed.

2.5. **SPRINGS** - The ground ratings for the front and rear springs shall be as specified in Table Nos. 3 through 7 for each make of vehicle (see Paragraphs A.4.5., D.1.1., and G.1.7.2.).

2.6. **TIRES AND WHEELS** -

2.6.1. Tires - All standard tires shall be the steel belted radial tubeless type. All tires shall be new and the tread style furnished shall be the tire manufacturer's standard design and the brand normally furnished on regular production orders **unless otherwise specified in the Invitation for Bids.** All tires shall be "Original Equipment Line Quality." For tire size and load range for each size chassis, see Table Nos. 3 through 7 and the major components chart.

2.6.2. Wheel, Spare - **When so specified in the Invitation for Bids** (see Option No. 32), the bus shall have a spare wheel; **however carrier for spare wheel will not be provided under this option.**

D.3. CHASSIS FRAME AND RELATED COMPONENTS -

3.1. **BUMPERS, FRONT AND REAR** - Front and rear bumpers shall be chassis manufacturer's standard except the rear bumper furnished by body manufacturer shall be of the size and type and attached to frame as described in Par. C.1.2.

D. 15- THROUGH 20- PASSENGER CHASSIS SPECIFICATIONS

3.2. **CHASSIS FRAME SIDE MEMBERS** - Each frame side member shall be of one-piece construction. If the frame side members are extended, such extension shall be designed, furnished, and guaranteed by the installing manufacturer. The installation shall be made by either the chassis or body manufacturer. Extensions of frame lengths are permissible only when such alterations are welded on behind the hanger of the rear spring. This specification does not permit wheelbase extensions. Any welding, heating (for frame straightening or repairs), or the drilling of holes in chassis frame members shall be in accordance with chassis manufacturer's recommendations.

3.3. **FUEL TANKS** - Standard and auxiliary fuel tanks shall meet FMVSS No. 301 as applicable to school buses and shall meet the current design objectives of the SBMI. Fuel tanks installed on Texas school buses shall have a minimum "draw" of 83% of capacity.

3.3.1. Fuel Tanks, Standard - The standard fuel tank shall have a minimum capacity of 21 gallons. The tank shall be mounted, filled, and vented entirely outside the body (see Section D.5.4.3.)

3.3.2. Fuel Tank(s), Auxiliary - **When so specified in the Invitation for Bids**, (see Option No. 9), the bus shall be furnished with a minimum capacity 30-gallon fuel tank or tanks furnished and installed by the chassis manufacturer.

3.4. **STEERING, POWER** - The bus shall be furnished with the chassis manufacturer's standard power steering which will provide safe and accurate performance at maximum load and speed.

D.4. **ELECTRICAL SYSTEM AND RELATED COMPONENTS** -

4.1. **ALTERNATORS** - The 12-volt alternators with rectifier shall have the electrical outputs and the minimum charging rates shown below when tested in accordance with SAE rating at the manufacturer's recommended engine speed. These alternators shall be ventilated and voltage controlled and, if necessary, current controlled. Alternators shall be provided as follows:

4.1.1. Alternator, Standard - Type A buses and Type B buses shall a standard alternator with a minimum electrical output of 75 amperes with gasoline engines (65 amperes with diesel) and 100 amperes, respectively.

4.1.2. Alternators, Other - School buses equipped with the following equipment shall have alternators as follows:

4.1.2.1. Air-conditioned Buses - Type A buses and Type B buses equipped with air conditioning shall have alternators with a minimum electrical output of 100 and 130 amperes, respectively.

4.1.2.2. Wheelchair Lift-equipped Buses - Type A buses and Type B buses equipped with wheelchair lifts shall have alternators with a minimum electrical output of 100 and 130 amperes, respectively.

4.1.2.3. Air-conditioned and Wheelchair-equipped buses - Type A buses and Type B buses equipped with <u>both</u> air conditioning and wheelchair lifts shall have alternators with a minimum electrical output of 130 amperes and 160 amperes, respectively.

4.1.3. Alternator, Optional - **When so specified in the Invitation for Bids**, (see Option No. 3), Type A buses shall have an alternator with a minimum electrical output of 100 amperes. Type B buses shall have an alternator with a minimum electrical output of 130 amperes.

4.2. **BATTERY AND RELATED COMPONENTS** - The storage battery furnished on each chassis shall have sufficient capacity to supply current for adequate operation of the engine starter, lights, signals, heater, and all other electrical equipment. The batteries furnished for 15- through 20-passenger school buses shall have a potential of 12 volts and meet the following:

4.2.1. Battery, Diesel Engines - The batteries furnished with diesel engines shall be as specified by the chassis manufacturer. When two batteries are provided, they shall both be installed under the hood or one shall be installed under the hood and the other shall be installed in a battery box having outside access. Single batteries shall be installed under the hood.

4.2.2. Battery, Gasoline Engines - The minimum performance level shall be a BCI cold cranking capacity of no less than 360 amperes @ 0°F with a minimum 100-minute reserve capacity.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

2.3.1. Accu-Trak, Standard Car Truck, Park Ridge, IL 60068.

2.3.2. Engler Instruments, 250 Culver Ave., Jersey City, NJ 07305.

2.3.3. Veeder-Root, Hartford, CT 06102.

2.4. **SHOCK ABSORBERS** - Two front heavy-duty, double-acting shock absorbers shall be installed.

2.5. **SPRINGS** - Springs or suspension assemblies shall be of ample resiliency under all load conditions and of adequate strength to sustain the loaded bus without evidence of overload. Springs or suspension assemblies shall be designed to carry their proportional share of the gross vehicle weight as shown in Tables Nos. 12 through 35. Rear springs shall be of the progressive type. If leaf type front springs are used, stationary eyes shall be protected by a fullwrapper leaf in addition to the main leaf.

2.6. **TIRES AND WHEELS** -

2.6.1. Tires - All standard tires shall be the steel belted radial tubeless type. All tires shall be new and the tread style furnished shall be the tire manufacturer's standard design and the brand normally furnished on regular production orders **unless otherwise specified in the Invitation for Bids** . All tires shall be "Original Equipment Line Quality." Schools may order tube type steel belted radial, or tubeless type bias belted, or tube type bias belted tires as optional equipment on 35- through 77-passenger buses. For tire size and load range for each size chassis, see Table Nos. 12 through 35 and the major components ohart.

2.6.2. Wheels - Each chassis shall be equipped with 6 standard steel disc type wheels. **When so specified in the Invitation for Bids** (see Options 32, 33), the following optional wheels and carrier shall be furnished on the chassis as indicated:

2.6.2.1. Wheels, Chassis, Cast Spoke (All Wheels) - (for 35- through 77-passenger bus).

2.6.2.2. Wheel, Spare, Mounted (with Carrier but <u>not</u> tire (or tube); for 35- through 83-passenger only; see Option No. 33). **NOTE**: Carrier <u>not</u> available for 24-passenger bus; spare wheel <u>only</u> is available on this option.

2.6.2.3. Wheel, Spare, Unmounted (without Carrier, Tire, (or Tube)) - (for 24- through 77-passenger buses; see Option No. 32).

F.3. CHASSIS FRAME AND RELATED COMPONENTS -

3.1. **BUMPER, FRONT** - The front bumper shall be furnished by the chassis manufacturer and must extend to the outer edges of the body at the bumper top line (to assure maximum fender protection). The front bumper shall be heavy duty transit type, not less than 3/16 inches by 9-1/2 inch steel (9-3/4 inches for the 83-passenger bus). It must be of sufficient strength to permit pushing a vehicle of equal gross weight without permanent distortion to the bumper, chassis, or body. The bumper shall be painted black (color No. 17038).

3.2. **CHASSIS FRAME SIDE MEMBERS** - Each frame side member shall be of one-piece construction. If the frame side members are extended, such extension shall be designed, furnished, and guaranteed by the installing manufacturer. The installation shall be made by either the chassis or body manufacturer. Extensions of frame lengths are permissible only when such alterations are welded on behind the hanger of the rear spring. This specification does not permit wheelbase extensions. Any welding, heating (for frame straightening or repairs), or the drilling of holes in chassis frame members shall be in accordance with chassis manufacturer's recommendations.

