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.1.11.

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.2.5.1. 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 tops 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 <u>only</u> 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.2.1.1.2.) 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 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.

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.2.1.9.5.). 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.2.1.11.

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.2.1.5.

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. (see Par. C.2.14.4.)

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.

2.12.5. Seat Belts and Seat Belt Assembly - A 3-point, Type 2 seat belt assembly conforming to FMVSS No. 209 shall be provided for the driver. The belt assembly shall be equipped with at least one reel-type emergency locking retractor (ELR) for the continuous belt assembly. The location of the seat belt anchorage shall conform to SAE Standard J383 with the driver's seat adjusted to its rearmost position. The anchored ends of the belt assembly shall be fitted with a minimum 8-inch semi-rigid plastic boot which will prevent that portion of the belt between the buckle and the retractor reel from contacting the floor and to keep the belt from hitting the feet of the passengers in the front seat directly behind the driver. The seat belt assembly shall be anchored in such a manner or guided at the seat frame so as to prevent the driver from sliding sideways from under the belt.

2.13. SEATING REQUIREMENTS, PASSENGER - The bus passenger seats shall meet or exceed the knee spacing and crash protection requirements of FMVSS No. 222 and shall conform to the following:

2.13.1. Seat Back Heights - When so specified in the Invitation for Bids (see Option 21), seat back heights shall be increased 4 inches over the seat back heights required by FMVSS No. 222.

NOTE: Seat backs with this option will have heights of approximately 28 inches.

2.13.2. Seat Belts, Passenger, Optional - (see Par. E.3.13.).

2.13.3. Seat Cushions - All 26-inch and all 39-inch seat cushions shall be designed to adequately support, respectively, two and three passenger of 120 pounds each. All seat cushion materials shall meet or exceed the requirements of FMVSS No. 302 and/or California Technical Bulletin 117. The seat cushion shall be either of one-piece construction or may be constructed of more than one piece at the manufacturer's option. The seat cushion unit shall consist of a base, a one- or two-piece polyurethane foam cushion, and upholstery, meeting the following requirements:

2.13.3.1. Base - The base shall be nominal 1/2-inch thick, interior grade, C-D plywood with exterior grade glue, identification index 32/16, manufactured in conformance with U.S. Product Standard PS 1-83 and identified as to veneer grade and glue bond type by the trademarks of an approved testing agency. Plywood with blue stain in sapwood is not acceptable.

Alternatively, the base may be made of "Donnite" material, manufactured by the Donnite Corporation, Flora & Harrison, Plymouth, Indiana 45563, of equal or better strength and thickness.

2.13.3.2. Foam Cushion Assembly, One-Piece Polyurethane Foam -

(i) Construction - The seat cushion dimensions shall be in accordance with the nominal dimensional requirements as shown in Fig. 2.

(ii) Design - The one-piece foam cushion shall be solid polyurethane foam conforming to the physical requirements in Table No. 10 (rebonded or molded polyurethane foams are not acceptable for seat cushion).

TABLE NO. 10

ONE-PIECE CUSHION
PHYSICAL PROPERTIES
(ASTM D 3574)

ITEM	ONE-PIECE SEAT CUSHION
Density, lbs/cubic foot, Min	1.8
Load Deflection, 4" thick @ 25% Indentation, Min	90
Indentation Load, Ratio, 65%/25%, Min	2.3
Compression Set, 50% Deflection (22 hrs @ 158°F), Max.	20
Tensile Strength, lbs/square inch. Min	10
Tensile Elongation, %, Min	150
Tear Resistance, lbs/inch, Min	1.5

2.13.3.3. Foam Cushion Assembly, Two-piece Polyurethane -

(i) Construction - The seat cushion assembly shall be fabricated in accordance with the nominal dimensional requirements as shown in Fig. 2. In the two-piece assembly, the top 1-1/2 inches of the cushion shall be of one continuous foam piece. All parts of the seat cushion and the seat stiffeners shall be securely cemented or otherwise bonded together to form the seat cushion assembly shown in Fig. 2.

(ii) Design - The two-piece foam cushion assembly shall be constructed of unfilled polyurethane foam conforming to the physical requirements in Table No. 11 (rebonded polyurethane foams are not acceptable for seat cushion or seat stiffeners):

TABLE NO. 11

TWO-PIECE CUSHION ASSEMBLY
PHYSICAL PROPERTIES
(ASTM D 3574)

ITEM	SEAT CUSHION	SEAT STIFFENERS
Density, lbs/cubic foot, Min	1.8	2.4
Load Deflection, 4" thick @ 25% Indentation Min	52 ±5	80
Indentation Load, Ratio, 65%/25%, Min	2.3	2.5
Compression Set, 50% Deflection (22 hrs @ 158°F), Max.	10	20
Tensile Strength, lbs/square inch, Min	10	12
Tensile Elongation, %, Min	150	75
Tear Resistance, lbs/inch, Min	1.5	1.5

2.13.4. Seat Frames -

2.13.4.1. Design and Material - The seat frames shall be constructed of steel of the type, size, and gauge necessary to meet the seat load deflection requirements of FMVSS No. 222. Seat frames legs shall be two, four, or six pedestal type. The seat backs shall slope backward to provide a comfortable seating angle. Seat backs that are set in a vertical plane or tilt forward are not acceptable.

2.13.4.2. 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 E.1.10.).

2.13.5. Seat Installation -

2.13.5.1. Aisle Width - The minimum aisle width between rows of seats shall be 12 inches except a 30-inch aisle is required if regular seating is provided between the rear emergency door and any wheelchair positions on wheelchair-equipped buses (see Par. G.1.7.3.).

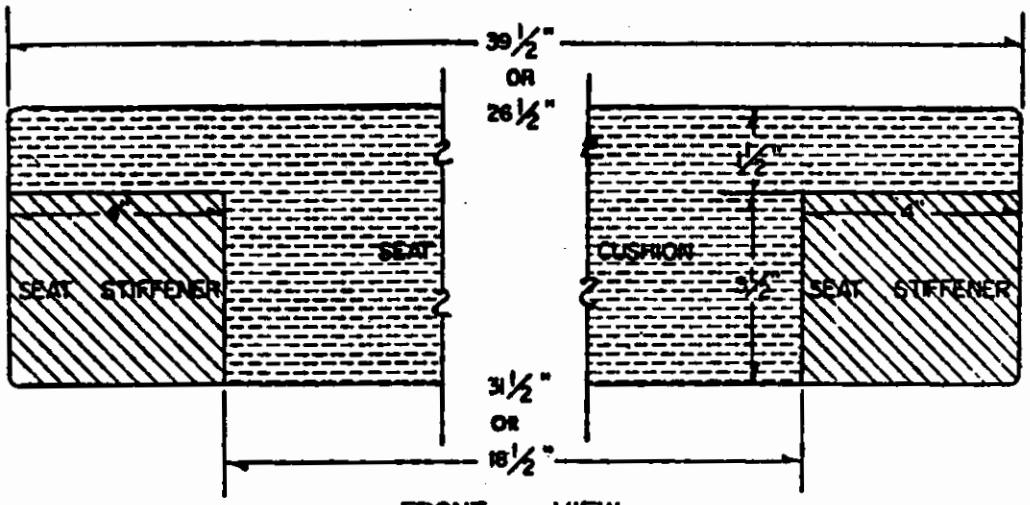
2.13.5.2. Attachment - Each leg shall be attached to the floor with at least 2 bolts, flat washers, lock washers, and nuts, or approved equal. Where it is impossible to use bolts and nuts at certain floor points due to main cross members or floor sill interference, thread-forming or cutting bolts and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

2.13.5.3. Knee Spacing - Allowing for manufacturing tolerances, Texas requires the maximum allowable knee space on buses consistent with the overall standard body lengths (see Par. A.2.13. for the definition of knee spacing and Option No. 15 for increased knee space on all 24- through 71-passenger buses). These minima are generally not less than the following (see Table No. 8):

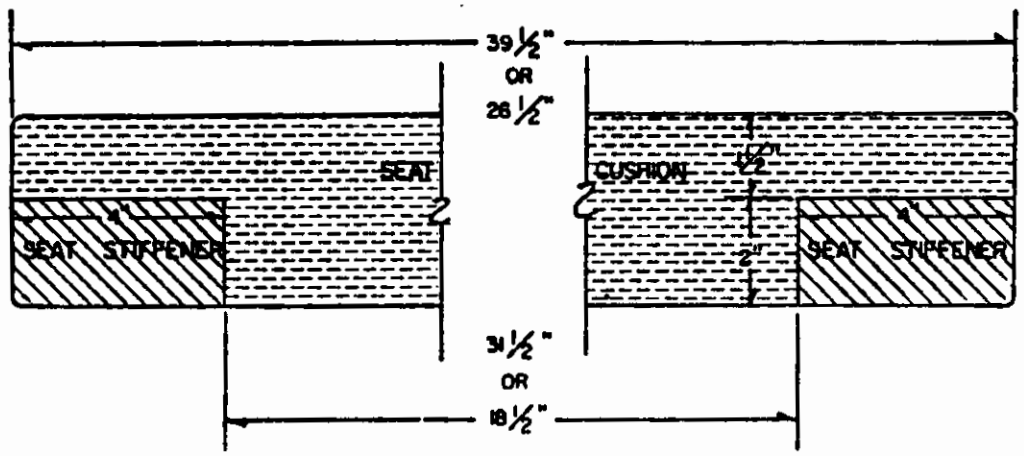
(i) 24 inches for the 24-passenger bus
(ii) 24 3/4 inches for the short wheelbase 71- and the 83-passenger buses.
(iii) 25 inches for all other 35- through 77-passenger buses.

FIGURE 2

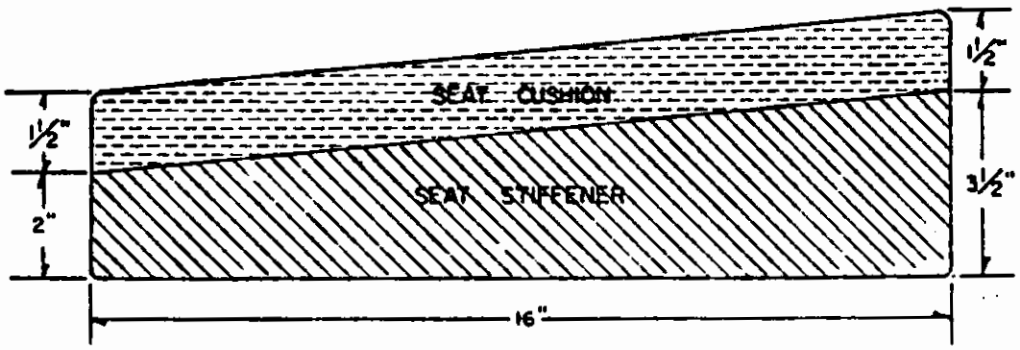
SEAT CUSHION ASSEMBLY



FRONT VIEW



REAR VIEW



SIDE VIEW

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

2.13.6.1. 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.

2.13.6.2. 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.

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

2.14. SERVICE ENTRYWAY -

2.14.1. Design of Steps - The entrance door steps shall be designed so that the first step shall be not less than 10 inches and not more than 14 inches for Type A, B, and C buses and not less than 12 inches and not more than 16 inches for Type D buses, from the ground when the bus is unloaded. Service door entrance may be equipped with two-step or three-step entrance. Risers in each case 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. (See Par. E.2.6.3. for material requirements.) The stepwell shall not protrude beyond the side body line and shall be fully enclosed to prevent accumulation of ice, snow, and dust.

2.14.2. Entryway Access - There shall be a minimum of 12 inches of unrestricted access from the service door to the center aisle.

2.14.3. Floor Material - All steps and the floor line platform area shall be covered with 3/16-inch rubber metal-backed treads with at least 1-1/2 inch white nosing as an integral piece without any joint. A three-inch white rubber step edge with metal back may be substituted in the floor line platform area. Step tread minimum overall thickness shall be 3/16-inch ribbed design similar to the ribbed design of the aisle rubber. Metal back of tread, minimum 24-gauge cold rolled steel, shall be permanently bonded to ribbed rubber. Grooved design shall be such that said grooves run at 90-degree angle to long dimension of step tread. The rubber portion of the step trends shall have the following characteristics:

2.14.3.1. Show a Durometer or equivalent hardness of 85 to 95.

2.14.3.2. Special compounding for good abrasion resistance and high coefficient of friction.

2.14.3.3. Sufficient flexibility so that it can be bent around a 1/2-inch mandrel both at 130°F and 20°F without breaking, cracking, or crazing.

2.14.4. Handrails - A grab handle not less than 20 inches in length shall be provided and placed in an unobstructed location inside the doorway. The outside surface of this handle shall be stainless steel, polished aluminum, or chrome-plated steel (see Par. C.2.11.1.).

2.15. SERVICE OR ENTRANCE DOORS - The service door shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal:

2.15.1. Attachment - The hinges for the service or 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 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.).

2.15.2. 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 collision or roll-over.

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 doors for conventional buses shall be operated manually, or **when so specified in the Invitation for Bids (see Option 10)**, 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 10)**, 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 doors 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 10)**, 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 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. A static-type, nonclosable exhaust ventilator shall be installed in the low-pressure area of roof.

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 39). 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 16), 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 (including push-out type emergency exit 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 16), passenger side windows <u>only</u> 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 shall 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.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.1.7.3.).

3.2. **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.

3.3. **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.

B. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

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.

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 14), 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.2.13.5.2. 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.

3.8. **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. 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 General Services Commission Drawings Numbered 040-35(1), 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.

3.8.3. 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. above except the mirror backing and mounting shall be made of stainless steel.

