TABLE NO. 9

STEEL COMPONENTS NOMINAL METAL THICKNESSES AND ZINC COATING DESIGNATIONS

ITEM NUMBER	COMPONENTS	THICKNESS, IN.	METAL ZINC COATING DESIGNATION
1	Bows, Frames	.0635	G60
2	Bows, Roof	.0635	G60
3	Cowl, Front	.0635	G60
. 4	Doors, Emergency and Service:		G60
4a	Exterior Panel	.0396	G60
4b	Interior Panel	.0336	G60
5	Door Posts:		
5a	Emergency Door	.0785	G60
6	Floor Panels	.0785	G60
7	Longitudinal Frame Members:		
7a	Floor Line	.0635	G60
7b	Seat Line	.0635	G60
7c	Belt Line	.0635	G60
7d	Window Header Line	.0635	G60
8	Panels, Exterior:		
8a	Front	.0396	G60
8b	Rear	.0396	G60
8c	Roof	.0396	G60 or A60
8d	Side	.0396	G60 or A60
8e	Skirts	.0396	· G60
9	Panels, Interior:		
9a	Headlining	.0336	G60 or A60
9b	Front Lap	.O336	G60 or A60
9c	Rear Lap	.0336	G60 or A60
9d	Lower (below windows)	.0336	G60 or A60*
10	Posts, Side	.0635	G60
11	Rub Rails:		
lla	Skirt Line	.0635	G60
11b	Floor Line	.0635	G60
11c	Seat Line	.0635	G60
11d	Window Line	.0396	G60
12	Wheel Housing	.0635	G60
13	Window Sills	.0396	G60**

*NOTE:

Lower interior embossed panels (Item No. 9d) and stepwell wall panels shall be clear-coated galvanized steel, ASTM designation A446-76, or Galvalume, aluminized steel, or aluminum over steel.

••NOTE: It is mandatory that all components listed in Table No. 9 be of the following types of steel, **unless** otherwise specified, and except Item No. 13 may be of aluminum alloy 6063-T6 having a minimum thickness of 0.062 inch. Any and all other metal components not listed in Table No. 9 may also be zinc-coated steel:

- TYPE I
 (Regular) ASTM Specification A525, coating designation G60, as specified, mill zinc-coated steel. Coated steel, except components not to be primed and painted, shall have a smooth minimized spangle surface which has been zinc phosphate treated by the steel mill or by the bus body manufacturer.
- **TYPE II** (Alloyed) ASTM Specification A525, coating designation A60, mill zinc-coated steel which has been zinc phosphate treated by the steel mill or by the bus manufacturer.

Standard ANCI tolerances allowed for metal thickness requirements.