3.3. **FUEL TANKS** - Standard and auxiliary fuel tanks shall meet FMVSS No. 301-75 as applicable to school buses and shall meet the current design objectives of the SBMI. Fuel tanks installed on Texas school buses shall have a minimum "draw" of 83% of capacity.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

3.3.1. Fuel Tanks, Standard - The standard fuel tank for 47- through 83-passenger school buses shall have a minimum capacity of 60 gallons, except the 47- and 53-passenger forward control bus may have a minimum capacity of 35 gallons. The 24- and the 35-passenger buses shall have fuel tanks with minimum capacities of 20 and 30 gallons, respectively. The tank(s) shall be mounted, filled, and vented entirely outside the body (see Par. F.4.5.3.).

3.3.2. Fuel Tank(s), Auxiliary - **When so specified in the Invitation for Bids** (see Option 9), the 24- and the 83-passenger buses shall be furnished with minimum capacity fuel tank or tanks of 30 and 90 gallons, respectively. The auxiliary fuel tank for the 24-passenger bus shall be furnished and installed by the chassis manufacturer. 35- through 77-passenger buses do not have auxiliary fuel tanks available.

3.3.3. Material - Each tank (including auxiliary fuel tanks) shall be constructed of 16-gauge terneplate or equivalent and shall be equipped with baffles. Each tank may be mounted on either the right or left side of the chassis.

3.4. **HOOD, TILTING** - A forward-tilting hood, giving access to the engine compartment shall be furnished on conventional bus chassis (except 24- and 83-passenger buses).

3.5. **STEERING, POWER** - The bus shall be furnished with the chassis manufacturer's standard power steering which will provide safe and accurate performance at maximum load and speed. The mechanism must provide for easy adjustment for lost motion unless the unit doesn't require adjustment due to design. No changes shall be made in the power steering apparatus which are not approved by the chassis manufacturer.

F.4. ELECTRICAL SYSTEM AND RELATED COMPONENTS -

4.1. **ALTERNATORS** - The 12-volt alternators with rectifier shall have the electrical outputs and the minimum charging rates shown below when tested in accordance with SAE rating at the manufacturer's recommended engine speed. These alternators shall be ventilated and voltage controlled and, if necessary, current controlled. Dual belt drive or a single serpentine belt shall be used with the alternators provided on the 35- through 83-passenger buses:

4.1.1. Alternator, Standard - The 24- through 83-passenger buses shall have a standard alternator with a minimum electrical output of 100 amperes.

4.1.2. Alternator, Optional - **When so specified in the Invitation for Bids**, (see Option 3), the 24- through 83-passenger chassis shall have an alternator with a minimum electrical output of 130 amperes.

4.1.3. Alternators, Other - School buses equipped with the following equipment **shall have** alternators meeting the following requirements:

4.1.3.1. Air-conditioned Buses - Buses equipped with air conditioning shall have alternators with a minimum electrical output of 130 amperes.

4.1.3.2. Wheelchair Lift-equipped Buses - Buses equipped with wheelchair lifts shall have alternators with a minimum electrical output of 130 amperes.

4.1.3.3. Air-conditioned and Wheelchair-equipped buses - Buses equipped with both air conditioning and wheelchair lifts shall have alternators with a minimum electrical output of 160 amperes.

4.2. **BATTERY AND RELATED COMPONENTS** - The storage batteries furnished on each chassis shall have sufficient capacity to supply current for adequate operation of the engine starter, lights, signals, heater, and all other electrical equipment. The batteries for 24- through 83-passenger school buses shall have an potential of 6 or 12 volts and meet the following:

4.2.1. Battery, Diesel Engines - Batteries shall be single or dual 12 volt or dual 6 volt as specified by the chassis manufacturer. The minimum performance level shall be a BCI cold cranking capacity (CCA) of not less than 450 amperes @ 0°F with a minimum 130-minute reserve capacity except for the 24-passenger bus which shall have 360 CCA and 100-minute reserve capacity.

TABLE 16
47-PASSENGER SEMI-FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS		G	N
47-Passenger ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700**
GVWR, lbs	21500	22000	21500
GAWR, lbs - Front	6000	7000	6000
- Rear	15000	15000	15500
Axle Capacity, lbs - Front	6000	7500	6000
- Rear	15000	15000	15500
Wheelbase, in	189	189	193
Cowl-to-Axle, in	165	165	168
Cowl-to-Frame End, in	268	268	274
Gasoline Engine CID***	****	366-V8EFI	**
SAE Gross Horsepower	****	215	**
SAE Gross Torque, lb-ft	****	344	**
Transmission:			
Automatic, Gears/Model	4 Spd	AT-545	AT 545
Manual, Fwd. Gears	4 Spd	M4	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31	15 x 1.43
- Rear Lining, in	as shown	14.75 x 1.31	15 x 1.43
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual
- Rim Size, in	6.75	6.75	6.75

**Furnished with diesel engine only, Option 7.
***See diesel engine option 7.
****See minimum power requirements in Par. F.5.3.3.

DIESEL ENGINES (Option 7)

47-Passenger ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700
Engine Displacement, L.	***	8.2N-V8	7.3NV8
SAE Gross Horsepower	***	170	170
SAE Gross Torque, lb-ft	***	394	332
ront GAWR	6000	7500	6000

***See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).
The following Body/Chassis combinations are available as indicated:

47-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC2700	----	----	0701	----
Chassis Available	G,N	----	----	G,N	----

TABLE 17
47-PASSENGER FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS		B	S	N
47-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000**	Ward/Senator 4000**	NIC 3900**
GVWR, lbs	25800	25800 (air brake) 26500 (hyd brake)	26500	29500
GAWR, lbs - Front	10300	10300	10300	12000
- Rear	15500	15500 (air brake) 17000 (hyd brake)	17000	17500
Axle Capacity, lbs - Front	10800	12000	10800	12000
- Rear	17000	17000	17000	17500
Wheelbase, in	132	132	146	159
Cowl-to-Axle, in	N/A	N/A	N/A	N/A
Cowl-to-Frame End, in	N/A	N/A	N/A	N/A
Gasoline Engine CID***	****	**	**	**
SAE Gross Horsepower	****	**	**	**
SAE Gross Torque, lb-ft	****	**	**	**
Transmission:				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	4 Spd	M5	N/A	M5
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15.00 x 4.00	15 x 2.88
- Rear Lining, in	as shown	15 x 1.438	65.50 x 6.00	15 x 2.88
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5F	10R22.5F	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.50	8.25

*Furnished with air brakes only.
**Furnished with diesel engine only, Option 7.
***See diesel engine option 7.
****See minimum power requirements in Par. F.5.3.3.

DIESEL ENGINES (Option 7)

47-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000	Ward/Senator 4000	NIC 3900
Engine Displacement, L.	***	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	***	180	180	170
SAE Gross Torque, lb-ft	***	445	445	400
Front GAWR	10300	10300	10300	10300

***See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

47-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	AS2702/2802	TC2000	SFT3000	----	1SR001X
Chassis Available	N,S	B	N	----	N

TABLE 20
53-PASSENGER FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS		B	G	N	S
53-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000**	GMC/Chevrolet B7T042	NIC 3900**	Ward/Senator 4000
GVWR, lbs	26500	26500	28380	29500	26500
GAWR, lbs - Front	10300	10300	10300	12000	10300
- Rear	17000	17000	18080	17500	17000
Axle Capacity, lbs - Front	10800	12000	12000	12000	10800
- Rear	17000	17000	19000	17500	17000
Wheelbase, in	146	146	161	159	146
Cowl-to-Axle, in	N/A	N/A	N/A	N/A	N/A
Cowl-to-Frame End, in	N/A	N/A	N/A	N/A	N/A
Gasoline Engine CID***	****	**	366-V8EFI	**	**
SAE Gross Horsepower	****	**	219	**	**
SAE Gross Torque, lb-ft	****	**	348	**	**
Transmission:					
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	4 Spd	M5	M5	M5	N/A
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15.00 x 1.50	15 x 2.88	15.0 x 4
- Rear Lining, in	as shown	15 x 1.438	15.00 x 1.50	15 x 2.88	16.5 x 6
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	11R22.5G	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.50	7.50	7.50	8.25	7.50

*Furnished with air brakes only
**Furnished with diesel engine only, Option 7.
***See diesel engine option 7.
****See minimum power requirements in Par. F.5.3.3.