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).

3.8.5. Rearview Mirror system - 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 a distance of 32 feet back from the front bumper.

3.9. **MIRRORS, INTERIOR** - A clear-vision, interior rearview mirror conforming to FMVSS No. 111, with at least 6" x 30" 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.

3.10. **MUD FLAPS - When so specified in the Invitation for Bids** (see Option 18), mud flaps of durable, heavy-duty rubberized construction, complete with brackets, shall be installed behind each set of rear wheels. The mud flaps shall be comparable in size to the width of rear wheelhousing and shall reach within approximately 8 inches of the ground when the bus is empty. They shall be mounted at a distance from the wheels that will permit free access to spring hangers for lubrication, and to prevent their being pulled off when the bus is moving in reverse. **There shall be no advertisement on the mud flaps.**

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

3.11. **REFLECTIVE MATERIAL - When so specified in the Invitation for Bids** (see Option 19), buses shall be equipped with reflective material meeting the following requirements. The material shall be automotive engineering grade or better, shall meet the initial reflectance values in DOT FHWA FP-85 and shall retain at least 50% of those values for a minimum of six years. Reflective materials and markings shall be installed in the following locations:

3.11.1. Front and/or rear bumper shall be marked diagonally 45° down to centerline of pavement with 2-inch wide strips of non-contrasting reflective material.

3.11.2. Rear of bus body shall be marked with a strip of reflective National School Bus Yellow material no greater than 2 inches in width to be applied to the back of the bus, extending from the left lower corner of the "SCHOOL BUS" lettering, across to left side of the bus; then vertically down to the top of the bumper, across the bus on a line immediately above the bumper to the right side, then vertically up to a point even with the strip placement on the left side, and concluding with a horizontal strip terminating at the lower right corner of the "SCHOOL BUS" lettering.

3.11.3. "SCHOOL BUS" signs shall be marked with reflective National School Bus Yellow material comprising background for lettering of the front and/or rear "SCHOOL BUS" signs.

3.11.4. Side of bus body shall be marked with reflective National School Bus Yellow Material at least 6 inches but not more than 12 inches in width, extending the length of the bus body and located (vertically) as close as practicable to the beltline.

NOTE: See Par.. 3.15.1. for requirements for placement of reflective materials on Stop arms.

3.12. **STROBE LIGHT, Flashing - When so specified on Invitation for Bids** (see Option 26), an optional white flashing strobe light meeting the following requirements shall be provided:

3.12.1. 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 80-120 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.

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

3.13. **SEAT BELTS, PASSENGER - When so specified in the Invitation for Bids** (see Option 22), seat belts conforming to FMVSS Nos. 209 and 210 shall be provided for each passenger position. The seat belts shall meet the following requirements:

3.13.1. Colors - The belt assemblies shall be alternately color coded with contrasting colors. All aisle seats on the same side of the bus shall have belts with the same color. Two-position seats shall use two colors; three-position seats may use two or three colors.

3.13.2. Design - Seat belts shall have a buckle end and an attaching end which are adjustable to fit passenger sizes as required by FMVSS Nos. 208 and 209 (except lights and buzzers are not required). Buckles shall be of the plastic-covered push button design. Long and short ends shall be mounted alternately with the short end on the aisle. If possible, the design shall prevent fastening the belts across the aisle.

3.14. **STIRRUP STEPS** - There shall be one stirrup step and a suitably located handle on each side of the bus body front for easy accessibility in cleaning the windshield and lamps. The stirrup step on forward-control buses shall be on or in the bumper. Stirrup steps are not required on the 24-passenger bus unless necessary to clean windshield and windows.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

3.15. **STOP ARM** - A school bus stop arm meeting SAE J1133 and the following requirements shall be provided:

3.15.1. Design - The sign shall be octagon-shaped, constructed of zinc-coated steel or aluminum. 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. Tha letters, border and background shall be of reflective materials meeting DOT FHWA FP-85. 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.

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

3.16. **SUN VISOR** - A two-post, adjustable sun visor with a minimum size of 6 by 30 inches and a minimum thickness of 1/8 inches and constructed of tinted Plexiglas shall be furnished on each bus. Means shall be provided for tension adjustment. It shall be installed above the interior windshield on the driver's side or it may be mounted to the inside rearview mirror at each end using lock type nuts. If this type of mounting is used, the mirror shall have an adjustable reinforcing bracket at each end to reduce any vibration distortion caused by the weight of the sun visor.

3.17 **TOOL COMPARTMENT - When so specified in the Invitation for Bids** (see Option No. 30), 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 and shall be capable of being securely latched. However, if it is located inside the passenger compartment, it shall be provided with a separate cover, and shall be fastened to the floor in the right front or the right rear of the bus. A seat cushion shall not be used as this cover.

3.18. **WINDSHIELD WASHERS AND WIPERS** -

3.18.1. **Washers** - A vacuum-, electric-, or air-operated windshield washer shall be furnished and installed. The washer shall have a minimum reservoir capacity of one quart of liquid and shall direct a stream of water into the path of travel of each windshield wiper blade each time the actuating button is operated.

3.18.2. **Wipers** - Each bus shall be equipped with two, 2-speed electric motor-driven heavy-duty windshield wipers. The arms and blades shall be of sufficient size to provide clear vision for the driver during a heavy rain. The motors furnished shall be guaranteed to operate the wipers under all driving conditions and shall be American Bosch Model WWC, or approved equal.

E.4. **APPROVAL OF NEW BUS BODIES** - Procedures for approving a new bus body for 24- through 83-passenger school buses shall be as follows in the order indicated:

4.1. **SUBMISSION OF REQUEST** - Submit a written request that tha body be approved along with the following:

4.1.1. Letter - Letter stating that the body meets or exceeds each and every applicable requirement in Texas specification No. 070-SB-93.

4.1.2. Literature and drawings - See Par. A.6.5.

4.2. **REVIEW OF REQUEST** - The Commission will review the literature and drawings and advise the vendor or manufacturer by letter of the results of this review. A copy of this letter will be furnished to the School Bus Committee. If this review verifies that the bus body meets or exceeds the requirements of this specification, the vendor or manufacturer shall arrange for the school bus to be brought to Austin, Texas for inspection and evaluation by the Commission and the Texas School Bus Committee.

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

4.3. INSPECTION AND EVALUATION -

4.3.1. The bus body shall be inspected using the current School Bus Inspection Check List.

4.3.2. The bus body will be evaluated and if found suitable for the intended purpose, the Commision will issue a letter to the manufacturer listing the model as approved for the capacities requested. If found not suitable, the Commission will issue a letter to the vendor or manufacturer giving the reason(s) for disapproval.

NOTE: Once a bus body is approved for one passenger capacity, other capacities of this same body differing <u>only</u> in length and capacity need not be inspected and evaluated prior to approval. The vendor or manufacturer shall request by letter that these other body lengths/models be approved.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

F.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. 12 through 28 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 alternative fuel storage tanks, 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, including bumpers and wheels shall be painted black (Color 17038); cowl, fenders, and hood shall be painted school bus yellow (Color 13432).

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

2.1. **AXLES** -

2.1.1. Axle Capacities - Axle capacities and gross axle weight ratings (GAWRs) shall be as specified in Table Nos. 12 through 28 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., F.1.1., and G.1.7.2.).

2.1.2. Rear Axle Ratios - Rear axle ratios shall be compatible with the required engines and gradeability requirements for school buses driven at governed top rated road speeds of 55 MPH minimum (see Par. F.5.3.4.).

2.2. **BRAKES AND RELATED COMPONENTS** -

2.2.1. Air Brakes and Associated Equipment - Each 59-, 65-, 71-, 77- and 83-passenger chassis shall be equipped with full air brake and parking brake systems as <u>standard</u> equipment. Full air brake systems shall meet the requirements of FMVSS No. 121 as applicable to school buses. The following equipment shall be furnished as follows:

2.2.1.1. Air Compressor - The air compressor on 83-passenger buses shall have a minimum 12 cu. ft. capacity. Other sizes of buses equipped with air brakes shall have an air compressor of sufficient capacity to provide adequate air pressure for the air brake system.

2.2.1.2. Air Tanks - The air tank(s) for 83-passenger buses shall be equipped with automatic valves to drain condensation from the tanks.

2.2.1.3. Automatic Moisture Ejectors - Automatic moisture ejectors shall be furnished and installed.

2.2.1.4. Automatic Slack Adjusters - Four automatic slack adjusters shall be furnished and installed, two at the front and two at the rear.

2.2.2. Hydraulic Brakes - The 24-, 35-, 47- and 53- passenger school bus chassis shall have as standard, hydraulic service brakes, emergency stopping system, and parking brakes meeting the requirements of FMVSS No. 105-83. **If so specified in the Invitation for Bids** (see Option 6), the 59-, 65-, 71-, and 77-passenger school buses shall be equipped with hydraulic brakes.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

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 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 28. 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. All tires shall be "Original Equipment Line Quality." Schools may order Mud and Snow tread design tires (see Option No. 29). For tire size and load range for each size chassis, see Table Nos. 12 through 28.

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 31 and 32), the following optional wheels and carrier shall be furnished on the chassis as indicated:

2.6.2.1. Wheel, Spare, Mounted (with Carrier but <u>not</u> tire (or tube); for 35- through 83-passenger only; see Option No. 32).

NOTE: Carrier <u>not</u> available for 24-passenger bus; spare wheel <u>only</u> is available on this option.

2.6.2.2. Wheel, Spare, Unmounted (without Carrier, Tire, or Tube) - (for 24- through 77-passenger buses; see Option No. 31).

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, CONVENTIONAL FUEL** - 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 Tank(s), 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.5.5.3.).

3.3.2. Fuel Tank(s), Auxiliary - **When so specified in the Invitation for Bids** (see Option 12), 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. **FUEL TANKS, ALTERNATIVE FUEL** - Fuel tank(s) for alternative fuels (see Option 3) shall meet or exceed all of the rules and regulations of the Texas Railroad Commission. Capacity shall be that required to meet the range requirements of the Option or as **specified in the Invitation for Bids.**

3.5. **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).

3.6. **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 4), 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 a minimum 360 CCA and 100-minute reserve capacity.

4.2.2. Battery, Gasoline Engines - Batteries shall be 12 volts with a minimum performance level of BCI cold cranking capacity (CCA) of not less than 360 amperes @ 0°F with a minimum 100-minute reserve capacity.

4.2.3. Battery(s), Alternative fueled vehicles - Dedicated alternative fueled vehicles shall have batteries meeting or exceeding those required for a gasoline engine school bus with comparable horsepower.

4.2.4. Battery Cables - The battery cables shall be one piece and of sufficient length to allow pull out or lift out of the battery for servicing or removal and arranged so as to prevent damage to the battery posts when removed.

4.2.5. Mounting - The preferred battery mounting location for gasoline-powered buses is outside the body shell under the hood in an adequate carrier and readily accessible for maintenance and removal from above or outside. (See Par. E.2.6. for requirements of diesel-powered buses and other battery mounting locations.)

4.3. **HORNS** - Each bus shall be equipped with horn or horns of standard make. Each horn shall be capable of producing audible sounds in the frequency range from 250 to 2,000 Hz and at an intensity between 82 and 102 decibels. The sound level measurements shall be made at a distance of 50 feet directly in front of the vehicle in accordance with SAE J377.

4.4. **INSTRUMENTS AND INSTRUMENT PANEL** - The bus shall be equipped with the following nonglare illuminated instruments (controlled by an independent rheostat*), and gauges mounted for easy maintenance and repair and clearly visible to the seated driver. **Indicator warning lights in lieu of gauges are not acceptable.**

4.4.1. Air Pressure Gauge (where air brakes are used)
4.4.2. Ammeter (or Voltmeter) with graduated charge and discharge indications
4.4.3. Fuel Gauge
4.4.4. Glow Plug Indicator Light (for diesel buses with glow plugs only)
4.4.5. High Beam Headlamp Indicator
4.4.6. Odometer (6 digits, i.e., register to 99,999.9 miles)
4.4.7. Oil Pressure Gauge
4.4.8. Speedometer
4.4.9. Vehicle manufacturer's standard keyed ignition switch
4.4.10. Water temperature gauge

***NOTE:** If the intensity of the body-installed panel lamps is controlled, then the intensity control shall not be accomplished by the same rheostat that controls the chassis instrument lamps, <u>unless</u> the body company designs and installs the rheostat to accomplish both.

4.5. **LAMPS** - Each bus shall be equipped with at least two clear headlamps meeting the requirements of FMVSS No. 108 and a dimmer switch located on or near the steering column. Adequate parking lamps operated by a switch in common with the headlamps shall be provided.

4.6. **WIRING** - The chassis manufacturer shall provide a readily accessible terminal strip or plug on the body side of the cowl, or at an accessible location within the engine compartment, with the following minimum terminals for the body connections:

4.6.1. Backup Lamps
4.6.2. Instrument Panel Lights (rheostat controlled by head lamp switch)
4.6.3. Left Turn signals
4.6.4. Right turn signals
4.6.5. Stop lamps
4.6.6. Tail lamps

F.5. **ENGINE AND RELATED COMPONENTS** -

5.1. **AIR CLEANER** - Each chassis shall be equipped with a factory-installed maximum capacity, heavy-duty replaceable dry element type air cleaner.