- 2.1.3 **Body-Cowl Attachment -** Buses equipped with chassis manufacturer's cowl shall be furnished with the body securely attached to the rear face of the chassis cowl with a minimum of 9 bolts, nuts, and lock washers. On all such buses the junction between cowl and body shall be sealed to form a gastight and watertight seam. The sealant used shall be either the best grade of molded or extruded rubber weather stripping or a good quality, pressure applied, silicone elastomer sealant.
- 2.1.4 **Bus Body Length** The bus body shall extend to, or farther than, the end of the chassis frame so that all main cross members and auxiliary cross members will rest upon the chassis frame. The distance from the end of the chassis frame and the rear of the body shall not exceed 6 inches.
- 2.1.5 **Caulking** A flexible, tenacious, high quality caulking compound or adhesive shall be applied to the top of all rub rails, all unwelded metal joints, and to any place where moisture could enter through the exterior panels. This does not include the fresh air intake or heater or drain openings at the bottom of the rub rails. The compound shall be applied to the required areas in a neat and workmanlike manner without voids or skips.
- 2.1.6 **Chassis Frame Alterations** The body manufacturer shall not in any manner alter the 24- through 83-passenger chassis frame except to cut off the rear portion of the frame where necessary to weld bumper braces, and to lengthen the frame in order to comply with the requirements of Par. F.3.1. None of the rivets in the chassis frame shall be cut flush with the frame or removed. The body manufacturer may alter the chassis frame to adapt standard chassis to forward control. (Any change must have body manufacturer's warranty.)
- 2.1.7 **Exhaust Pipe Extension** The body manufacturer shall furnish and install an exhaust pipe extension when necessary in order to insure compliance with the chassis requirements of the exhaust system (see Par. F.5.5). The tail pipe shall not extend beyond the rear bumper.
- 2.1.8 **Fasteners, Bolts and Rivets -** All bolts and rivets used in the manufacture of the school bus body shall be high strength metal. All bolts shall be equipped with lock washers or other acceptable devices to prevent loosening under vibration. All bolts, nuts, and washers except U-bolts, their nuts and washers, shall be parkerized, cadmium-plated, or otherwise rustproofed.
- 2.1.9 **Fasteners, Other -** Sheet metal screws or self-tapping bolts of any type shall not be used in the construction of bodies except:
 - 2.1.9.1 Alignment* of doors or in conjunction with rivets, welds, or bolts for compliance with FMVSS No. 221, as applicable, or,
 - 2.1.9.2 Attachment of exterior mirrors in certain cases (see Par. E.3.8.5), or,
 - 2.1.9.3 Electrical wire moldings and light fixtures
 - 2.1.9.4 Installation of header pads over the doors, or
 - 2.1.9.5 Installation of rub rails or emergency door handles and latches where it is impossible to use rivets or bolts, nuts, and lock washers and then only when these fasteners are used in conjunction with the manufacturer's standard metal adhesive which is used to meet joint strength requirements, or,

- 2.1.9.6 Interior panels which must be removed to give accessibility to other interior or concealed components, or,
- 2.1.9.7 Seat construction (See Par. E.2.13.5.2), or,
- 2.1.9.8 Window frames when applied with the metal adhesive.

*When self-tapping bolts are used to align doors, they shall be tack-welded at the head or applied with the metal adhesive and shall not exceed the number of rivets, or bolts, nuts, and washers installed in the door hinges.

- 2.1.10 Front Body Section, Semi-forward Control Bodies On semi-forward control 24through 71-passenger buses, the front body section of the school bus from the windshield forward shall be of the bus body manufacturer's standard design and shall contain, but not be limited to, the following components:
 - 2.1.10.1 **Fenders** Properly braced fenders with the total spread of the outer edges exceeding the total spread of the front tires when the front wheels are in the straight-ahead position.
 - 2.1.10.2 **Grille -** A sufficiently reinforced grille assembly.
 - 2.1.10.3 **Hood** Hood cover with latching mechanism providing access to the forward part of the engine.
 - 2.1.10.4 **Lamps -** Headlamps and parking/turn-signal lamps as required by FMVSS No. 108.
- 2.1.11 **Fuel Filler Opening** The body manufacturer will provide an opening in the body panel of sufficient size to allow easy access and entry of fuel nozzle to the fuel tank filler neck opening. This opening in the panel must be so positioned that the filler neck, when viewed at right angles from the side, is approximately centered in the cut-out. This opening shall be provided with a hinged cover so designed and constructed to remain open when fueling is in progress and remain in a totally closed position at all other times (see Par. E.2.10.3.1).
- 2.1.12 **Identification Plate** Each body shall bear in a prominent place a permanently attached plate showing the name of the manufacturer and the body serial number (see Par. A.6.4.2).
- 2.1.13 **Steering Wheel Placement -** There shall be at least a 2-inch clearance between the steering wheel and the cowl, instrument panel, or any other surface.
- 2.1.14 **Wood** The use of wood shall be limited to the construction of passenger seats, seat backs, or header pads, and the bottom of any tool compartment or to insulate floors.
- 2.2 ACCESS PANELS Any panel used for access to the engine radiator or radiator overflow container and installed in the passenger compartment shall have a keyed lock. (This does not include the engine cover.)
- 2.3 **BATTERY COMPARTMENT -** If the battery is mounted on the chassis frame (which is required on diesel-powered buses), the bus body manufacturer shall provide a battery