DIESEL ENGINES (Option 7)

53-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000	GMC/Chevrolet B6P042	NIC 3900	Ward/Senator 4000
Engine Displacement, L.	***	5.9T-I6	8.2N-V8	5.9TI6	5.9T-I6
SAE Gross Horsepower	***	180	170	170	180
SAE Gross Torque, lb-ft	***	445	394	400	445
Front GAWR	10300	10300	10300	10300	10300

***See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

53-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	AS2702/2902	TC2000	SFT3000	----	1SR007X
Chassis Available	G,N,S	B	G,N	----	G,N

TABLE 21
59-PASSENGER CONVENTIONAL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		G	N	F
59-Passenger Conv.	1991	GMC/Chevrolet	NIC	Ford
ITEM	Min. Rqmts.	B6P042	3700*	B600
GVWR, lbs	25500	25580	25500	25500
GAWR, lbs - Front	7500	7500	8000	9000
- Rear	17500	18080	17500	17500
Axle Capacity, lbs - Front	7500	7500	8000	9000
- Rear	17500	19000	17500	17500
Wheelbase, in	235	235	236	237
Cowl-to-Axle, in	211	211	211	213
Cowl-to-Frame End, in	323	323	329	345
Gasoline Engine CID**	***	366-V8EFI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	344	*	*
Transmissions:****				
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5
Brake Linings, in - Front	15.0 x 3.5	15.0 x 4.0	15.0 x 3.5	15.00 x 4.00
- Rear	16.5 x 6.0	16.5 x 7.0	16.5 x 6.0	16.5 x 7.00
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5

*Furnished with diesel engine only, Option 7.
**See diesel engine option 7.
***See minimum power requirements in Par. F.5.3.3.
****Direct in fourth gear (automatic); direct in fifth gear (manual).

DIESEL ENGINES (Option 7)

59-Passenger Conv.	1991	GMC/Chevrolet	NIC	Ford
ITEM	Min. Rqmts.	B6P042	3700	B600
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	165
SAE Gross Torque, lb-ft	***	394	332	410
Front GAWR	7500	7500	8000	9000

*** See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

59-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-26	2800/2807	77SB2800	0910	1F2701
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

TABLE 22
59-PASSENGER SEMI-FORWARD CONTROL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		G	H
59-Passenger ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700*
GVWR, lbs	25500	25580	25500
GAWR, lbs - Front	7500	7500	8000
- Rear	17500	18080	17500
Axle Capacity, lbs - Front	7500	7500	8000
- Rear	17500	19000	17500
Wheelbase, in	235	235	236
Cowl-to-Axle, in	211	211	211
Cowl-to-Frame End, in	323	323	329
Gasoline Engine CID**	***	366-V8EFI	*
SAE Gross Horsepower	***	215	*
SAE Gross Torque, lb-ft	***	344	*
Transmissions:****			
Automatic, Gears/Model	4 spd	AT-545	AT 545
Manual, Fwd. Gears	5 spd	M5	M5
Brake Linings, in - Front	15.0 x 3.5	15.0 x 4.0	15.0 x 3.5
- Rear	16.5 x 6.0	16.5 x 7.0	16.5 x 6.0
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5

*Furnished with diesel engine only, Option 7.
**See diesel engine option 7.
***See minimum power requirements in Par. F.5.3.3.
****Direct in fourth gear (automatic); direct in fifth gear (manual).

DIESEL ENGINES (Option 7)

59-Passenger Conv. ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700
Engine Displacement, L.	***	8.2N-V8	7.3N-V8
SAE Gross Horsepower	***	170	170
SAE Gross Torque, lb-ft	***	394	332
Front GAWR	7500	7500	8000

*** See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

59-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC-3300	----	----	0910	----
Chassis Available	G,N	----	----	G,N	----

TABLE 23
59-PASSENGER FORWARD CONTROL DIESEL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	G	N	T	S
59 Passenger FC ITEM	1991 Min. Rqmts.	Blue Bird TC2000	GMC/Chev S7T042	NIC 3900	Thomas SAF-T-LINER MVP 3189***	Ward/Senator* 4000
GVWR, lbs	26500	27800	28380	29500	28380	26500
GAWR, lbs - Front	10300	12000	10300	12000	10300	10300
- Rear	17000	17000	18080	17500	18080	17000
Axle Capacity, lbs - Front	10800	10800	12000	12000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	160	160	161	184	181	160
Engine Displacement, L.	*	5.9T-I6	8.2N-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	170	170	210/190	180
SAE Gross Torque, lb-ft	*	445	394	400	468/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 6
- Rear	16.5 x 6	16.5 x 7	16.5 x 7	16.5 x 6	16.5 x 7	16.5 x 6
Tires. Steel Belted Radial Tubeless						
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	11R22.5G	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	8.25	7.5	7.5

*Furnished with air brakes only
*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear (automatic); direct in fifth gear (manual).
***Rear Engine.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

NOTE: The NIC 5.9T is the model DT-360 diesel engine.

The following Body/Chassis combinations are available as indicated:

59-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	FCS3007 AS2905/AS30	TC2000	SFT300	1109	1SR104X
Chassis Available	G,N,S	B	G,N	T	G,N

TABLE 26
65-PASSENGER FORWARD CONTROL DIESEL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	G	N	T	S
65-Passenger FC ITEM	1991 Min. Rqmts.	Blue Bird TC2000	GMC/Chevrolet B7T042	NIC 3900	Thomas SAF-T-LINER MVP 1109***	Ward/Senator* 4000
GVWR, lbs	26500	27800	28380	29500	28380	26500
GAWR, lbs - Front	10300	11340	10300	12000	10300	10800
- Rear	17000	17000	18080	17500	18080	17000
Axle Capacity, lbs - Front	10800	12000	12000	12000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	174	174	182	197	181	180
Diesel Engine Displacement, L.	*	5.9T-I6	8.2N-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	170	170	180/190	180
SAE Gross Torque, lb-ft	*	445	394	400	445/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	as shown	15.0 x 4	16.5 x 5	15.0 x 4	15.0 x 4	15.0 x 4
- Rear	as shown	16.5 x 6	16.5 x 7	16.5 x 6	16.5 x 7	16.0 x 6
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	10R22.5F	10R22.5G	10R22.5F	11R22.5G	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	8.25	7.5	7.5

*Furnished with Air Brakes only.
*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear (automatic); direct in fifth gear (manual).
***Rear Engine.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

NOTE: The NIC 5.9T is the Model DT-360 diesel engine.

The following Body/Chassis combinations are available as indicated:

65-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	FSC3109 AS310/AS32	TC2000	77SFT3000	1209	1SR201X
Chassis Available	G,N,S	B	G,N	T	G,N

TABLE 27
71S-PASSENGER CONVENTIONAL BUS
(Short Wheelbase, Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		G	N	F
71-Passenger SWB Conv ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700*	Ford B700
GVWR, lbs	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	19000
Axle Capacity, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	19000
Wheelbase, in	254	254	254	255
Cowl-to-Axle, in	229	230	229	231
Cowl-to-Frame End, in	349	349	349	377
Gasoline Engine CID**	***	366-V8EFI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	344	*	*
Transmission:****				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5
Brake Lining, in - Front	15.0 x 4	16.5 x 5	15.0 x 4	15.0 x 4
- Rear	16.5 x 7	16.5 x 7	16.5 x 7	16.5 x 7
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25

*Furnished with diesel engine only, Option 7.
**See diesel engine option 7.
***See minimum power requirements in Par. F.5.3.3.
****Direct in fourth gear (automatic); direct in fifth gear (manual).