5.2. **COOLING SYSTEM** - The cooling system radiator shall be heavy-duty with increased capacity to cool the engine at all speeds in all gears. The cooling system fan shall be the heavy-duty reinforced type with a fan clutch. Thin pressed fan blades are not acceptable.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

5.3. **ENGINES** - Approved engines listed in each table for the various size buses are the engines for which the vendor has requested approval and are usually the smallest engine in terms of performance that will meet the requirements listed below. Other approved engines which the vendor may provide with a given chassis will be listed also in an Approved Products List (APL). The APL will be updated as new engines or additional versions of current engines are approved. **Please note that only those engines approved as specified below and listed either in the Texas School Bus Specification or in the Class 070-SB-APL will be acceptable for school buses.**

5.3.1. Diesel Engines - **When so specified in the Invitation for Bids** (see Option 8), a bus chassis having a gasoline engine listed as standard, shall be furnished with a 4-cycle diesel engine. (Diesel engines are standard for 47- through 77-passenger and the 83-passenger forward control buses).

5.3.2. Gasoline Engines - Engines for the 24- through 71-passenger conventional (and semi-forward control) and the 77-passenger school buses shall be of the gasoline type **unless otherwise specified in the Invitation for Bids.** Approved engines are listed in Table Nos. 12 through 28 **and** in the Class 070-SB APL.

5.3.3. Alternative Fuel Engines - **When so specified in the Invitation for Bids** (see Option 3), the 24- through 83 passenger buses shall be equipped with engines capable of operating on alternative fuels.

5.3.4. Power Requirements - Each bus shall be furnished with an engine that meets or exceeds the following **minimum** criteria (see second note at the end of Par. F.5.3.5.8.), when tested at or above the GVWR required for a given bus capacity and with all accessories except air conditioning compressor on and operating:

5.3.4.1. Acceleration from 0 to 50 mph in 60 seconds or less.
5.3.4.2. Gradeability of 1.5% minimum at 50 mph.
5.3.4.3. Gradeability of 5.0% minimum at 25 mph.
5.3.4.4. Startability of 20% minimum.
5.3.4.5. Top speed of 55 mph minimum at the manufacturer's rated rpm for the governed engine.

5.3.5. Approval of New Engines - Procedures for approving new school bus engines for 24- through 83- passenger school buses shall be as follows:

5.3.5.1. Submit to the Commission, a recent computer SCAAN (not the typed results of a SCAAN) showing that the proposed engine meets or exceeds each requirement of Par. F.5.3.4. under the following conditions:

(i) Air resistance coefficient = 0.550 or relative drag coefficient of 88--whichever the manufacturer uses.
(ii) **All** engine accessories on and operating **including** fan clutch, alternator, power steering pump, air compressor, and any other powered accessory except air conditioning compressors.
(iii) GVWR equal to or greater than that of the largest bus for which approval is requested.
(iv) Minimal frontal area of 75 square feet, or actual frontal area, if different.
(v) Other parameters shall be of the manufacturer's standard values for the coefficient of friction on smooth concrete, driveline efficiency, etc.
(vi) Radial tires of the size specified in the table for tha particular bus capacity.
(vii) Transmission, chassis manufacturer's standard automatic, or AT-545, MT-643 transmission, as applicable (see Par. F.6.).

5.3.5.2. The Commission will review the SCAAN and advise the vendor or manufacturer **by letter** of the results of this review. Copies will be furnished to the School Bus Committee.

5.3.5.3. If this review verifies that the engine meets the requirements of this specification, and is so stated in the above letter, the vendor or manufacturer shall contact the GSC Purchaser to arrange for testing of the engine in the largest size school bus for which approval is requested. The Purchaser will consult with the **TEA** Representative and inform the vendor of the name(s) of the school district(s) from which to select a participant.

5.3.5.4. The vendor must obtain the cooperation of one of the named school districts in agreeing to test the bus and to provide a report to the GSC on the form provided (see copy of the form entitled, "Three-Month Test of New School Bus Engines," on Page 117).

5.3.5.5. The vendor or manufacturer shall then contact the GSC Purchaser and TEA School Bus Committee Representative about ordering the school bus with the subject engine.

5.3.5.6. The bus shall be tested for a period of not less than three months during the regular nine-months school term, preferably on a variety of routes and on activity trips.

5.3.5.7. Upon receipt of the school district's report, the Commission will make a determination that the engine be accepted or rejected, and advise the vendor of that determination. The School Bus Committee will be advised of this action and the engine will be added to the Class 070-SB-APL, if acceptable.

NOTES: Once an engine is approved in one horsepower and torque version, other power versions of this same engine need not be tested in a school bus prior to approval. For approval, the vendor or manufacturer shall follow Par. F.5.3.5.1, and, in addition, state the rear axle ratio recommended for the size bus for which approval is requested. Then the engine will be added to the Class 070-SB-APL which will show the SAE net horsepower and SAE net torque as well as the rear axle ratio for the particular application.

THE VALUES OF DISPLACEMENT, HORSEPOWER, AND TORQUE LISTED IN THE FOLLOWING TABLES UNDER EACH MANUFACTURER ARE NOT MINIMUM VALUES AND SHOULD NOT BE CONSTRUED AS SUCH. THE ONLY MINIMUM REQUIREMENTS FOR THE PERFORMANCE OF ENGINES IN 24- THROUGH 83-PASSENGER SCHOOL BUSES IN THE STATE OF TEXAS ARE THE FIVE REQUIREMENTS LISTED IN PARAGRAPH F.5.3.4. (There are additional requirements for engines, either implied or specified, separate from the above performance requirements.)

5.4. **ENGINE WARNING SYSTEM** - An engine warning system shall be provided for the 35- through 83-passenger diesel-powered buses and shall be chassis factory-installed. Audible signals (which may be also be visual) shall indicate to the driver when the oil pressure is too low and/or the engine temperature is too high for safe operation. These signals shall begin within 8 seconds or less after the condition begins in order that the engine can be shut down before permanent damage occurs. **A manual engine shut-down device is preferred.**

5.5. **EXHAUST SYSTEM** -

5.5.1. Component Placement - The exhaust pipe, muffler, and tailpipe shall be mounted under the bus and attached to the chassis frame.

5.5.2. Noise Level - The noise level shall neither exceed EPA "Noise Emission Standards" nor 85 dB(A) at the ear of the occupant in the bus nearest to the noise source in the bus. **When so specified in the Invitation for Bids** (see Option No. 24), the bus shall be furnished with the noise level not exceeding 86 dB(A) measured at the same place.

5.5.3. Tailpipe - The tailpipe shall be constructed of seamless or electrically welded tubing of 16-gauge steel or equivalent, and shall extend at least 5 inches beyond the chassis frame. The size of the tailpipe shall not be reduced after it leaves the muffler.

5.5.4. Tailpipe Exit - The tailpipe of a gasoline-powered bus shall not exit the side of the bus anywhere within 12 inches of a vertical plane through the center of the fuel filler opening and perpendicular to the side of the bus, <u>unless</u> protected with a metal shield to divert spilled fuel away from tailpipe.

5.6. **FUEL FILTER** - Each diesel engine shall be equipped with a fuel filter of the full-flow design, installed between the fuel tank and the injector pumps.

5.7. **GOVERNOR** - A governor set to the manufacturer's recommended maximum engine speed (RPM) shall be installed by the chassis manufacturer.

5.8. **OIL FILTER** - Each chassis shall be equipped with a factory-installed, minimum one-quart capacity oil filter with a replaceable element or cartridge type. It shall be connected by flexible oil lines if it is not of the built-in or engine-mounted design.

5.9. **TACHOGRAPH - When so specified in the Invitation for Bids** (see Option 27), a tachograph containing a combination clock/speedometer/recorder shall be installed on the dashboard. The tachograph shall be Argo Model(s) 1310-6, Veeder-Root Model AB-1407, or approved equal.

F.6. **TRANSMISSION AND RELATED COMPONENTS** - The 24- through 77-passenger school buses shall be equipped with a manual or an automatic transmission, **WHICHEVER IS SELECTED BY THE SCHOOL DISTRICT ON THE SCHOOL BUS REQUISITION FORM.**

6.1. **AUTOMATIC TRANSMISSION, CHASSIS MANUFACTURER'S - Unless otherwise specified in the Invitation for Bids**, the 24-passenger bus shall be furnished with a minimum three forward speed automatic transmission which shall be the chassis manufacturer's standard automatic transmission for this type of chassis.

6.2. **AUTOMATIC TRANSMISSION (ATD MODEL AT 545) - Unless otherwise specified in the Invitation for Bids**, the 35- through 71-passenger and the 77-passenger conventional buses shall be furnished with a minimum four forward speed automatic transmission. The transmission shall be the ATD Model AT 545, or approved equal **(see Par. F.6. above), unless an ATD Model MT-643 is required to match engine torque.** The application will conform to the manufacturer's recommended capacity limits of 30,000 GVWR and/or 445 lb.-ft. maximum torque rating.

6.3. **AUTOMATIC TRANSMISSION (ATD MODEL MT-643) - Unless otherwise specified in the Invitation for Bids**, the 77- and 83-passenger forward control buses shall be furnished with a minimum four forward speed automatic transmission. The transmission shall be the ATD Model MT-643, or approved equal.

6.4. **DRIVE SHAFT GUARD** - Each drive shaft section shall be equipped with protective metal guard or guards to prevent the shaft from whipping through the floor or dropping to the ground when broken.

NOTE: Drive shaft guard is not required on rear engine, rear-drive bus.

6.5. **MANUAL TRANSMISSIONS - Unless otherwise specified in the Invitation for Bids**, the manual type transmission shall be furnished on all 24- through 77-passenger buses (but not the 83-passenger bus, which requires an automatic transmission). The transmission shall be the synchromesh (all gears except first and reverse) type. It shall be of sturdy construction, and the input torque capacity shall be at least 10 percent above the maximum net torque developed by the engine. Its design shall provide for four forward and one reverse speeds for the 24-passenger chassis, and five forward (direct in fifth) and one reverse speed for 35-, 47-, 53-, 59-, 65-, 71-, and 77-passenger chassis.

6.6. **MANUAL TRANSMISSION CLUTCH** - The clutch in buses equipped with manual transmissions shall have a torque capacity not less than 10 percent in excess of the maximum net torque output of engine. The diameter of the clutches for the various sizes of buses equipped with manual transmissions shall be as follows:

6.6.1. 12-inch Clutch - All chassis for the 24-, 35-, 47-, 53-, and 59-passenger buses with manual transmissions shall be equipped with a minimum 12-inch diameter clutch..

6.6.2. 13-inch Clutch - All chassis for 65-, 71-, and 77-passenger buses with manual transmissions shall be equipped with a minimum 13-inch diameter clutch or a clutch with equivalent performance.

TABLE 12
24-PASSENGER BUS CHASSIS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

24-Passenger ITEM	1993 Min. Rqmts.	GMC/Chevrolet P31042/P31442	Navistar 3600
GVWR, lbs	14500	14500	14500
GAWR, lbs - Front	5000	5000	6000
- Rear	10500	11000	10500
Axle Capacity, lbs - Front	5000	5000	6000
- Rear	11000	11000	13000
Wheelbase, in	133/157	133/157	138/152
Chassis Length, in	as shown	238.8/262.8	252/258
Track, in - Front	65.2	65.2	81.0
- Rear	66.7	66.7	82.0
Gasoline Engine, L.*	**	5.7L-V8	*
SAE Gross Horsepower	**	201	*
SAE Gross Torque, lb-ft	**	318	*
Transmission:			
Automatic, Gears	4 spd	A4OD	AT-542/545
Manual, Fwd. Gears	4 spd	M4/NA	NA
Tires, Steel Belted Radial Size & Load Range	Tubeless as shown	8R19.5E	225/70R19.5
Wheels, Rear	Dual	Dual	Dual
Alternator, amperes	100	105	100

*See diesel engine Option 8.
**See minimum power requirements in Par. F.5.3.4.

DIESEL ENGINES (Option 8)

24-Passenger ITEM	1993 Min. Rqmts.	GMC/CHEVROLET P31042/P31442	NAVISTAR 3600
Engine Displacement, L.	**	6.2N-V8	7.3N-V8
SAE Gross Horsepower	**	164	170
SAE Gross Torque, lb-ft	**	302	332

**See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following bodies are available on semi-forward control or stripped chassis:

24-PASSENGER BUS BODIES

24-Passenger ITEM	1993 Min. Rqmts.	Blue Bird Mini-Bird	Carpenter Cadet	Thomas Minotaur GP/ Vista
Interior Headroom, in	73	77	77	73
Interior Width, in	90	90.5	90	90
Service Door	as shown	Tall	Tall	Tall

TABLE 13
35-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
35-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700*	NIC-Semi**** 3600*	FORD B600*
GVWR, lbs	21500	23100	21500	21500	23000
GAWR, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Axle Capacity, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Wheelbase, in	151	157/175	152	170	151
Cowl-to-Axle, in	127	133/151	127	127	127
Cowl-to-Frame End, in	217	223/244	217	217	231
Gasoline Engine CID**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.38 x 1.53
- Rear Lining, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 9R22.5F	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	7.5	6.75	6.75	6.75

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
****NOTE: Buses ordered in this capacity (35-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.

DIESEL ENGINES (Option 8)

35-Passenger ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3600/3700	FORD B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	6000	6000	6000	8000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

35-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-17	1808/2005	77SB1808	0510/0511/0600	3F1802
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 14
47-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
47-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700*	NIC-Semi**** 3600*	FORD B600*
GVWR, lbs	21500	23100	21500	21500	23000
GAWR, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Axle Capacity, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Wheelbase, in	193	193	193	193	193
Cowl-to-Axle, in	168	169	168	168	169
Cowl-to-Frame End, in	274	279	274	274	280
Gasoline Engine CID**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.38 x 1.53
- Rear Lining, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 9R22.5F	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	7.5	6.75	6.75	6.75

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
****NOTE: Buses ordered in this capacity (47-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.