DIESEL ENGINES (Option 7)

71-Passenger SWB Conv ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700	Ford B700
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	170
SAE Gross Torque, lb-ft	***	394	332	412
Front GAWR, lbs	9000	9000	9000	9000

*** See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

71S-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS31	3201	77SB3201	1100	1F3200
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

TABLE 30
71L-PASSENGER SEMI-FORWARD CONTROL BUS
(Long Wheelbase, Full Air Brake Standard)

Refer to General Requirements, Page 4

71-Passenger LWB Semi F.C. ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700*
GVWR, lbs	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000
- Rear	19000	19000	19000
Axle Capacity, lbs - Front	9000	9000	9000
- Rear	19000	19000	19000
Wheelbase, in	274	274	276
Cowl-to-Axle, in	250	250	251
Cowl-Frame-End, in	368	368	387
Gasoline Engine CID**	***	366-V8EFI	*
SAE Gross Horsepower	***	215	*
SAE Gross Torque, lb-ft	***	344	*
Transmission:****			
Automatic, Gears/Model	4 Spd	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5
Brake Lining, in - Front	15.0 x 4	16.5 x 5	15.0 x 4
- Rear	16.5 x 7	16.5 x 7	16.5 x 7
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25

*Furnished with diesel engine only, Option 7.
**See diesel engine option 7.
***See minimum power requirements in Par. F.5.3.3.
****Direct in fourth gear (automatic); direct in fifth gear (manual).

DIESEL ENGINES (Option 7)

71-Passenger LWB Conv. ITEM	1991 Min. Rqmts.	GMC/Chevrolet B6P042	NIC 3700
Engine Displacement, L.	***	8.2N-V8	7.3N-V8
SAE Gross Horsepower	***	170	170
SAE Gross Torque, lb-ft	***	394	332
Front GAWR, lbs	9000	9000	9000

***See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis conbinations are available as indicated:

71L-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC3706	---	---	1101	---
Chassis Available	G,N	---	---	G,N	---

TABLE 31
71-PASSENGER FORWARD CONTROL DIESEL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	T	N	T	S
71-Passenger FC	1991	Blue Bird	GMC/Chevrolet	NIC	Thomas	Ward/
					1309	Saastor*
ITEM	Min. Rqmts.	TC2000	S7T042	3900	MVP	4000
GVWR, lbs	26500	26500	30340	29500	30000	27000
GAWR, lbs - Front	10800	10800	11340	12000	11000	10800
- Rear	17000	17000	19000	17500	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	12000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	195	195	201	197	209	195
Diesel Engine Displacement, L.	*	5.9T-I6	8.2T-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	180	185	210/190	180
SAE Gross Torque, lb-ft	*	445	410	435	468/475	445
Tansmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	15.0 X 4	15.0 X 4	16.5 X 5	15.0 X 6	15.0 X 4	15.0 x 4
- Rear	16.5 X 6	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 6
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	10R22.5G	10R22.5G	10R22.5G	11R22.5G	10R22.5G	10R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	8.25	7.5	7.5

*Furnished with air brakes only.
*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear (automatic); direct in fifth gear (manual).
***Rear Engine.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

NOTE: The NIC 5.9T is the Model DTA-360 diesel engine.

The following Body/Chassis conbinations are available as indicated:

71-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC3501 AS33/35	TC2000	77SFT3510	1309	1SR207X
Chassis Available	G,N,S	B	G,N	T	G,N

TABLE 32
77-PASSENGER CONVENTIONAL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		G	N	F
77-Passenger Conv. ITEM	1991 Min. Reqmts.	GMC/Chevrolet B6P042	NIC 3700*	Ford B700
GVWR, lbs	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	21000
Axle Capacity, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	21000
Wheelbase, in	274	274	276	275
Gasoline Engine CID**	***	366-V8EFI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	330	*	*
Transmission:****				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5
Brake Lining, in - Front	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4
- Rear	16.5 x 7	16.5 x 7	16.5 x 7	16.5 x 7
Tires, Steel Belted Radial Tubeless				
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25

*Furnished with diesel engine only, Option 7.
**see diesel engine Option 7.
***see minimum power requirements in Par. F.5.3.3. .
****Direct in fourth gear (automatic); direct in fifth gear (manual).

DIESEL ENGINES (Option 7)

77-Passenger Conv. ITEM	1991 Min. Reqmts.	GMC/Chevrolet B6P042	NIC 3700	Ford B700
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	170
SAE Gross Torque, lb-ft	***	394	332	412

***See minimum power requirements in Par. F.5.3.3.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

77-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Model	SS-33	3310	77SB3310	1200	1F3403
Chassis available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F.

TABLE 33
77-PASSENGER FORWARD CONTROL DIESEL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	T	N	G	S
77-Passenger FC	1991	Blue Bird All American	GMC/Chevrolet	NIC	Thomas 1309	Ward/ Senator* 4000
ITEM	Min. Rqmts.	3611/ TC-2000*	S7T042	3900	MVP	
GVWR, lbs	29500	33280/30000	31080	29500	30000	29800
GAWR, lbs - Front	11000	12080/12000	12080	12000	11000	12000
- Rear	17500	21200/19000	19000	17500	19000	19000
Axle Capacity, lbs - Front	12000	13200/12000	14600	12000	13200	12000
- Rear	17500	23000/19000	19000	17500	19000	19000
Wheelbase, in	212	223/216	217	212	238	216
Diesel Engine Displacement, L.	*	5.9T-I6	8.2T-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	180	185	210/190	180
SAE Gross Torque, lb-ft	*	445	410	435	468/475	445
Tansmission:**						
Automatic, Gears/Model	4 Spd	MT-643[a]/AT-545	MT-643[a]	AT-545	AT-545	MT-643[a]
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	16.5 X 5 15.0 X 4	15.0 X 4	16.5 X 5	15.0 X 4	15.0 X 4	15.0 x 4
- Rear	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 7
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25	8.25	8.25

*Furnished with air brakes only.
*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear (automatic); direct in fifth gear (manual).
***Rear Engine.
[a]= or, as required.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

NOTE: The NIC 5.9T is the Model DT-360 diesel engine.

The following Body/Chassis conbinations are available as indicated:

77-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	AS-37 KS3607	3611/3700	77SFT3707	1309	1SR304X
Chassis Available	G,N,S	B	G,N	T	G,N

TABLE 34
83-PASSENGER FORWARD CONTROL DIESEL BUS
(Front Engine, Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	G	H
83-Passenger FC (Front Engine) ITEM	1991 Min. Rqmts.	Blue Bird All American 3903	GMC/Chevrolet S7T042	NIC 3900
GVWR, lbs	32200	36200	34220	32200
GAWR, lbs - Front	13200	13200	13220	13200
- Rear	19000	23000	21000	19000
Axle Capacity, lbs - Front	13200	13200	14600	14000
- Rear	19000	23000	21000	19000
Wheelbase, in	229	245	237	229
Engine Displacement, L.	*	8.2T-V8	8.2T-V8	5.9T-I6
SAE Gross Horsepower	*	210	210	185
SAE Gross Torque, lb-ft	*	468	468	485
Transmission, Automatic**	MT643	MT643	MT643	MT643
Brake Lining, in - Front	16.5 X 5	16.5 X 5	16.5 X 5	16.5 x 5
- Rear	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R22.5H	11R22.5H	11R22.5H	11R22.5H
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25

*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

The following Body/Chassis combinations are available as indicated:

83-PASSENGER (FRONT ENGINE) BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Wayne
Models	AS-39	3903	77SFT3904	1SR401X
Chassis Available	G,N	B	G,N	G,N

TABLE 35
83-PASSENGER FORWARD CONTROL DIESEL BUS
(Rear Engine, Full Air Brake Standard)

Refer to General Requirements, Page 4

83-Passenger FC (Rear Engine) ITEM	1991 Min. Rqmts.	Blue Bird All American AARE	Thomas Pusher 3885
GVWR, lbs	36200	36200	36200
GAWR, lbs - Front	13200	13200	13200
- Rear	23000	23000	23000
Axle Capacity, lbs - Front	13200	13200	13200
- Rear	23000	23000	23000
Wheelbase, in	267	284	267
Engine Displacement, L.	*	8.3T-I6	8.3T-I6/ 10.4T-V8
SAE Gross Horsepower	*	210	210/215
SAE Gross Torque, lb-ft	*	605	605/600
Transmission, Automatic**	MT643	MT643	MT643
Brake Lining, in - Front	16.5 x 5	16.5 x 5	16.5 x 6.0
- Rear	16.5 x 7	16.5 x 7	16.5 x 8.6
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	11R/22.5H	11R2.5H	11R22.5H
Wheels - Rear	Dual	Dual	Dual
Wheels, Rim Size, in	8.25	8.25	8.25

*See minimum power requirements in Par. F.5.3.3.
**Direct in fourth gear.

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.5.3.3.).

3.4. The mobile seating device/occupant securement system shall be successfully, dynamically sled-tested at a minimum impact speed/force of 30 mph/20 G'S. The dynamic test shall be performed using system components and hardware (including attachment hardware) which are identical to the final installation in type, configuration,, and positioning. The body structure at the attachment points may be simulated for the purpose of the sled test, but the simulated structure used to pass the sled test may not exceed the strength of the attachment structures to be used in the final body installation. The mobile seating device used for test purposes shall be a 50th percentile male test dummy as specified in FMVSS Part 571.208, S6.1.2, 6.1.3, and 6.1.4. The test dummy shall be retained within the securement system throughout the test and forward excursion shall be such that no portion of the test dummy's head or knee pivot points passes through a vertical transverse plane intersecting forward-most point of the floor space designated for the mobile seating device. All hardware shall remain positively attached throughout the test and there shall be no failure of any component. Each mobile seating device belt assembly including attachment hardware and anchorages shall be capable of withstanding a force of not less than 2,500 pounds. This will provide equal mobile seating device securement when subjected to forces generated by forward, rear or side impact.

3.4.1. The belt materials at each space designated for the mobile seating device and the occupant restraint system shall be similar in size and fabric.

3.5. Occupant securement belt assemblies and anchorages shall also be certified to meet the requirements of FMVSS 209 and 210.

3.6. The occupant securement system must be designed to be attached to the bus body either directly or in combination with the mobile seating device securement system, by a method which prohibits the transfer of weight or force from the mobile seating device to occupant in the event of an impact.

3.7. All securement system attachments or coupling hardware not permanently attached shall be a "positive latch" type to prohibit accidental disconnecting.

3.8. All attachment or coupling systems designed to be connected or disconnected frequently shall be accessible and operable without the use of tools or other mechanical assistance.

3.9. All securement system hardware and components shall be free of sharp or jagged areas and shall be of a non-corrosive material or treated to resist corrosion.

3.10. The occupant securement system shall be made of materials which do not stain, soil, or tear an occupant's clothing.

3.11. No mobile seating device securement system hardware shall be placed so that a mobile seating device can be placed blocking access to lift door.

G.4. **SUPPORT EQUIPMENT AND ACCESSORIES** - The following is recommended by the National Standards for School Buses for support equipment and accessories. <u>It is included here for the information of school districts.</u> (The following are not required to be provided by the body manufacturer unless specified in the Invitation for Bids.)

4.1. **SUPPORT EQUIPMENT SECUREMENT** - Portable student support equipment or special accessory items shall be secured at the mounting location to withstand a pulling force of five times the weight of the item, or shall be retained in an enclosed, latched compartment. Such special items, if used, shall meet specifications and/or include the following:

4.1.1. Belt Cutter - The bus shall contain a belt cutter for use in emergencies, including evacuations. The belt cutter should be designed to eliminate the possibility of the operator or others being cut during use, and should be secured in a location of safekeeping such as a first aid kit.

4.1.2. Crutches, Walkers, Canes, and Similar Devices - These items to be secured as specified above.

4.1.3. Medical Support Equipment - These items include oxygen bottles, ventilators, and other items. These items shall be secured as specified above.

E. AIR CONDITIONING SPECIFICATIONS

E.1. SPECIAL REQUIREMENTS - Unless otherwise noted, all school buses ordered with air conditioning shall be furnished with the following:

1.1. ALTERNATOR - Type A buses equipped with air conditioning shall be furnished with an alternator with a minimum output rating of 100 amperes. Types B, C, and D buses equipped with air conditioning shall be furnished with an alternator with a minimum output rating of 130 amperes. Type A and Type B, C, and D buses equipped with air conditioning and wheelchair lifts shall be furnished with alternators with a minimum output rating of 130 amperes and 160 amperes, respectively.

1.2. INSULATION - Minimum 5/8-inch nominal thickness plywood shall be installed over the existing or manufacturer's standard steel floor for insulation (see Par. C.2.12. for plywood requirements including installation requirements). Air-conditioned buses shall have the equivalent of 1.5 inches of fiberglas or other insulation in the ceilings and walls including the interior of hat-shaped bows. The insulation shall have a minimum R-factor value of 5.77.

1.3. TINTING - The windshield and all windows of air-conditioned school buses must be tinted to reduce the heat load of the system, meeting the requirements of Option No. 10 for dark tinting. (NOTE: It is not necessary to order Option 10; it must be furnished.)

1.4. WHITE ROOF - When so specified in the Invitation for Bids, the roofs of buses equipped with air conditioning shall be painted white, meeting the requirements of Option No. 42 and Paragraphs C.1.8.2. and E.1.9.2.

1.5 EXTRA COOLING - When so specified in the Invitation for Bids, additional cooling may be ordered for 15- through 71-passenger school buses (see Option 2). This is intended for use in buses operated under severe conditions (e.g., buses with handicapped lifts where the doors remain open for long periods of time, buses operated in urban areas with slow, stop-and-go traffic, etc.). Ordering this option will provide a Btu/hr capacity equal to the next passenger-capacity category, as shown in Table 36. (For example, an 18-passenger school bus with this option would be furnished with a 53,000 Btu/hr capacity air conditioning system instead of the standard 40,000 Btu/hr. unit.)

E.2. GENERAL AND PERFORMANCE REQUIREMENTS - Air-conditioning systems furnished to meet the requirements of this specification shall be the mechanical vapor compression refrigeration type. Each air conditioning system shall have sufficient power for simultaneous cooling, circulating, cleaning, and dehumidifying the air. The refrigerant for the system must be nontoxic, nonflammable, and nonexplosive. The air conditioning system shall be manufactured to conform to the requirements of SAE J639. Air conditioning units furnished under this specification shall be of the current year's production. Details not specifically defined herein shall be in accordance with the manufacturer's standard commercial practice for products of this type. Table 36 lists the components and the appropropiate ratings required by this specification:

TABLE 36

BUS SIZE	CAPACITY, Btu/hr	AIR FLOW, CFM	COMPRESSOR(S) /No.	CONDENSER(S), Location/No.	EVAPORATORS, Location/No.
15 pass.	19,000	1,000	1	1-skirt mtd. (or eng. comp.)	1 - Front & rear
16-20 pass.	40,000	1,200	1	1-skirt mtd.	1 - rear (no dash unit included)
24-47 pass.	53,000	1,900	2	2	2 - rear
53-71 pass.*	84,000	2,000	2	2	2 - 1 each side, staggered
77-83 pass.*	108,000	2,400	2	2	2 - 1 each side, staggered

* except rear engine buses may be single units provided they meet or exceed the BTU/cfm requirement.

H. AIR CONDITIONING SPECIFICATIONS

2.1. **CONTROLS** - A control box or panel, which shall be located in the driver's compartment, shall be permanently installed to house inside temperature and fan speed(s) controls. The control box or panel shall be positioned so that the driver shall be able to operate the air conditioning controls while seated in the driver's seat and operating the bus. The fan(s) (blower) shall have a minimum of two operating speeds ("off" is not considered an operating speed).

2.2. **INSTALLATION** -

2.2.1. Installing Dealer - Installation of the air conditioning system(s) shall be by the bus body company or by an authorized factory air conditioning dealer who normally stocks, sells, installs, and services a unit of the type being furnished.

2.2.2. Workmanship - Poor, shoddy installation will be grounds for immediate rejection of the complete bus.

NOTE: NO INSTALLATION OF ANY AIR CONDITIONING UNITS OR SYSTEMS SHALL, UNDER ANY CIRCUMSTANCES VOID THE CHASSIS MANUFACTURER'S ENGINE WARRANTY.

H.3. **COMPONENTS** - The following is a list of components required for air conditioning systems (see Par. H.2. above). Any parts or components not specifically mentioned below, but which are required to provide a complete operating unit, or which are standard for the model offered, shall be included:

3.1. **BLOWER UNIT** - The blower unit shall be of heavy-duty, commercial design and shall circulate air over the evaporator(s) to cool the passenger compartment. Fans shall be of the centrifugal or axial type and quiet in operation. Unless they are self-contained, fan motor(s) shall have bearings of the permanent lubrication type and designed to operate on the 12V-DC system of the school bus. The blower unit(s) shall not increase the ambient noise level of the unloaded school bus while parked with the engine idling more than 5 dB. when measured in the center of the bus.