DIESEL ENGINES (Option 8)

47-Passenger ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3600/3700	FORD B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.96T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	6000	6000	6000	8000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

47-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-22	2304	77SB1808	0701/0710	3F2300
Chassis Available	N,F	B,N,F	N,F	N-S, N,F	N,F

TABLE 15
47-PASSENGER FORWARD CONTROL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

CHASSIS		B	S	N	W
47-Passenger ITEM	1993 Min. Rqmts.	Blue Bird TCFC	Crane 4000**	NIC 3900**	Wayne/ Crane 721
GVWR, lbs	26500	26500	26500	29500	29000
GAWR, lbs - Front	10300	11240	10300	12000	12000
- Rear	15500	15500	17000	17500	17000
Axle Capacity, lbs - Front	10800	12000	10800	12000	12000
- Rear	17000	17000	17000	17500	17000
Wheelbase, in	132	132	146	159	159
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***	****	**	**	**	**
SAE Gross Horsepower	****	**	**	**	**
SAE Gross Torque, lb-ft	****	**	**	**	**
Transmission:					
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	n/a	M5	n/a
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15.00 x 4.00	15 x 2.88	15.00 x 4.00
- Rear Lining, in	as shown	15 x 1.438	15.50 x 6.00	15 x 2.88	15.00 x 6.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5G	10R22.5F	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.50	8.25	8.25

*Furnished with air brakes only.
**Furnished with diesel engine only, Option 8.
***See diesel engine option 8.
****See minimum power requirements in Par. F.5.3.4.

DIESEL ENGINES (Option 8)

47-Passenger ITEM	1993 Min. Rqmts.	Blue Bird TC2000	Crane 4000	NIC 3900	Wayne/ Crane 721
Engine Displacement, L.	***	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	***	190	180	170	190
SAE Gross Torque, lb-ft	***	475	445	400	475
Front GAWR	10300	11340	12000	10300	12000

***See minimum power requirements in Par. F.5.3.4.
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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

47-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS2611/NS2602	TCFC2511	2902	----	3S/C2806
Chassis Available	N,S	B	S, N	----	N,W

TABLE 16
53-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
53-Passenger Conv.	1993	B.B.	NIC	NIC-Semi****	FORD
ITEM	Min. Rqmts.	CV200	3700*	3600*	B600*
GVWR, lbs	21500	23100	21500	21500	23000
GAWR, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Axle Capacity, lbs - Front	6000	8100	6000	6000	8000
- Rear	15000	15000	15500	15500	15000
Wheelbase, in	211	211/229	218	218	217
Cowl-to-Axle, in	187	187/205	193	193	193
Cowl-to-Frame End, in	305	307/328	305	305	323
Gasoline Engine CID**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.38 x 1.53
- Rear Lining, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	9R22.5F	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	7.5	6.75	6.75	6.75

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
****NOTE: Buses ordered in this capacity (53-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.

DIESEL ENGINES (Option 8)

53-Passenger	1993	B.B.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3700	B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	6000	6000	6000	8000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

53-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-24	2508/2705	77SB2508	0801/0810	3F2503
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 17
53-PASSENGER FORWARD CONTROL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)

Refer to General Requirements, Page 4

CHASSIS		B	N	S	T-A	W
53-Passenger ITEM	1993 Min. Rqmts.	Blue Bird TCFC**	NIC 3900**	Crane 4000*	Thomas All-Star	Wayne/ Crane 721
GVWR, lbs	26500	26500	29500	26500	30000	29000
GAWR, lbs - Front	10300	10300	12000	10300	11000	12000
- Rear	17000	17000	17500	17000	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	10800	12000	12000
- Rear	17000	17000	17500	17000	19000	17000
Wheelbase, in	136	146	159	146	136	159
Cowl-to-Axle, in	n/a	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	n/a
Gasoline Engine, L.***	****	**	**	**	**	**
SAE Gross Horsepower	****	**	**	**	**	**
SAE Gross Torque, lb-ft	****	**	**	**	**	**
Transmission:						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	n/a	n/a	n/a
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15 x 2.88	15.0 x 4	16.5 x 5	15.0 x 4.0
- Rear Lining, in	as shown	15 x 1.438	15 x 2.88	16.5 x 6	16.5 x 7	15.0 x 6.0
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5F	11R22.5G	10R22.5F	10R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.50	7.50	8.25	7.50	7.50	8.25

*Furnished with air brakes only
**Furnished with diesel engine only, Option 8.
***See diesel engine option 8.
****See minimum power requirements in Par. F.5.3.4.

DIESEL ENGINES (Option 8)

53-Passenger ITEM	1993 Min. Rqmts.	Blue Bird TCFC	NIC 3900	Crane 4000	Thomas All-Star	Wayne/ Crane 721
Engine Displacement, L.	***	5.9T-I6	5.9TI6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	***	190	170	180	190	190
SAE Gross Torque, lb-ft	***	475	400	445	475	475
Front GAWR	10300	10300	10300	10300	11000	12000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

53-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS2805/NS2805	TCFC2701	SFT2902	0903	3S/C2806
Chassis Available	N,S	B	S,N	T-A	N/W

TABLE 10
59-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
59-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700*	NIC-Semi**** 3600*	FORD B600*
GVWR, lbs	25500	26180	25500	25500	25500
GAWR, lbs - Front	8000	8100	8000	8000	9000
- Rear	17500	18080	17500	17500	17500
Axle Capacity, lbs - Front	8000	8100	8000	8000	9000
- Rear	17500	19000	17500	17500	17500
Wheelbase, in	236	241	236	236	237
Cowl-to-Axle, in	211	217	211	211	213
Cowl-to-Frame End, in	329	342	329	329	345
Gasoline Engine, L.**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	15.00 x 4.00	15.0 x 4.00	15.0 x 4.00	15.00 x 4.00
- Rear Lining, in	as shown	16.50 x 7.00	16.5 x 7.00	16.5 x 7.00	16.50 x 7.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5	7.5

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
******NOTE: Buses ordered in this capacity (59-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.**

DIESEL ENGINES (Option 8)

59-Passenger ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3600/3700	FORD B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	8000	9000	8000	9000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

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	0901/0910	3F2701
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 19
59-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	T	S	T-A	W
59 Passenger FC ITEM	1993 Min. Rqmts.	Blue Bird TCFC	NIC 3900	Thomas SAF-T-LINER MVP 1109***	Crane 4000	Thomas All-Star	Wayne/ Crane 721
GVWR, lbs	26500	27800	29500	28380	26500	30000	29000
GAWR, lbs - Front	10300	10300	12000	10300	10300	11000	12000
- Rear	17000	17000	17500	18080	17000	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	13200	10800	12000	12000
- Rear	17000	17000	17500	19000	17000	19000	17000
Wheelbase, in	155	160	184	181	160	155	159
Engine Displacement, L.	*	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	190	170	190	180	190	190
SAE Gross Torque, lb-ft	*	475	400	475	445	475	475
Transmission:**							
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. gears	5 Spd	M5	M5	M5	n/a	n/a	n/a
Brake Lining, in - Front	as shown	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 6	16.5 x 5	15 x 5
- Rear	as shown	16.5 x 7	16.5 x 7	16.5 x 7	16.5 x 6	16.5 x 7	16.5x7
Tires. Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5G	11R22.5G	10R22.5F	10R22.5F	10R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	8.25	7.5	7.5	7.5	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

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

DEDICATED CNG ENGINES (Option 3A)

59-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	11340

***See minimum power requirements in Par. F.5.3.4.

The following Body/Chassis combinations are available as indicated:

59-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS3008/NS3008	TCFC2810	SFT3303	1109/1003	3S/C3009
Chassis Available	N,S	B	N,S	T/T-A	N,W

TABLE 20
65-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
65-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700*	NIC-Semi**** 3600*	FORD B600*
GVWR, lbs	26500	27080	27500	27500	26500
GAWR, lbs - Front	9000	9000	10000	10000	9000
- Rear	17500	18080	17500	17500	17500
Axle Capacity, lbs - Front	9000	9000	10000	10000	9000
- Rear	17500	19000	17500	17500	17500
Wheelbase, in	254	259	254	254	255
Cowl-to-Axle, in	229	235	229	229	231
Cowl-to-Frame End, in	359	370	359	359	377
Gasoline Engine, L.**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	15.00 x 4.00	15.0 x 4.00	15.0 x 4.00	15.00 x 4.00
- Rear Lining, in	as shown	16.50 x 7.00	16.5 x 7.00	16.5 x 7.00	16.50 x 7.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5	7.5

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
******NOTE: Buses ordered in this capacity (65-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.**

DIESEL ENGINES (Option 8)

65-Passenger ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3600/3700	FORD B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	9000	9000	10000	9000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

65-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-29	3004/3011	77SB3004	1001/1010	3F2905
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 21
65-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	T	S	T-A	W
65-Passenger FC ITEM	1993 Min. Rqmts.	Blue Bird TCFC TCRE***	NIC 3900	Thomas SAF-T-LINER MVP 1109***	Crane 4000	Thomas All-Star	Wayne/ Crane 721
GVWR, lbs	26500	27800	29500	28380	26500	30000	29000
GAWR, lbs - Front	10300	11340	12000	10300	10800	11000	12000
- Rear	17000	17000	17500	18080	17000	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	13200	10800	12000	12000
- Rear	17000	17000	17500	19000	17000	19000	17000
Wheelbase, in	174	174	197	181	180	174	184
Diesel Engine Displacement, L.	*	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	190	170	190	180	190	190
SAE Gross Torque, lb-ft	*	475	400	475	445	475	475
Transmission:**							
Automatic, Gears/Model	4 Spd	AT-545	T-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	n/a	n/a	n/a
Brake Lining, in - Front	as shown	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4	16.5 x 5	15.0 x 4
- Rear	as shown	16.5 x 7	16.5 x 6	16.5 x 7	16.0 x 6	16.5 x 7	16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5G	11R22.5G	10R22.5F	10R22.5F	10R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	8.25	7.5	7.5	7.5	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

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

DEDICATED CNG ENGINES (Option 3A)

65-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	11340

***See minimum power requirements in Par. F.5.3.4.

The following Body/Chassis combinations are available as indicated:

65-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS3201/NS3211	TCFC3007	SFT3303	1209/1103	3S/C3300
Chassis Available	N,S	B	N,S	T/T-A	N,W

TABLE 22
71S-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Short Wheelbase, Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
71S-Passenger Conv.	1993	B.B.	NIC	NIC-Semi****	FORD
ITEM	Min. Rqmts.	CV200	3700*	3600*	B600*
GVWR, lbs	28000	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000	9000	9000
- Rear	19000	19000	19000	19000	19000
Axle Capacity, lbs - Front	9000	9000	9000	9000	9000
- Rear	19000	19000	19000	19000	19000
Wheelbase, in	254	259	254	254	255
Cowl-to-Axle, in	229	235	229	229	231
Cowl-to-Frame End, in	349	384	349	349	377
Gasoline Engine, L.**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	15.00 x 4.00	15.0 x 4.00	15.0 x 4.00	15.00 x 4.00
- Rear Lining, in	as shown	16.50 x 7.00	16.5 x 7.00	16.5 x 7.00	16.50 x 7.00
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25	8.25

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
******NOTE: Buses ordered in this capacity (71S-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.**

DIESEL ENGINES (Option 8)

71S-Passenger	1993	B.B.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3700	B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	9000	9000	10000	9000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

71S-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-31	3201	77SB3201	1100/1110	3F3200
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 23
71L-PASSENGER CONVENTIONAL BUS****
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Long Wheelbase, Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	N-S	F
71L-Passenger Conv.	1993	B.B.	NIC	NIC-Semi****	FORD
ITEM	Min. Rqmts.	CV200	3700*	3600*	B600*
GVWR, lbs	28000	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000	9000	9000
- Rear	19000	19000	19000	19000	19000
Axle Capacity, lbs - Front	9000	9000	9000	9000	9000
- Rear	19000	19000	19000	19000	19000
Wheelbase, in	274	274	274	276	275
Cowl-to-Axle, in	250	250	251	251	251
Cowl-to-Frame End, in	387	405	387	387	387
Gasoline Engine, L.**	***	6.0L-V8	*	*	*
SAE Gross Horsepower	***	210	*	*	*
SAE Gross Torque, lb-ft	***	340	*	*	*
Transmission:					
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M5	M5	M5	M5
Brakes - Front Disc Rotor, in	as shown	15.00 x 4.00	15.0 x 4.00	15.0 x 4.00	15.00 x 4.00
- Rear Lining, in	as shown	16.50 x 7.00	16.5 x 7.00	16.5 x 7.00	16.50 x 7.00
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25	8.25

*Furnished with diesel engine only, Option 8.
**See diesel engine option 8.
***See minimum power requirements in Par. F.5.3.4.
******NOTE: Buses ordered in this capacity (71L-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.**

DIESEL ENGINES (Option 8)

71L-Passenger	1993	B.B.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3700	B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400
Front GAWR	9000	9000	10000	9000

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

The following Body/Chassis combinations are available as indicated:

71L-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-31	3208/3310	77SB3208	1101/1110	3F3200
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N,F