3.2. **COMPRESSORS** - Compressors shall be of the air conditioning or chassis manufacturer's standard design. Lubrication of all moving parts shall be accomplished automatically. An automatic (electric) clutch shall be provided on each compressor. The compressor size shall be as required to meet the performance requirements above. Compressor(s) shall be compatible with the engine speed.

NOTE: Compressors shall be geared so that their speed does not exceed the manufacturer's maximum recommended sustained speeds at a road speed of 60 mph in high gear.

3.3. **CONDENSERS** - The condenser(s) shall be as recommended by the manufacturer of the unit. The air conditioning manufacturers shall use their standard condenser fabrication and installation practices.

3.4. **DASH OUTLETS** - **Unless otherwise specified in the Invitation for Bids**, air conditioners on 16- through 19-passenger school buses will not have in-dash air outlets. In-dash outlets are required on 15-passenger buses equipped with air conditioning.

3.5. **EVAPORATOR (COOLING COIL)** - Air conditioning manufacturers shall use their standard cooling coil, fabrication and installation practices.

3.6. **REFRIGERANT DRYER** - A dryer with a minimum of 10 oz of desiccant shall be installed in the refrigerating circuit. The system shall be designed and installed in accordance with the manufacturer's standard practice to insure optimum performance and ease of service/replacement.

H.4. **TESTING** - Testing shall be done by, or a the discretion of, the State Purchasing and General Services Commission and/or the receiving School District. Tests shall be performed on buses furnished. In the event the bus air conditioning system fails to meet or exceed all conditions and requirements of this specification, the cost of the test shall be borne by the supplier.

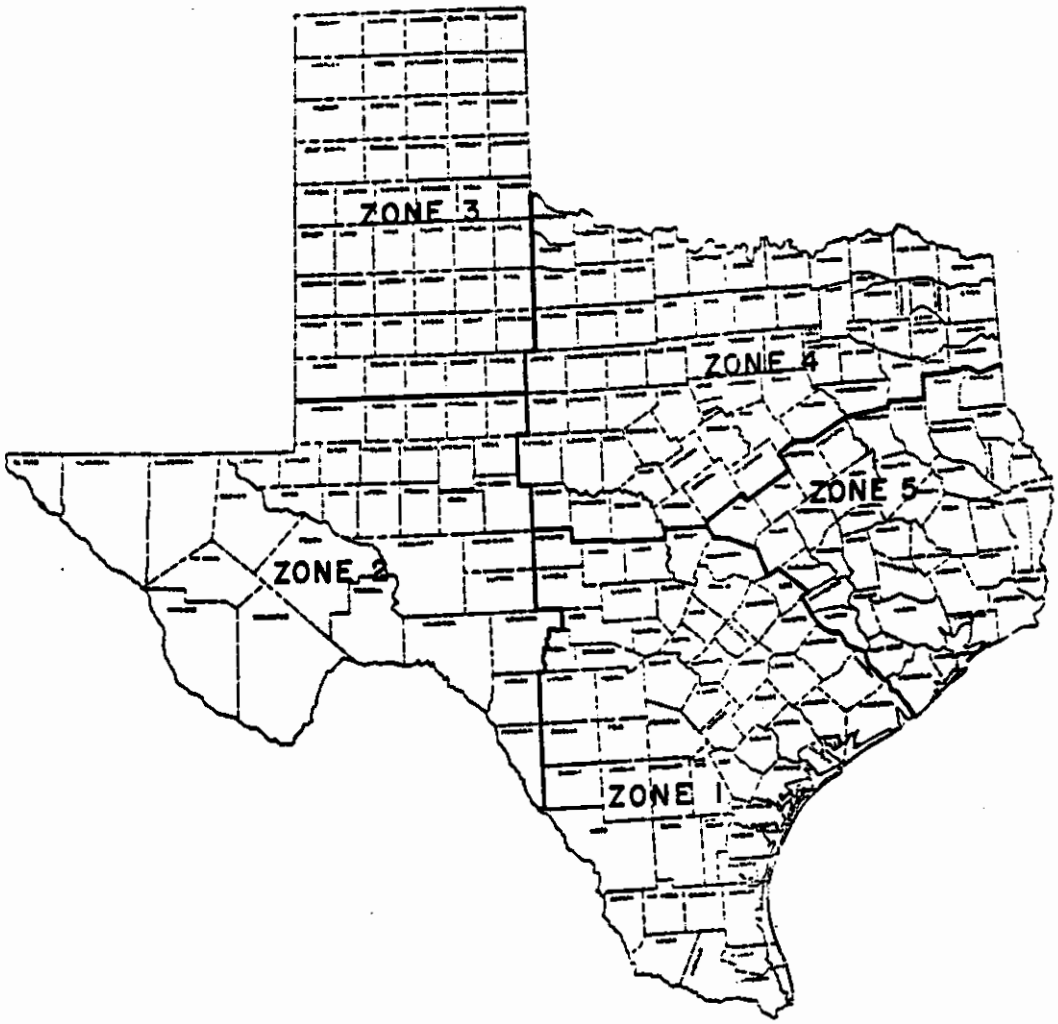
B.5. OTHER REQUIREMENTS -

5.1. AVAILABILITY OF SERVICE AND REPAIR PARTS - An adequate supply of repair parts normally required for most maintenance and warranty repair shall be carried in stock within the State of Texas. Bidder shall include with each bid, or have on file with the Purchasing Division of this Commission, a list of factory-authorized companies or individuals, and their addresses, who stock repair parts and who can perform service on the products furnished.

NOTE REQUIREMENT IN PAR. A.10.4.1. THE AIR CONDITIONING MANUFACTURER SHALL HAVE SERVICE FACILITIES AVAILABLE IN EACH OF THE 5 ZONES WITHIN THE STATE OF TEXAS THAT STOCK REPAIR PARTS NORMALLY REQUIRED FOR WARRANTY SERVICE AND REGULAR REPAIR (SEE FIG.3)

FIGURE 3

REQUIRED SERVICE FACILITY ZONES WITHIN THE STATE OF TEXAS



MAJOR COMPONENTS CHART - 1991 MODEL YEAR

SMALL SCHOOL BUSES

MAJOR COMPONENTS	PASSENGER CAPACITY 15	16	18	19	20	PAGE NO.
ALTERNATOR:						
Amps, Min - Std-Gas/Diesel	75/65	75/65	75/65	75/65	75/65	40
- Opt-Type A/B	100/130	100/130	100/130	100/130	100/130	40
- w WC Lift-A/B	100/130	100/130	100/130	100/130	100/130	40,109
- w A/C-A/B	100/130	100/130	100/130	100/130	100/130	40,114
- w both-A/B	130/160	130/160	130/160	130/160	130/160	40
BATTERY:						
Diesel Engine -						
CCA, Amp, Min	MS	MS	MS	MS	MS	40
Reserve. Minutes, Min	MS	MS	MS	MS	MS	40
Gasoline Engine -						
CCA, Amp, Min	360	360	360	360	360	40
Reserve, Minutes, Min	100	100	100	100	100	40
BRAKES: Standard	Hyd	Hyd	Hyd	Hyd	Hyd	39
Optional	NA	NA	NA	NA	NA	--
ENGINES: Diesel	Opt	Opt	Opt	Opt	Opt	41
Gasoline	Std	Std	Std	Std	Std	41
EMERGENCY DOOR GLASS, LOWER	N/A	N/A	N/A	N/A	N/A	--
FUEL TANK, Gal, Min - Std	21	21	21	21	21	40
- Opt	30	30	30	30	30	40
HEATER, Btu/hr - Std	MS	MS	MS	MS	MS	35
- Opt Aux.	MS	MS	MS	MS	MS	35
KNEE SPACING, Min - Std	24	25	26	25	25	19
- Opt	27	27	27	28	28	19
TILT HOOD	N/A	N/A	N/A	N/A	N/A	--
TIRES:						
Truck Steel Belt Radial -						
Tubeless	MS	MS	MS	MS	MS	39
Size	MS	MS	MS	MS	8R19.5E	39
Tube Type	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	--
Bias Belt -						
Tubeless	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	--
Tube Type	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	--
TRANSMISSIONS/CLUTCHES:						
Automatic -	Std	Std	Std	Std	Std	39
Model	MS	MS	MS	MS	MS	39
Standard -						
Fwd. Gears	NA	NA	NA	NA	NA	--
Clutch Size, in, Min	NA	NA	NA	NA	NA	--
U-BOLTS, NO., Min	NA	NA	NA	NA	4	23
WHEELS: Steel Disc	Std	Std	Std	Std	Std	39
Cast Spoke	NA	NA	NA	NA	NA	39