TABLE 24
71-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	T	S	T-A	W
71-Passenger FC	1993	Blue Bird	NIC	Thomas	Crane*	Thomas	Wayne/
		TCFC		1309		All-Star	Crane
ITEM	Min. Rqmts.	TCRE***	3900	MVP	4000		721
GVWR, lbs	27000	27800	29500	30000	27000	30000	29000
GAWR, lbs - Front	10800	11340	12000	11000	10800	11000	12000
- Rear	17000	17000	17500	19000	17000	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	13200	10800	12000	12000
- Rear	17000	17000	17500	19000	17000	19000	17000
Wheelbase, in	193	195	197	238	195	193	197
Diesel Engine Displacement, L.	*	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T
SAE Gross Horsepower	*	190	190	190	180	190	190
SAE Gross Torque, lb-ft	*	475	457	475	445	475	475
Transmission:**							
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	n/a	n/a	n/a
Brake Lining, in - Front	as shown	15.0 X 4	15.0 X 4	15.0 X 4	15.0 x 4	16.5 x 5	15.0x4
- Rear	as shown	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 6	16.5 x 7	16.5x7
Tires, Steel Belted Radial	Tubeless						
Size & Load Range	10R22.5G	10R22.5G	11R22.5G	10R22.5G	10R22.5G	10R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	8.25	7.5	7.5	7.5	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

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

DEDICATED CNG ENGINES (Option 3A)

71-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	11340

***See minimum power requirements in Par. F.5.3.4.

The following Body/Chassis combinations are available as indicated:

71-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS3404/NS3502	TCFC3211 TCRE3408 TCFC3306	SFT3602	1309/1203	3S/C3503
Chassis Available	N,S	B	N,S	T/T-A	N,W

TABLE 25
77-PASSENGER CONVENTIONAL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	F
77-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700*	Ford B600*
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	274	274	276	275
Cowl-to-Axle, in	250	250	251	251
Cowl-to-Frame End, in	387	405	387	387
Gasoline Engine, L. **	***	6.0L-V8	*	*
SAE Gross Horsepower	***	210	*	*
SAE Gross Torque, lb-ft	***	340	*	*
Transmission:****				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5
Brake Lining, in - Front	as shown	15.0 x 4	15.0 x 4	15.0 x 4
- Rear	as shown	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 8.
**see diesel engine Option 8.
***see minimum power requirements in Par. F.5.3.4. .
****Direct in fourth gear (automatic); direct in fifth gear (manual).
******NOTE: Buses ordered in this capacity (77-Passenger) may be either Conventional or Semi-forward Control configuration, at the option of the vendor, unless otherwise specified in the Invitation for Bids.**

DIESEL ENGINES (Option 8)

77-Passenger Conv. ITEM	1993 Min. Rqmts.	B.B. CV200	NIC 3700	Ford B600
Engine Displacement, L.	***	6.6T-I6	7.3N-V8	5.9T-I6
SAE Gross Horsepower	***	170	170	160
SAE Gross Torque, lb-ft	***	420	332	400

***See minimum power requirements in Par. F.5.3.4.

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.5.3.4.).

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	778B3310	1200/1201	3F3403
Chassis available	N,F	B,N,F	N,F	N,F	N,F.

TABLE 26
77-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	N	T	S	T-A	W
77-Passenger FC	1993	Blue Bird All American	NIC	Thomas 1309	Crane	Thomas All-Star	Wayne/ Crane
ITEM	Min. Rqmts.	3611/ TCFC/RE***	3900	MVP	4000		721
GVWR, lbs	29500	35480/30000	29500	30000	29800	30000	31000
GAWR, lbs - Front	11000	12480/12000	12000	11000	12000	11000	12000
- Rear	17500	23000/19000	17500	19000	19000	19000	19000
Axle Capacity, lbs - Front	12000	13200/12000	12000	13200	12000	12000	12000
- Rear	17500	23000/19000	17500	19000	19000	19000	19000
Wheelbase, in	212	223/216	212	238	216	212	212
Diesel Engine Displacement, L.	*	8.3T-I6/ 5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	210/190	190	190	180	190	190
SAE Gross Torque, lb-ft	*	605/475	457	475	445	475	475
Transmission:**							
Automatic, Gears/Model	4 Spd	MT-643[a]/AT-545	AT-545	AT-545	MT-643[a]	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	n/a	n/a	n/a
Brake Lining, in - Front	as shown	15.0 X 4	15.0 X 4	15.0 X 4	15.0 x 4	16.5 x 5	15.0 x 4
- Rear	as shown	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 Size & Load Range	Tubeless 11R22.5G	11R22.5G	11R22.5G	10R22.5G	11R22.5G	10R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	7.5	8.25	7.5	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

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

DEDICATED CNG ENGINES (Option 3A)

77-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	12000

***See minimum power requirements in Par. F.5.3.4.

The following Body/Chassis combinations are available as indicated:

77-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS3705/NS3705	AAFC3611 TCRE3700 TCFC3700	SFT3711	1309/1303	3S/C3706
Chassis Available	N,S	B	N,S	T/T-A	N,W

TABLE 27
83-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Front Engine, Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		B	S	N	W
83-Passenger FC (Front Engine) ITEM	1993 Min. Rqmts.	Blue Bird TCFC AAFC	Crane	NIC 3900	Wayne/ Crane
GVWR, lbs	32200	36200	34200	32200	32200
GAWR, lbs - Front	13200	13200	13200	13200	13200
- Rear	19000	23000	21000	19000	19000
Axle Capacity, lbs - Front	13200	13200	13200	14000	14000
- Rear	19000	23000	21000	19000	19000
Wheelbase, in	229	242	229	229	229
Engine Displacement, L.	*	8.3T-I6	5.9T-I6	5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	210	190	185	210
SAE Gross Torque, lb-ft	*	605	475	485	520
Transmission, Automatic**	MT643	MT643	MT643	MT643	MT-643
Brake Lining, in - Front	as shown	16.5 X 5	16.5 x 5	16.5 x 5	16.5 x 5
- Rear	as shown	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	11R22.5G	11R22.5H	11R22.5H
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

DEDICATED CNG ENGINES (Option 3A)

83-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	13200

***See minimum power requirements in Par. F.5.3.4.

The following Body/Chassis combinations are available as indicated:

83-PASSENGER (FRONT ENGINE) BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	IS3908	3904/3903	SFT3906	1313	3S/C3909
Chassis Available	N	B	N,S	T-A	N,W

TABLE 28
83-PASSENGER FORWARD CONTROL DIESEL BUS
(SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY.)
(Rear Engine, Full Air Brake Standard)

Refer to General Requirements, Page 4

83-Passenger FC (Rear Engine) ITEM	1993 Min. Rqmts.	Blue Bird All American AARE3903	Blue Bird TCRE3904	Thomas Saf-T-Liner 1408
GVWR, lbs	36200	36200	36200	36200
GAWR, lbs - Front	13200	13200	13200	13200
- Rear	23000	23000	23000	23000
Axle Capacity, lbs - Front	13200	13200	13200	13200
- Rear	23000	23000	23000	23000
Wheelbase, in	267	270	277	267
Engine Displacement, L.	*	8.3T-I6	5.9T-I6	8.3T-I6
SAE Gross Horsepower	*	210	210	210
SAE Gross Torque, lb-ft	*	605	484	605
Transmission, Automatic**	MT643	MT643	MT643	MT643
Brake Lining, in - Front	as shown	16.5 x 5	16.5 x 5	16.5 x 6.0
- Rear	as shown	16.5 x 7	16.5 x 7	16.5 x 8.6
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R/22.5H	11R22.5H	11R22.5H	11R22.5H
Wheels - Rear	Dual	Dual	Dual	Dual
Wheels, Rim Size, in	8.25	8.25	8.25	8.25

*See minimum power requirements in Par. F.5.3.4.
**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.5.3.4.).

DEDICATED CNG ENGINES (Option 3A)

83-Passenger ITEM	1993 Min. Rqmts.	Hercules	Tecogen Blue Bird
Engine Displacement, L.	***	5.6L	7.0L
SAE Gross Horsepower	***	190	195
SAE Gross Torque, lb-ft	***	440	315
Front GAWR	as shown	13200	13200

***See minimum power requirements in Par. F.5.3.4.

G. WHEELCHAIR LIFT SPECIFICATION

FLOOR-MOUNTED WHEELCHAIR LIFT, ELECTRIC (HYDRAULIC OR MECHANICAL)

G.1. **GENERAL REQUIREMENTS - When so specified in the Invitation for Bids** (see Options 33, 34, and 35), the 15- through 77-passenger school buses shall be equipped with a wheelchair lift meeting the following requirements. All parts which are not specifically mentioned, that are necessary for the unit to be complete and ready for operation, or which are normally furnished as standard equipment, shall be furnished by the successful bidder. All parts shall conform in strength, quality, and workmanship to industry standards. All wheelchair positions shall be **forward facing**.

1.1. **GENERAL DESIGN** - The lift furnished for these options (see Options 33, 34, and 35) shall be a **floor-mounted**, 12V DC electric-hydraulic or electric-mechanical operated wheelchair lift with a minimum 800 pounds lifting capacity. The vertical lift (platform travel) shall be a minimum of 30 inches. The unit shall be self-contained and mounted directly to the existing bus body floor.

1.2. **DOORS, SPECIAL SERVICE** - One or two special side doors with windows in each door shall be provided as follows:

1.2.1. Design - The special service door(s) may be the standard double swing-out doors or sliding door (with glass) furnished by the chassis manufacturer on vehicles used for converted van buses or the special service doors shall be constructed of zinc-coated steel (G-60) with a minimum thickness of 0.396 inches meeting ASTM A-525. Doors may be either standard widths or as required for the lift furnished. The doors shall extend from the window header to the bottom of the floor line. Doors shall be water- and weather-tight when closed and the lift is in the travel position.

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

1.2.3. Door Operation - The opening and closing operation of the door(s) may be manual, vacuum, pneumatic, or electrical. Controls for doors other than those manually operated shall be located in the driver's compartment and designed for easy manual opening in case of an emergency. (See Par. G.1.8. for lift operating controls.)

1.2.4. Drip Rails - Full length drip rails shall be furnished over the special service doors to direct water away from the doors.

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

1.2.6. Installation - Doors constructed by the body manufacturer shall be installed using piano or butt type hinges and attached to body by means of rivets or bolts, nuts, and lock washers. Neither **metal screws nor self-tapping bolts are acceptable** except for alignment purposes; when used for this purpose these types of fasteners shall be tack-welded at the head.

1.2.7. Rub Rails - Exterior side(s) of special service doors shall have two rub rails with end caps installed at approximately the same level as the side rub rails. Rub rail installation shall be in accordance with the requirements outlined in Paragraphs C.2.9. and E.2.10.

1.3. **ELECTRICAL SYSTEM** - All wiring and wiring connectors used in the construction of the wheelchair lift shall meet the requirements of SAE J561:

1.3.1. Alternator - Wheelchair lift-equipped buses shall be provided with alternators with the following performance for the following sizes of school buses:

1.3.1.1. 15- Through 20-passenger Buses - Type A buses equipped with wheelchair lifts shall have alternators with a minimum electrical output of 100 amperes.

1.3.1.2. 24- Through 77-passenger Buses - A minimum output rating of 130 amperes.

1.3.2. Electrical Insulation - Any component such as the motor, electric wiring, switches, and any connections or parts likely to pose a safety hazard, shall be enclosed in insulated housing(s) to protect passengers and equipment.

1.3.3. Motor - The motor shall be a heavy-duty, 12V DC type, equipped with shaft bearings.

1.4. **ELECTROMECHANICAL SYSTEMS** - Electromechanical hydraulic lift systems shall be furnished with worm screw or similar device for lift action.

1.5. **FRAME AND RELATED COMPONENTS** -

1.5.1. Frame - Frame of lift shall be constructed of **heavy-duty steel** and designed to support the platform extension, toeboard, and other parts necessary for proper operation, plus a minimum of 800 pounds of additional weight. (An aluminum frame may be substituted for steel provided the wheelchair lift warranty is upgraded (see Par. A.10.4.9.).

1.5.2. Platform, Automatic Folding Type -

1.5.2.1. Design - The platform shall be of sturdy construction and covered with minimum 1/8-inch safety plate steel or 1/8-inch expanded metal (open grate) with maximum 3/4-inch openings. The lift platform shall have a minimum 30-inch clear, usable width, unobstructed by the required handrail (See Par. G.1.5.2.2. below). The minimum clear length of the platform between the outer edge barrier and the inner edge shall be 40 inches. Any portion of platform in the folded (travel) position which obstructs window vision shall be covered with expanded metal.

1.5.2.2. Hand Rail - The lift platform shall be equipped with at least one handrail for security. The handrail shall be approximately 25-3/4 inches in height and a minimum 18 inches in length and designed to fold when in stowed position so as not to add to the overall lift projection into the bus.

1.5.2.3. Lift Action - Action of the lift must be power-up and controlled descent with slow (gentle) movement. Design of the platform shall be such that it will be level at all times during the raising and lowering action. A load switch shall be installed on the platform to prevent accidental folding while loading wheelchair passengers.

1.5.2.4. Safety Rails - The platform shall be equipped with safety rails on both sides of minimum 1/8-inch steel and one inch high. The front of the lift shall have a folding type safety rail not less than 3-inches in height. Safety rail folding action may be either manual or automatic.

1.5.2.5. Toeboard - A toeboard shall be furnished that is angled at approximately 8 degrees below the horizontal.

1.6. **HYDRAULIC SYSTEM AND RELATED COMPONENTS** - Electric-hydraulic wheelchair lifts shall be furnished with a hydraulic system for lift operation. The components shall include, but not be limited to, the following:

1.6.1. Hoses and Fittings - Hose, hose fittings, and hydraulic fittings shall meet the requirements of SAE J517, J516, and J514, respectively, for nominal size(s) furnished.

1.6.2. Hydraulic Cylinders - Hydraulic cylinders shall be installed for lift operations. Piston rod diameter of each cylinder shall be not less than 3/4 inch. Cylinders shall have a minimum of 34 inches of extension action and shall be capable of lifting a minimum of 800 pounds in addition to the weight of the lift.