LEGEND: AC = Air Conditioning; Amp = Amperes; Aux. = Auxiliary; CCA = Cold Cranking Amperes; Fwd. = Forward; Gal = Gallon; Hyd = Hydraulic; in = inches; M4/M5 = Manual 4-spd/5-spd Transmission; Min = Minimum; MS = Manufacturer's Standard; NA = Not Available/Not Applicable; Opt = Optional; Std = Standard; WC = Wheelchair

MAJOR COMPONENTS CHART

LARGE SCHOOL BUSES

MAJOR COMPONENTS	PASSENGER CAPACITY 24	35	47	53	59	65	71	77	83	PAGE
ALTERNATOR: Amps, Min - Std	90	90	90	90	90	90	90	90	100	80
- Opt	130	130	130	130	130	130	130	130	130	80
- w WC Lift or AC	130	130	130	130	130	130	130	130	130	80,109
- w WC Lift & AC*	160	160	160	160	160	160	160	160	160	80,114
BATTERY: Diesel Engine -										
CCA, Amp, Min	450	450	450	450	450	450	450	450	450	80
Reserve, Minutes, Min	130	130	130	130	130	130	130	130	130	80
Gasoline Engine -										
CCA, Amp, Min	360	360	360	360	360	360	360	360	NA	80
Reserve, Minutes, Min	100	100	100	100	100	100	100	100	NA	80
BRAKES: Standard	Hyd	Hyd	Hyd	Hyd	Air	Air	Air	Air	Air	78
Optional	NA	NA	NA	NA	Hyd	Hyd	Hyd	Hyd	NA	78
ENGINES: Diesel	Opt	Opt	Opt**	Opt**	Opt**	Opt**	Opt**	Opt**	Std	82
Gasoline	Std	Std	Std	Std	Std	Std	Std	Std	NA	82
EMERGENCY DOOR GLASS, LOWER	Std	Std	Std	Std	Std	Std	Std	Std	Std	60
FUEL TANK, Gal, Min - Std	30	30	35	35	60	60	60	60	60	80
- Opt	30	NA	NA	NA	NA	NA	NA	NA	90	80
HEATER, Btu/hr - Std	45,000	45,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	73
- Opt Aux.	40,000	40,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	73
KNEE SPACING, Min - Std	24	25	25	25	25	25	24.75[a]	25	24.75	50
- Opt	27	28	28	27.75	28	27.75	27.50[b]	27.75	27.75	50
TILT HOOD, CONV. CHASIS:	NA	Std	Std	Std	Std	Std	Std	Std	NA	8
TIRES: Steel Belt Radial -										
Tubeless	Std	Std	Std	Std	Std	Std	Std	Std	Std	79
Size	8R 19.5.E	9R 22.5F	9R 22.5F	9R 22.5F	10R 22.5F	10R 22.5F	11R 22.5G	11R 22.5G	11R 22.5H	79
Tube Type	NA	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	79
Size	NA	8.25R 20F	8.25R 20F	8.25R 20F	9.00R 20F	9.00R 20F	10.00R 20G	10.00R 20G	10.00R 20H	79
Bias Belt -										
Tubeless	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	79
Size	8- 19.5E	9- 22.5E	9- 22.5E	9- 22.5E	10- 22.5F	10- 22.5F	10- 22.5F	10- 22.5F	11- 22.5G	79
Tube type	opt	opt	opt	opt	opt	opt	opt	opt	opt	79
Size	8.00x 19.5E	7.50x 20E	8.25x 20E	8.25x 20E	9.00x 20F	9.00x 20F	10.00x 20F	10.00x 20F	10.00x 20G	79
TRANSMISSIONS/CLUTCHES:										
Automatic -	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Std	84
Model	MS	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545[c]	MT-643	84
Standard -										
Fwd. Gears	M4	M4	M4	M4	M5	M5	M5	M5	NA	84
Clutch Size, in, Min	12	12	12	12	12	13	13	13	NA	84
U-BOLTS, NO., Min	4	6	6	6	6	8	8	8	8	56
WHEELS: Steel Disc	Std	Std	Std	Std	Std	Std	Std	Std	Std	79
Cast Spoke	NA	Opt	Opt	Opt	Opt	Opt	Opt	Opt	NA	79

LEGEND: AC = Air Conditioning; Amp = Amperes; Aux. = Auxiliary; CCA = Cold Cranking Amperes; Fwd = Forward; Hyd = Hydraulic; M4/M5 = Manual 4-spd/5-spd Transmission; Min = Minimum; MS=Manufacturer's Standard; NA = Not Available/Not Applicable; Opt = Optional; Std = Standard; WC = Wheelchair

NOTES: [a] = 25.00" on 71-passenger Long Wheelbase School Bus; [b] = 27.75" on 71-passenger Long Wheelbase School Bus; [c] = MT 643 on 77-passenger Forward-control School Bus or where required to mat engine torque.

TILT HOODS NOT APPLICABLE TO FORWARD CONTROL BUSES.

*See Par. H for Self-contained Air Conditioning Units.

**Diesel Engine Required on 53- to 71-passenger Forward Control Buses.

STATE OF TEXAS

State Purchasing and General Services Commission
1711 San Jacinto P.O. Box 13047 Capitol Station
Austin, Texas 78711-3047
(512) 463-3445

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RON ARNETT

December 31, 1990

VENDORS/MANUFACTURERS
AGENCIES

RE: Texas Specification **No. 070-SB-91, SCHOOL BUSES**

Ladies and Gentlemen:

Attached is the revised Texas specifications for **1991** school buses, effective **January 1, 1991**, for your information and use. It covers the requirements for school buses from 15- through 83-passengers. This specification supersedes Texas specification No. 070-SB-90 which should not be used after January 1, 1991.

Major changes discussed on August 16, 1990 have been summarized and attached. Please review each referenced page and paragraph for detailed information on changes made for the 1990 model year. If you have any questions about the changes or the specification, please call 512-463-3411.

We suggest that you acquaint yourself with the requirements of this specification before filing for future reference.

Sincerely,

Troy C. Martin
Specifications/Inspections Chief

TCM:RCD:dc
Attachment

cc: Ray Brewer

MAJOR CHANGES FOR 1991

TEXAS SCHOOL BUS SPECIFICATION

No. 070-SB-91

The following is a list of some of the major changes made in the 1991 school bus specification, which may differentiate from the 1990 specification.

Please note that this is not intended to be a comprehensive listing of all changes, and are intended to serve as a guide only.

You may wish to review the following changes as well as those not listed herein prior to bidding and ordering 1991 school buses.

PAGE NO.	ADDITIONS, CHANGES, DELETIONS, ETC.
i	Table of Contents expanded, and Index moved to end of specification.
3	Updated National Standards for School Buses (NSSB) rulings referenced throughout specification.
17-18	TEA ADM-04090 School Bus Requisition Form has been revised. **PLEASE DISCARD PREVIOUS VERSIONS.**
27, 61	The requirements for Emergency Exits has been modified to conform to NSSB requirements.
28, 62	Joint Strength requirement conforming to FMVSS No. 221 has been expanded to include all Texas school buses.
31, 68	Entry step height requirement has been modified to conform to NSSB requirements.
31, 68	Upholstery used shall be fire-resistant to conform to NSSB requirements which require adherence to Boston Fire Block Test.
34, 72	Requirement for Body Fluid Clean-up Kit has been added.
40, 80	The alternator requirement has been clarified.
112	Universal Handicap symbols are to be displayed on school buses with wheelchair lifts.
112	Wheelchair occupant orientation shall be in the forward-facing position, with relating hardware and securement systems.
113	Recommended Handicapped Support equipment is listed for reference only.
114	Air conditioning requirements have been revised to address the performance of the systems only.