1.6.3. Hydraulic Fluid Reservoir - A reservoir for hydraulic fluid shall be furnished and installed in an accessible location to allow easy checking of the fluid level and filling as necessary. Fluid capacity and type shall be as recommended by the lift manufacturer.

1.6.4.. Hydraulic Valves - The system shall provide valves for the following actions:

1.6.4.1. Override Action - **A bypass valve (or other means) shall be provided to prevent the lifting of the bus by over extending the hydraulic cylinders.**

1.6.4.2. Power Failure - The system shall also be equipped with either a relief valve or other mechanical means for raising or lowering the wheelchair platform in case of power failure.

1.6.4.3. Speed - Adjustable valves shall be provided to control the raising and lowering speed of the lift.

1.6.5. Weather/Dust Protection - Exposed hydraulic cylinders, pumps, and any other parts requiring protection from the weather, or dust, or any other foreign objects for proper durable operation shall be properly sealed.

1.7. **MOUNTING AND INSTALLATION** - Installation shall be such that vibrations will be minimal. The wheelchair lift shall be installed by the bus body manufacturer or authorized dealer for lift manufacturers.

1.7.1. Fuel Access Port (see Par. E.3.1.) - A fuel access port is required on all 35- through 83-passenger buses except front wheelchair equipped buses.

1.7.2. Level Test - The sides of any bus provided with a wheelchair lift shall be within ± 2 inches of each other when measured from comparable points on each side to the ground with the bus empty and parked on a level hard surface (such as concrete). Chassis springs and suspension **shall be adjusted as necessary** to provide a level bus when the additional weight of a wheelchair lift is installed (see paragraphs A.4.5., D.1.1., and F.1.1.).

1.7.3. Mounting - The lift shall be mounted on the front right (curb) side (see Option No. 33) rear curb-side (see Option 34) or front or rear (see Option 35) of the school bus body floor and securely bolted in place (see **NOTE** below). Floor frame shall be reinforced as required to support the lift and load. Lift shall be positioned approximately 36 inches behind the main entrance door for the 18- and 24- through 77-passenger buses leaving sufficient space for one regular bus seat or one wheelchair. **If the body is designed so space specified above is not available, the lift shall be mounted as far forward as practical to minimize floor space loss.** (Tail pipe may be routed anywhere between the frame rails to provide sufficient clearance for the lift.)

NOTE: School District may specify <u>rear</u> curb side mounting of lift and wheelchair positions for the 18- and 24- through the 77-passenger buses only and mounted as above (see Option 34) in order to place the required minimum 30-inch wide aisle in the rear portion of the bus (see Par. C.2.13.4.2. and Par. E.2.13.5.1.). This will increase the seating capacity for regular passengers in the front section since a narrower aisle (minimum 12 inches) may be used in this area. **This option is recommended only for those buses which will have a regular attendant in addition to the driver.**

1.8. **OPERATING CONTROLS AND SAFETY DEVICES** -

1.8.1. Operating Switches - Controls for each movement of the lift shall be through a remote pendant-type control (or equivalent) which has automatic <u>return-to-off</u> switches. Electrical cables shall be good quality copper, covered by heavy-duty rubberized sheath and of sufficient length to allow operation of the lift from inside <u>and</u> outside of bus.

1.8.2. Warning and Safety Devices -

1.8.2.1. Safety Switch - A safety switch shall be installed at or near the service door to prevent operation of the lift except when all **special service doors** are <u>substantially</u> open.

1.8.2.2. Warning Light - **A flashing <u>amber</u> signal light**, mounted near the other dashboard instruments, shall warn the driver when the ignition switch is activated and the special service doors are **open or ajar**, i.e., **not completely closed.**

G. **WHEELCHAIR LIFT SPECIFICATIONS**

G.2. **OTHER REQUIREMENTS** - Wheelchair lift-equipped school buses shall also be provided with the following:

2.1. **FLOOR COVERING** - The floor in the wheelchair area and the area in the lift entryway shall be smooth and free of projections. Aisle floor covering shall be the same as required in Par. E.2.7.

2.2. **FLOORING** - Any plywood flooring used to cover the existing steel floors (e.g., see Par. C.2.5.2.) on wheelchair-equipped buses shall be CDX grade.

2.3. **INTERIOR LAMP, LIFT COMPARTMENT** - The lift compartment shall have one interior lamp installed in the roof panel above the center of the lift compartment; or one lamp shall be installed in the roof panels on each side of the lift door to illuminate the platform entryway area. The lamp(s) shall be minimum 15 candlepower each and shall be one of the approved lamps listed in Par. E.1.7.4.2.

2.4. **SECUREMENT SYSTEM LITERATURE** - The following information shall be provided with each vehicle equipped with a securement system:

2.4.1. Detailed instructions, including a parts list, regarding installation and use of the system.

2.4.2. Detailed instructions, including a diagram, regarding the proper placement and positioning of the system, including correct belt angles.

2.5. **PAINTING** - The interior and exterior of the special service doors lifts shall be primed and painted in accordance with the painting requirements in Par. E.1.10. as follows:

2.5.1. Interior - The interior of the special service door(s) of wheelchair lifts shall be painted to match the manufacturer's standard interior color of the bus on which it is installed.

2.5.2. Exterior - The exterior of special service doors shall be primed and painted in accordance with painting requirements in Par. E.1.10.

2.6. **UNIVERSAL HANDICAP SYMBOLS** - School buses with wheelchair lifts shall display the **Universal Handicapped Symbols** on the front of one side and the rear of the other side below the window line of the bus. These emblems shall be white on a blue background, shall not exceed 12 inches in size, and may be of a high intensity reflectorized material meeting U.S. Department of Transportation FHWA FP-85 Standards.

G.3. **SECUREMENT SYSTEM FOR MOBILE SEATING DEVICE/OCCUPANT** -

3.1. The school bus body shall be designed for positioning and securement of mobile seating devices and occupants in a forward-facing orientation. Securement system hardware and attachment points for the forward-facing system shall be provided.

3.2. Mobile seating device securement system shall utilize four-point tie-downs, with a minimum of two body floor attachment points located at the rear of the space designated for the mobile seating devices and a minimum of two body floor attachment points at the front of the space.

3.3. A Type 2 Occupant Securement System shall provide for securement of the occupant's pelvic lap area and upper torso area.

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.2.5. for plywood requirements including installation requirements). Air-conditioned buses shall have the equivalent of 1-1/2 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 shall be tinted to reduce the heat load of the system, meeting the requirements of Option No. 13 for dark tinting. (**NOTE:** It is not necessary to order Option 13; it must be furnished.)

1.4. WHITE ROOF - **When so specified in the Invitation for Bids** (see Option 38), the roofs of buses equipped with air conditioning shall be painted white, meeting the requirements of Option No. 38 and Paragraphs C.1.4.2. and E.1.4.1.

1.5 EXTRA COOLING - **When so specified in the Invitation for Bids** (see Option 2), additional cooling may be ordered for 15- through 71-passenger school buses. 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 29. (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 29 lists the components and the appropriate ratings required by this specification:

TABLE 29
AIR CONDITIONING COMPONENTS (minimum requirements)

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)
24-35 pass.	53,000	1,300	1	1	1 - rear
47 pass.	78,000	1,900	2	2	1 - 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 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 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 at the direction of, the 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.

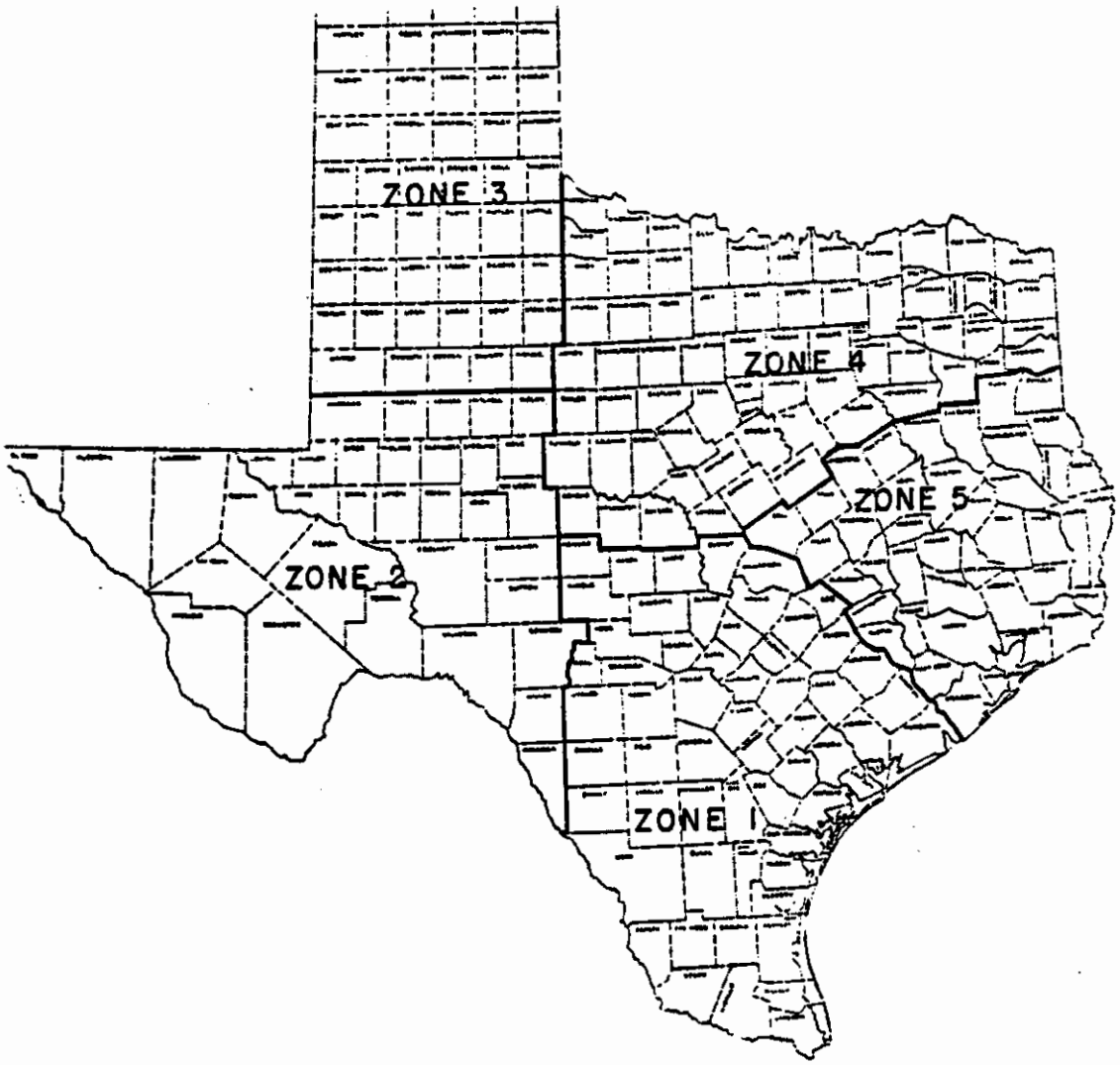
E.5. OTHER REQUIREMENTS -

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.)

FIGURE 3

REQUIRED SERVICE FACILITY ZONES WITHIN THE STATE OF TEXAS



H. AIR CONDITIONING SPECIFICATIONS

5.2. **INSTRUCTION BOOKS** - One copy of complete maintenance and operating instructions shall accompany each air conditioned bus upon delivery. If a parts list is required by the school district the district should contact the vendor supplying the equipment.

5.3. **LABELING** - Each air conditioning unit shall have affixed a legible and durable nameplate with the following information:

5.3.1. Name and address of the manufacturer.

5.3.2. Cooling Capacity of the installed unit (in Btu/hr.), based upon the smallest rating of any component in the system.

5.3.3. Recirculation and ventilation of air quantity (in CFM).

5.4 **WARRANTY** - The complete air conditioning system, including all components, shall be warranted for a period of one year, unlimited mileage, from the date of delivery.

I.1. AVAILABILITY OF SPECIFICATIONS -

Copies of this specification may be obtained from:

General Services Commission
P. O. Box 13047
Austin, Texas 78711-3047
Phone (512) 463-3445

FOR ASSISTANCE

SCHOOL BUSES

NOTE TO SCHOOL DISTRICTS: You may want to communicate with the Commission using this form to describe problems you are having with your school buses. However, you should first attempt to have the complaint corrected by the body vendor or chassis dealer, whichever is applicable. (Please refer to Par. A.10.4. for a list of the names and titles of individuals in the various organizations to contact for service.) Then, if you are not satisfied with the repairs or corrections made, or if nothing is done to alleviate the problem, please use a copy of the following form to inform us.

_____ Date _____
Name of School District

_____ Texas _____
Address City (Zip)

Phone Number _____ Name to Contact _____
(Area Code)

BC Number _____ Date Delivered _____.

Passenger Capacity (Please circle one): 15 16 18 19 20 24 35 47 53 59 65 71 77 83

Body Make (Please check): _ AmeriCoach _Blue Bird _Carpenter _Collins _Lewis _ SturdiCorp _Thomas _Ward _ Wayne_VanCon

Chassis Make (Please check): ____Blue Bird ____Chevrolet ____Dodge ____Ford ____GMC

____Thomas ____Navistar ____Crane Carrier ____TransiCorp

I ____have ____have not (Please check one) contacted body vendor or chassis dealer for assistance.