GENERAL

The print font for the specification has been enlarged to facilitate easier reading.

APPROVED PRODUCTS LIST - SCHOOL BUS ENGINES

TEXAS SPECIFICATIONS NO. 070-SB-91

GASOLINE ENGINES
CAPACITY

MANUFACTURER	15	16	18	19	20	24	35	47	53C	59C	65C	71SC	71LC	77C
DODGE														
CID	360		360											
SAE Gross hp	205		205											
Axle Ratio	3.54		3.54											
Trans. Auto.	A727		A727											
G.M.C.														
CID	350	350		350	350	350	366	366	366	366	366	366	366	366
SAE Gross hp	185	185		185	185	201	215	215	215	215	215	215	215	215
Axle Ratio							7.17	7.17	7.17	7.17	7.17	7.17	7.17	7.17
Tran. Auto.	400	400		400	400	400	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545

DIESEL ENGINES
CAPACITY

	15	16	18	19	20	24	35	47	53	59C	59FC	65C	65FC	71SC	71LC	71FC	77C	77FC	83FE	83RE
CATERPILLAR																				
Displacement											10.4		10.4	10.4	10.4	10.4		10.4	10.4	10.4
SAE Gross hp											165		165	165	165	165		200	2100	215
Axle ratio											4.11		4.11	4.11	4.11			4.88	5.29	5.29
Trans. Auto.											MT-643		MT-643	MT-643	MT-643	MT-643		MT-643	MT-643	MT-643
CUMMINS																				
Displacement								5.9T	5.9T		5.9T		5.9T			5.9T		5.9T	8.3T	8.3T
SAE Gross hp								180	180		180		180			180		190	235	235
Axle Ratio								4.78	4.78		4.78		4.78			4.78		4.63	4.63	4.63
Trans. Auto.								AT-545	AT-545		AT-545		AT-545			AT-545		MT-643*	MT-643	MT-643
FORD																				
Displacement	7.3	7.3	7.3				6.6T	6.6T	6.6T	6.6T		6.6T		6.6T	6.6T		6.6T			
SAE Gross hp	180	180	180				165	165	165	165		165		170	170		170			
Axle Ratio							4.88	4.88	4.88	4.88		4.88		4.88	4.88		4.88			
Trans. Auto.							AT-545	AT-545	AT-545	AT-545		AT-545		AT-545	AT-545		AT-545			
FORD																				
Displacement												7.8T		7.8T	7.8T		7.8T			
SAE Gross hp												210		210	210		210			
Axle Ratio												4.56		4.56	4.56		4.56			
Trans. Auto.												MT-643		MT-643	MT-643		MT-643			
G.M.C.																				
Displacement	6.2N	6.2N		6.2N	6.2N	6.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2N	8.2T	8.2T	8.2T
SAE Gross hp	155	155		155	155	155	170	170	170	170	170	170	170	170	170	170	170	210	210	210
Rear Axle							4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88	5.38	5.38	5.38
Trans. Auto	400	400		400	400	400	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	MT-643*	MT-643	MT-643
G.M.C.																				
Displacement									8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T	8.2T
SAE Gross hp									180	180	180	180	180	180	180	180	180	230	230	230
Rear Axle									5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.29	5.38	5.38	5.38
Trans. Auto.									AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	MT-643	MT-643	MT-643
N.I.C. (DT-360)																				
Displacement							5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	5.9T	
SAE Gross hp							170	170	170	170	185	170	185	170	170	185	170	185	185	
Axle Ratio							5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	
Trans. Auto.							AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	MT-643*	
N.I.C. (7.3N)																				
Displacement							7.3N	7.3N	7.3N	7.3N		7.3N		7.3N	7.3N		7.3N			
SAE Gross hp							170	170	170	170		170		170	170		170			
Rear Axle							6.14	6.14	6.14	6.14		6.14		6.14	6.14		6.14			
Trans. Auto.							AT-545	AT-545	AT-545	AT-545		AT-545		AT-545	AT-545		AT-545			
N.I.C. (DT2-360)																				
Displacement							5.9T	5.9T	5.9T	5.9T		5.9T		5.9T	5.9T		5.9T			
SAE Gross hp							185	185	185	185		185		185	185		185			
Axle Ratio							5.24	5.24	5.24	5.24		5.24		5.24	5.24		5.24			
Trans. Auto.							AT-545	AT-545	AT-545	AT-545		AT-545		AT-545	AT-545		AT-545			
N.I.C. (DT-466)																				
Displacement							7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	7.6T	
SAE Gross hp							190	190	190	190	190	190	190	190	190	190	190	210	210	
Axle Ratio							5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	5.38	
Trans. Auto.							AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	MT-643	MT-643	

LEGEND: C=Conventional Bus, FC=Forward Control Bus, FE=Front Engine Bus, RE=Rear Engine Bus, SC=Short Wheelbase Conventional Bus
LC=Long Wheelbase Conventional Bus
*= or, as required.

APPROVED PRODUCTS LIST - SCHOOL BUS BODIES

TEXAS SPECIFICATIONS NO. 070-SB-91

Bus Size	Configuration/Mfg.	BLUE BIRD	CARPENTER	COLLINS	LEWIS	MID BUS	STURDI-COACH	THOMAS	VAN CON	WARD (ENTRAN)	WAYNE
15	Van Conversion or Cutaway	Micro Bird	-	Bantam Econobus SuperBantam	Reddi-Bus #1 & #2		SG15TC	0406	V-15	VSS	1M10L
16	Commercial Cutaway	Micro Bird	SCL1706 SCL1801	-	-	Busette 16		0406	-	VSS-16	1M10L
18	Van Conversion	-	-	Bantam SuperBantam	- Reddi-Bus		SSF18TC	-	V-18	-	-
19	Commercial Cutaway	Micro Bird	SCL1706 SCL1801	-	-	Busette 19		0406	-	VSS-19	1M10L
20	Stripped Chassis	Mini Bird	WSCV1808 Cadet	-	-			0404,0417 0407	-	VSS-20	-
24	Conventional	2103	WSCV2100 WSCV2107	-	-			0500 0517	-	SS-1506	-
	Semi-Fwd-Control	-	-	-	-	-	-	0607			
35	Conventional	1808, 2005	77SB1808	-	-			0510,0600	-	SS-17	1F1802
	Semi-Fwd-Cntl	-	WSCV2311	-	-			0511	-	SFC2206	-
47	Forward Control	TC2000	-	-	-			-	-	2702	1SR007X
	Conventional	2304	77SB2304	-	-			0710	-	SS-22	1F2300
	Semi-Fwd-Control	-	-	-	-			0701	-	SFC2700	-
53	Forward Control	TC2000	77SFT2810	-	-			-	-	2702	1SR007X
	Conventional	2508	77SB2508	-	-			0810	-	SS-24	1F2503
	Semi-Fwd-Control							0801		SFC2903	-
59	Forward Control	TC2000	77SFT3211	-	-			1109	-	SCS3007	1SR104X
	Conventional	2800, 2807	77SB2800	-	-			0910	-	SS-26	1F2701
	Semi-Fwd-Control	-	-	-	-			0901	-	SFC3300	-
65	Forward Control	TC2000	77SFT3211	-	-			1209	-	SCS3109	1SR201X
	Conventional	3004, 3011	77SB3004	-	-			1010	-	SS-29	1F2905
	Semi-Fwd-Control	-	-	-	-			1001	-	SFC3503	-
71S	Forward Control	TC2000	77SFT3503	-	-			1309	-	FCS3501	1SR207X
	Conventional	3201	77SB3201	-	-			1100	-	SS-31	1F3200
	Semi-Fwd-Control	-	-	-	-			1101	-	SFC3706	-
71L	Conventional	3208	77SB3201	-	-			1110	-	SS-31	1F3200
	Semi-Fwd-Control	-	-	-	-			1101	-	SFC3706	-
77	Foward Control	3604, 3611	77SFT3707	-	-			1309	-	3500	1SR304X
	Conventional	3310	-	-	-			1200	-	FCS3704	1F3403
	Semi-Fwd-Control	-	-	-	-			1201	-	SFC3809	-
83	Forward Control	3907	77SFT3904	-	-			1405	-	MS3907	1SR401X