_____ Firm (Dealer) and Name of Person Contacted

State Nature of Complaint or Problem (please be as specific as you can): _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Use additional Sheets, if required)

Please mail to: **General Services Commission**
P.O. Box 13047
Austin, Texas 78711-3047

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THREE MONTH TEST OF NEW SCHOOL BUS ENGINES

Note to School District: It would be helpful in our deliberation on approval of school bus engines if the attached form could be completed at the end of the test period on the bus engine you have agreed to test and evaluate. Please add any information that you think may be significant. In this test we believe that different drivers should be allowed to drive the bus and give their opinions of its suitability for school bus use.

New Engine Evaluation

(Please check or complete appropriate item)

Description

Engine size: _____ Liters or, _____ CID

Engine type: _____ Gasoline (mono) _____
_____ Diesel (mono)
_____Naturally aspirated _____Turbocharged

Engine Manufacturer _____

Chasis Manufacturer _____

_____ Dedicated alternative fuel (indicate type):
_____ Compressed natural gas (CNG)
_____ Liquefied petroleum gas (LPG)
_____ Other (specify) _____

Rear axle ratio _____

__ Automatic __ Manual Transmission, __ Air conditioner, __ Wheelchair lift, __ Air or __ Hydraulic Brakes,
_____ Tire Size, Luggage Rack __ Top __ Bottom

Installed in _____ passenger _____ bus body
(Body Manufacturer's Name)

BEGIN DATE _____ DISTRICT _____ END DATE _____

Tests

Loaded with approximately 120 pounds for each passenger space with an approximate 150-pound driver, please conduct the following five tests if possible:
(We will need to know if criteria different from that recommended are used.)

1. Acceleration - 0 to 50 MPH in 60 seconds or less: From a standing start on a level stretch of asphalt or concrete highway, record with a stop watch the time required to reach 50 MPH. ____ Time in seconds rounded to the nearest 0.1 second.
2. * Grade of 1.5% minimum @ 50 MPH: From a running start, drive the bus at 50 MPH up a grade of approximately 1.5%. Most federal highways have maximum grades of 3.0% except overpasses which are steeper. Record the speed at the summit _____ Miles per hour.
3. * Grade of 5.0% minimum - @ 25 MPH: From a running start, drive the bus at 25 MPH up a grade of approximately 5.0%. Most state highways have maximum grades of 7.0%. Record the speed at the summit _____ Miles per hour.
4. Startability - 20.0%: If possible locate a grade of approximately 20.0 degrees. (Your local Highway Department engineering may be able to help you locate grades.) Park the bus on the foot of the hill facing upward then start the engine and drive up the hill. If no 20.0% grade is available, use the steepest hill in the district. Est. grade _____ %.

   *** Grades of 1.5% and 5.0% rise 1.5 and 5.0 feet, respectively, in a 100 foot distance.**
5. Speed - 55 MPH: With the engine speed governor connected and operating, determine if the bus will reach a minimum of 55 MPH on a level stretch of asphalt or concrete highway.
   Complies: _____ Yes _____ No

Documentation

6. Record the hubodometer reading at the beginning and end of a 2- or 3-month period and the amount of fuel used. Calculate the overall fuel consumption _____ Miles per gallon.
7. Document any warranty work or other repairs required on the test bus. _____
   _____
8. Note regular maintenance performed and any unusual problems such as excessive oil consumption or fluid leaks.
   _____
   _____

Operation on a Regular Route

Average daily mileage: _____ Miles Starting: _____ O.K. _____ Hard to start

Acceleration: _____ Adequate _____ Poor, Comments: _____

_____

Temperature: Runs _____ O.K. _____ Hot Adequate power fully loaded? _____ Yes _____ No

Oil Consumption: _____ Miles/qt. Regular Route Fuel Consumption: _____ Miles/gal.

Operation on an Activity Trip

Maintain 50 mph Loaded? _____ Yes _____ No Comments: _____

_____

_____

Oil Consumption: _____ Miles/qt. Activity Trip Fuel Consumption: _____ Miles/gal.

Maximum Lawful Speed up Steepest Hill: _____ MPH Power: _____ O.K _____ Need more

List any problems or comments concerning operation on an Activity Trip: _____

_____

_____

Is this engine suitable for transporation needs in your District? _____ Yes _____ No

Signatures _____ _____ Date _____

Superintendent Transportation Director

We thank you for your cooperation and assistance in providing written results of this engine test and the recommendations of your Administration, Drivers and Mechanics.

Earl Tipton	Tommy Crowe	Ken Hailey
TEA	GSC	DPS

TEXAS SCHOOL BUS COMMITTEE

ADDITIONAL REMARKS:

_____

_____

_____

Return To: **General Services Commission**
P.O. Box 13047
Austin, TX 78711-3047

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MAJOR CHANGES FOR 1993

TEXAS SCHOOL BUS SPECIFICATION

No. 070-SB-93

The following is a list of some of the major changes made in the **1993** school bus specifications, which may differentiate from the 1992 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 1993 school buses. Please note that the **1993 SCHOOL BUS ACTION DATES**, previously submitted to you in a separate document is now incorporated into the specification book on the reverse side of the cover letter, which has also been incorporated into the specification book.

PAGE NO.	**ADDITIONS, CHANGES, DELETIONS, etc.**
10	A note has been added to the statement regarding the preparation of the Purchase Requisition. **"PLEASE NOTE THAT THE REQUISITION FORM IS VALID FOR THE CURRENT MODEL YEAR ONLY. THE APPLICABLE YEAR APPEARS AT THE TOP OF THE REQUISITION. USE ONLY A CURRENT FORM. OBSOLETE FORMS WILL BE RETURNED."** Your cooperation in the matter will be appreciated.
12	Option No. 3, **Alternative Fuel Engines** has been **deleted** from this category bus due to unavailability of dedicated alternative fueled engines for these size buses.
13-17	Option No. 3, **Alternative Fuel Engines**, has been modified to allow for only dedicated OEM alternative fueled engines. Option No. 17, **Low Profile Tires**, has been added to the option selection for large buses. Option No. 37, **Wheels, Cast, Spoke, all wheels**, has been eliminated from the Regular Bus Option selection. They are still available as a Special Option.
19	The **TEA Requisition Form** has been up-dated. **PLEASE USE CURRENT FORM.**
96, 98, 101, 103, 104, 105	A sub-table, **DEDICATED CNG ENGINES**, has been added various size buses, **as applicable**. As other sizes and configurations become available, they will be added to the **Approved Products List.** The **MAJOR COMPONENTS CHARTS** have been eliminated. They were causing confusion at the ordering district level.

APPROVED PRODUCTS LIST - SCHOOL BUS BODIES

TEXAS SPECIFICATIONS No. 070-SB-93

Size	Configuration/Mfg.	AMERI-COACH	BLUE BIRD	CARPENTER	COLLINS	STURDI-CORP.	RED BUS	THOMAS	VAN CON	WARD (AMERICAN)	WAYNE
15	Van Conversion or Cutaway	Star	Micro Bird	-	Bantam Roamabus SuperBantam	SturdiVan	-	0402 0412	V-15	VS8	3M10L
16	Commercial Cutaway	-	Micro Bird	SCL1706 SCL1901	-	SturdiBus	Busette 16	0406	-	VS8-16	3M10L
18	Van Conversion	Star	-	-	Bantam SuperBantam	Super SturdiVan	-	-	V-18	-	-
19	Commercial Cutaway	-	Micro Bird	SCL1706 SCL1901	-	Super SturdiBus	Busette 19	0406 0416	-	VS8-19	3M10L
20	Stripped Chassis	-	Mini Bird	WSCV1808 Cadet	-	-	-	0404,0417 0407	-	VS8-20	-
24	Conventional		2103 2307	WSCV2100 WSCV2107	-	-	-	0500 0410	-		-
	Semi-Fwd-Control	-	-	-	-	-	0501	-		-	
35	Conventional Semi-Fwd-Control	-	1808, 2008	77SB1908	-	-	0501	0510,0600	-	SS-17	3F1802
47	Forward Control		FC2000	-	-	-		-	-	KS,KS	3E/C2806
	Conventional		2304	77SB2304	-	-		0710	-	SS-22	3F2300
	Semi-Fwd-Control		-	-	-	-		0701	-	-	-
53	Forward Control		FC2000	77SF22810	-	-			-	KS,KS	3E/C2806
	Conventional		2508	77SB2500	-	-		0810	-	SS-24	3F2503
	Semi-Fwd-Control		-	-	-	-		0801		-	-
59	Forward Control		FC2000	77SF22211	-	-		1103	-	KS,KS	3E/C3009
	Conventional		2900, 2907	77SB2900	-	-		0910	-	SS-26	3F2701
	Semi-Fwd-Control		-	-	-	-		0901	-	-	-
65	Forward Control		FC2000	77SF22211	-	-		1209,1103	-	KS,KS	3E/C3300
	Conventional		3004, 3011	77SB3004	-	-		1010	-	SS-29	3F2905
	Semi-Fwd-Control		-	-	-	-		1001	-	-	-
71S	Forward Control		FC2000	77SF22503	-	-		1309,1203	-	KS,KS	
	Conventional		3201	77SB3201	-	-		1100	-	SS-31	3F3200
	Semi-Fwd-Control		-	-	-	-		1101	-	-	-
71L	Conventional		3208	77SB3201	-	-		1110	-	SS-31	3F/C3200
	Semi-Fwd-Control		-	-	-	-		1101	-	-	-
77	Forward Control		3604, 3611	77SF23707	-	-		1309,1303	-	KS,KS	3E/C3706
	Conventional		3310	-	-	-		1200	-	FCS3704	3F3403
	Semi-Fwd-Control		-	-	-	-		1201	-	-	-
83	Forward Control		3907	77SF23904	-	-			1405,1313	- KS,KS	3E/C3909

070-SB-93 01/01/93

APPROVED PRODUCTS - SCHOOL BUS ENGINES

TEXAS SPECIFICATION No. 070-SB-93

GASOLINE ENGINES
CAPACITY

MANUFACTURER	15	16	18	19	20	24	35	47	53	53C	53HC	63C	63HC	71HC	71LC	71HC	77C	77HC	83HE	83HE
DODGE																				
CID	5.9L		5.9L																	
SAE Gross hp	190		190																	
Axle Ratio	3.54		3.54																	
Trans.Auto.	A727		A727																	
G.M.C.																				
CID	5.7L	5.7L	5.7L	5.7L	5.7L	5.7L	6.0L	6.0L	6.0L	6.0L	7.0L	6.0L	7.0L	6.0L	6.0L	7.0L	6.0L	7.0L		
SAE Gross hp	201	201	201	201	201	201	225	225	225	225	255	215	255	215	215	255	215	255		
Axle Ratio							7.17	7.17	7.17	7.17	**	7.17	**	7.17	7.17	**	7.17	**		
Trans. Auto.	400	400	400	400	400	400	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545		

DEDICATED NATURAL GAS ENGINES
CAPACITY

MANUFACTURER	15	16	18	19	20	24	35	47	53	53C	53HC	63C	63HC	71HC	71LC	71HC	77C	77HC	83HE	83HE
NEWTON																				
Displacement							5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L				
SAE Gross hp							190	190	190	190	190	190	190	190	190	190				
Axle Ratio							**	**	**	**	**	**	**	**	**	**				
Trans. Auto.							AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545	AT545				
MERCEDES/BENZ																				
Displacement											7.0L		7.0L			7.0L		7.0L	7.0L	7.0L
SAE Gross hp											185		185			185		185	185	185
Axle Ratio											**		**			**		**	**	**
Trans. Auto											AT545		AT545			AT545		AT545*	MT643	MT643.

DIESEL ENGINES
CAPACITY

MANUFACTURER	15	16	18	19	20	24	35	47	53	53C	53HC	63C	63HC	71HC	71LC	71HC	77C	77HC	83HE	83HE
CHRYSLER																				
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							5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L
SAE Gross hp							160-190	160-190	160-190	160-190	190	160-190	190	160-190	160-190	190	160-190	190	235	235
Axle Ratio							4.33	4.78	433/456	433/456	433/456	433/456	4.78	433/456	433/456	4.78	433/456	4.63	4.63	4.63
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	MT-643
FORD																				
Displacement	7.3L	7.3L	7.3L				6.6L	6.6L	6.6L	6.6L		6.6L		6.6L	6.6L		6.6L			
SAE Gross hp	180	180	180				165/185	165/185	165/185	165/185		165/185		170/185	170/185		170/185			
Axle Ratio							488/456	488/456	488/456	488/456		488/456		488/456	488/456		488/456			
Trans. Auto.							AT-545	AT-545	AT-545	AT-545		AT-545		AT-545	AT-545		AT-545			
FORD																				
Displacement												7.8L		7.8L	7.8L		7.8L			
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	6.2L	6.2L	6.2L	6.2L	6.2L	6.2L														
SAE Gross hp	164	164	164	164	164	164														
Rear Axle																				
Trans. Auto.	400	400	400	400	400	400														
N.I.C.(7.3L)																				
Displacement						7.3L	7.3L	7.3L	7.3L	7.3L		7.3L		7.3L	7.3L		7.3L			
SAE Gross hp						170	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		6.14			
Trans. Auto.						AT542/5	AT-545	AT-545	AT-545	AT-545		AT-545		AT-545	AT-545		AT-545			
N.I.C.(DEL-360)																				
Displacement							5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L	5.9L		
SAE Gross hp							170/190	170/190	170/190	170/190	170/190	170/190	170/190	170/190	170/190	170/190	170/190	170/190		
Axle Ratio							**	**	**	**	**	**	**	**	**	**	**	**		
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		
N.I.C.(DE-466)																				
Displacement							7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	7.0L	
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	

** = Rear axle ratio, as required.

LEGEND: O=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.

General Services Commission

1711 San Jacinto P.O. Box 13047
Austin, Texas 78711-3047

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February 26, 1993

TO: HOLDERS OF TEXAS SPECIFICATION NO. 070-SB-93 (1993 SCHOOL BUSES)

RE: Amendment # 1

Please remove the following pages from your copy of this Texas specification: **1-2, 7-8,** and **19-20,** 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):

"Am. # 1 02/26/93 Changed by . . ."

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

Your attention is specifically directed to the change on the "School Bus Purchase Requisition" form found on pages 19 and 20, where we have added a reporting requirement under the Alternative Fuel Certification, Section B. If applicable, please indicate the TYPE of alternative fuel to which the bus will be converted.

Thank you for your cooperation.

Sincerely,

Ron Dyer
Specifications Technician

RCD

Enclosures

cc: Ralph Simonson
School Bus Committee:
Mr. Tipton
Mr. Hailey
Mr. Crowe

EFFECTIVE DATE:
January 01, 1993

TEXAS SPECIFICATION
No. 070-SB-93
Supersedes No. 070-SB-92

SPECIFICATION

for

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 (**"CAPACITY" is based upon national height and weight percentile averages as specified in Federal Highway Safety Program Standard No. 17. See Par. B.1.2.**):

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 will 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.

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. The State of Texas requires that MPVs used as school buses 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.

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 **GSC** mean 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. **SCAAN** means a computer analysis of engine performance.
2.20. **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.
2.21. **Vendor** means a manufacturer's representative or dealer authorized to make sales and supply parts and services in Texas.
2.22. **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** - Supt. 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 Roll-over 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.**

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

7.3. **DELIVERY TIME** - Buses may be delivered to the receiving school districts only between the hours of 8:00 a.m. and 4:00 p.m. Monday through Friday, excluding holidays. Deliveries at other times are not to be made without at least 24 hours notice and only then with the expressed consent and approval of the receiving school district. The person delivering the bus shall present a delivery receipt to the responsible school personnel and obtain that school official's signature before delivery is considered complete. (See Par. A.7.6.)

7.4. **LATE DELIVERIES** - Failure by the vendor to deliver buses, caused directly by natural disaster, war, civil disturbance, Federal Law and regulations, or labor disputes, which is beyond control of the contractor, will not cause the damages described in Par. A.7.2. above to be assessed.

7.5. **LATE DELIVERY NOTIFICATION** - At least 20 days in advance of the final delivery date, the successful, complete unit bidder shall notify the Commission and the receiving school district in writing, when a known delay precludes delivery of a unit on time.

In addition, a vendor who has orders for buses which have not been delivered in accordance with the terms of the purchase order shall submit a monthly report to Purchaser U, Purchasing Division, General Services Commission by the 15th of each month. The report shall contain the following information: (1) purchase order number, (2) school district name, (3) reason for the late delivery, (4) current status and (5) expected delivery date.

7.6. **PRE-DELIVERY SERVICE** - The vendor or the vendor's representative who is responsible for the final delivery shall attach a signed certificate to the bus stating that the following service was performed and that inspection indicates the bus is in good condition and ready for delivery. The following service on the chassis and body shall be performed before the bus is delivered to the receiving school district:

7.6.1. Chassis lubrication, complete.
7.6.2. Check all fluid levels and maintain proper grade and types of fluids.
7.6.3. Clean and wash interior and exterior of bus.
7.6.4. Pre-delivery inspection and service on chassis.

A.8. **INSPECTION** - Inspection shall be by and at the discretion of this Commission or its designated agent and may be performed either at the place of manufacture, at the vendor's facility in Texas, or at the final destination, or a combination of these. The authorized State Inspector shall have access to the manufacturer's plant during all normal working hours in order to make all necessary inspections during the process of manufacture and assembly. This does not preclude the school districts' personnel from making inspections during manufacture or after acceptance of delivery. The school district's personnel are urged to make detailed inspections, especially upon delivery, and report any discrepancy or discrepancies to the Commission. Any such discrepancies found during or after manufacturing shall be immediately corrected to the satisfaction of the Commission, at no charge, by the manufacturer or distributor.

A.9. **TERMS, INVOICING AND PAYMENT** -

9.1 **INVOICE, VENDOR'S** -

9.1.1. **School District's Copies** - The vendor shall submit the invoice to the school district at the address shown on the purchase order. The invoice must certify that the buses delivered meet or exceed the requirements and conditions of this specification. (See Par. A.6.3.)

9.2. **PAYMENTS, DISPUTED** - If the school district believes that there is an error in an invoice submitted for payment, the school district shall notify the vendor who submitted the invoice of the alleged error not later than the 21st day after the date on which the invoice is received. A copy of the notice to the vendor shall be forwarded to the General Services Commission, Purchaser U.

A.10. **WARRANTY AND SERVICE** -

10.1. **CONTRACTOR'S RESPONSIBILITY** - Each successful bidder is ultimately responsible for and must assure the State that any warranty service shall be performed to the satisfaction of the Commission, regardless of whether the successful bidder or the bidder's agent performs the warranty work on school buses (see Par. A.10.4.). If there is a question of whether it is the responsibility of the body or the chassis manufacturer to repair a given defect, then it shall automatically become the prime contractor's and/or successful bidder's responsibility to see that the repair(s) is made to the satisfaction of the receiving school district and this Commission.

10.2. **DEFECTIVE WORKMANSHIP** - In the event that an error is discovered or conclusive proof of defective workmanship and/or materials is found on any body or chassis after acceptance and payment has been made, the successful bidder shall make such repairs as required at the vendor's expense.

10.3. **PENALTIES** - Upon refusal of the prime contractor and/or successful bidder to make satisfactory adjustment(s), the Commission reserves the right to claim and recover from said prime contractor and/or successful bidder by due process of law, such sums as may be sufficient to correct the error or make good the defect in material and/or workmanship.

10.4. **WARRANTY WORK AND GENERAL TERMS OF WARRANTIES** - The Commission's purchase orders for school buses are issued to a single distributor or vendor. This distributor or vendor has the ultimate responsibility of insuring the delivery of a bus that meets Texas specifications in all details and is free of defects in materials and workmanship. In addition, the bus body and chassis are warranted against defects in materials and workmanship by the bus body manufacturing company and the chassis manufacturer, respectively. The warranty on a school bus is thus a dual warranty. The following are general terms of the warranties; however, for specific coverage of any item on a school bus, please refer to the warranty literature provided at time of vehicle delivery.

NOTE: WARRANTY REGISTRATIONS MUST BE COMPLETED AND MAILED TO INITIATE WARRANTY.

10.4.1. Air Conditioner - Basic coverage for chassis and body parts is for 12 months as specified in manufacturer's warranty pamphlet. The air conditioning manufacturer shall have service facilities available in each of the 5 zones within the State of Texas (see Fig. 3). (For service on units provided by chassis manufacturer, contact local chassis dealer; for service on other makes, contact the vendor.)

10.4.2. Automatic Transmission - Basic coverage is for 12 months, 12,000 miles, whichever occurs first, and as more specifically defined in the manufacturer's warranty pamphlet included with delivery of the vehicle. (For service, contact the chassis or transmission dealer, or authorized service outlet as specified in the warranty pamphlet.)

(1) Allison Transmission Division (ATD) transmissions are warranted for 36 months, unlimited mileage, at 100% cost of parts and labor. An extended warranty for 48 months or 60 months is available at extra cost.

10.4.3. Batteries - 12 months or 12,000 miles, whichever occurs first. (For service contact the local dealer as specified in the battery warranty pamphlet.) Battery warranties are included with the chassis warranty.

10.4.4. Bus Body - A minimum of 12 months beginning on the date of delivery to the user. For service contact the vendor identified on the school bus purchase order issued by the Commission.

10.4.5. Bus Chassis - 12 months or 12,000 miles, whichever occurs first, beginning on the date of delivery (see delayed chassis warranty, Par. A.10.4.6., below). For warranty service and repairs on the bus chassis:

10.4.5.1. **First**, contact the chassis dealer recommended by the vendor (as shown on the school bus purchase order issued by the Commission) or any other convenient chassis dealer. If the problems are not satisfactorily resolved,

School Bus Purchase Requisition

District Name _____ | Texas Specification No. 070-SB-93 | County-District No. _____

Effective 1/93 - 12/93

TEXAS EDUCATION AGENCY
Transportation Division
1701 North Congress Avenue
Austin, Texas 78701-1497

SCHOOL REQ. # _____

STATE REQ. # _____

FOR TEA USE ONLY
Approved by: _____
Date: _____

Authority for Data Collection: TEC 11.12 and 21.165
Planned Use of Data: Required informtion 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) 463-9185.

Section I—Bus Requirements

Quantity: _____
Size: _____ —Passenger School Bus
(See Par. B.1.2 for Reduced Passenger Capacities)

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

Type: ____ Conventional
____ Forward Control

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

_____ 1. **Air conditioning,** standard cooling
_____ 2. **Air conditioning,** extra cooling (n/a for 77-83 pass. buses)
_____ 3. **Alternative fuel engines, Dedicated-O.E.M. Supplied** (Select from A or B)
  _____ 3A. **Compressed Natural Gas (CNG)**
  _____ 3B. **Liquefied Petroleum Gas (LPG)**
_____ 4. **Alternator,** increased capacity
_____ 5. **Axle, Rear, Two-speed** (24-71-pass. buses only)
_____ 6. **Brakes, Hydraulic** (59-77-pass. buses only)
_____ 7. **Chassis, Long Wheelbase** conventional 24 and 71 pass. buses only)
_____ 8. **Diesel Engine**
_____ 9. **Differential, No-spin** (24-71 pass. buses only).
_____ 10. **Door, Powered Service** (n/a with automotive type door)
_____ 11. **Door, Service,** Automotive sedan-type, manually operated for 18 and 19 pass. buses only)
_____ 12. **Fuel Tank, Increased Capacity** (15-24 and 83 pass. buses only)
_____ 13. **Glazing, Dark Tint Passenger Side Windows** (min. 30%, max. 40% light transmittance.)
_____ 14. **Heater, Rear** (auxiliary)
_____ 15. **Knee spacing** (maximum; requires deleting one row (8 positions) of seats which will reduce seating capacity).
_____ 16. **Laminated Safety Plate Glass**
_____ 17. **Low Profile Tires** (24-83 pass. buses only)
_____ 18. **Mud Flaps, with Brackets, Mounted**
_____ 19. **Reflective material**
_____ 20. **School Name Lettering** (*type* EXACTLY as required):
_____

_____ 21. **Seat Backs, Increased Height**
_____ 22. **Seat Belts** (standard on all 15-20 passenger buses)
_____ 23. **Security System Lock, All Doors**
_____ 24. **Sound Abatement Insulation**
_____ 25. **Option Deleted**
_____ 26. **Strobe light, Roof-mounted**
_____ 27. **Tachograph**
_____ 26. **Tachometer** (to indicate engine RPM)
_____ 29. **Tires, Mud and Snow Tread**
_____ 30. **Tool Compartment**
_____ 31. **Wheel, Spare** (without carrier and tire/tube)
_____ 32. **Wheel, Spare, Mounted** (with carrier, but without tire/tube)
_____ 33. **Wheelchair Lift, Folding Platform Type, Front Curb Side Mounted** (24-71 pass. buses *only;* with _____ wheelchair positions. *Will reduce seating capacity.*)
_____ 34. **Wheelchair Lift, Folding Platform Type, Rear Curb Side Mounted** (24-71 pass. buses *only;* with _____ wheelchair positions.*Will reduce seating capacity.)*
_____ 35. **Wheelchair Lift, Folding Platform Type, Right Curb Side Mounted** (15-20 pass. buses *only;* with _____ wheelchair positions. *Will reduce seating capacity.*)
_____ 36. **Wheelchair Restraints, Webbed-belt Type** (15-71 passenger buses only)
_____ 37. **Option Deleted**
_____ 38. **White Roof**
_____ 39. **Windows, push-out,** additional, for emergency exit. Indicate extra number requested, per side _____

NOTES: Discard all previous editions of this form. Use only this form to order 1993 school buses. NA means Not Available/Not Applicable. Return this form with a copy and any attachments to TEA at the address shown above.

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

Typed Name of Superintendent	Date	Telephone	Signature

NOTE: THE SIGNATURE OF THE SUPERINTENDENT AND THE FOLLOWING INFORMATION MUST BE COMPLETE TO PROCESS THIS REQUISITION -
Number of motor vehicles used for transporting school children _____
If more than 50, the alternative fuel certification on the reverse must be completed.

District Name _____ County-District No. _____

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

A. _____ F. _____

B. _____ G. _____

C. _____ H. _____

D. _____ I. _____

E. _____ J. _____

ALTERNATIVE FUEL CERTIFICATION

A. ___ This requisition is for the purchase of an dedicated alternative fueled school bus with an original equipment manufactured engine. The alternative fuel is to be _____ (indicate CNG, LPG, electricity or other fuel designated as an alternative fuel in the rules of the Texas Air Control Board).

B. ___ This requisition is for the purchase of a school bus that will be converted to alternative fueled operation. The alternative fuel is to be _____ (indicate CNG, LPG, electricity or other fuel designated as an alternative fuel in the rules of the Texas Air Control Board). By signature hereon, we certify the anticipated conversion date is _____ days following delivery. We also understand that the conversion must be completed prior to the bus being placed in service, unless undue hardship would result. In the case of potential undue hardship, the Commission may approve use of the vehicle for one or more periods of 90 days following delivery before it is converted to alternative fuel operation.

C. ___ A valid, current waiver, number _____, is on file with the General Services Commission.