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

- 2.4 **BODY FRAME** The complete body frame shall be formed, welded, riveted, or lock bolted, assembled and constructed in accordance with recognized engineering practices within the bus body industry.
 - 2.4.1 **Design -** The frame shall have a formed shape with a minimum cross sectional depth of 1-1/8 inches. Frame members, running from one side main cross member to the other side main cross member, may be continuous bow frames, or they may consist of side posts and roof bows. If side posts and roof bows are used, every pair of side posts must be connected by a roof bow to form the equivalent of a continuous bow frame. The side posts shall be set on not more than 30-inch centers, except that one side post and bow or one bow frame may be set on a maximum of 38-3/4 center, or three bow frame sections not exceeding 36-1/2 inches may be used in any one body (up to four 38-3/4 inch body frame sections may be used for Forward Control Rear Engine buses <u>ONLY</u>). Each of the side posts or bow frames shall be securely welded, riveted, or lock bolted to the floor system at each main cross member or to the longitudinal frame member which is located at the floor line. Each side post and/or bow frame must also be attached, as specified above, to the remaining longitudinal frame members.
 - 2.4.2 **Front Frame Section -** The front frame shall be a unitized framework of formed sections designed with the necessary stress members required to withstand the torsional stresses set up by or in the chassis. The corner posts shall extend from the bottom of the body to the windshield header and shall not cause or produce a "blind spot" for the driver. The front assembly shall be securely attached to the floor system by lock bolting, welding, or riveting and shall be securely bolted to the chassis cowl in such a manner as to <u>not</u> to cause undue strain (see Par. E.2.4.1).
 - 2.4.3 Longitudinal Frame Members The body frame shall have not less than four individual side longitudinal frame members extending the full length of the body (except as interrupted by side posts or when cut for an opening for the wheelhousing). One each shall be located at the floor line, the seat line, the belt line, and at the window header line. The belt line longitudinal member may be replaced by an exterior rub rail, i.e., an extra rub rail in the belt line area. This rub rail shall meet requirements specified under RUB RAILS, Par. E.2.10.
 - 2.4.4 **Material** The body frame system (see Par. E.2.1.1) shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal, and shall meet the requirements of FMVSS No. 220.
 - 2.4.5 **Rear Frame Section -** The rear frame shall consist of a formed sill, two posts (one on either side of the emergency door, extending from the sill to the roof bow and intersected by a rear header at the proper point), and suitable strainers to form a

rigid framework. This framework shall be assembled and attached to the floor system by welding, riveting, or lock bolting.

- 2.5 **EMERGENCY EXITS** Texas school buses shall be provided with emergency exits which comply with FMVSS 217 and those requirements as listed below:
 - 2.5.1 **EMERGENCY DOORS** The emergency door shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal. Emergency doors on buses furnished to this specification shall be equipped with doors meeting the requirements below. Emergency doors shall be furnished with upper glass panels, permanently closed, set in rubber or sealed against rubber. (See Par. E.2.19.2 for glazing requirements and Par. E.1.4.4 for lettering.) No seat or other object shall be placed in the body that restricts the passageway to the emergency door to less than 12 inches. There shall be no steps leading to the emergency door.
 - 2.5.1.1 Attachment The hinges for the emergency doors shall be attached with rivets or bolts, nuts, and lock washers. Metal screws or self-tapping bolts are not acceptable. Metal screws may be used for alignment of doors while installing rivets. Self-tapping bolts may be used for alignment if the bolt heads are tack-welded to the hinges (see Par. E.2.1.9.1).
 - 2.5.1.2 **Design** The emergency door on all except rear-engine buses* shall be located in the center of the rear of the body and shall have a minimum horizontal opening of 30 inches and a minimum vertical opening of 48 inches measured from the floor level. The door shall be hinged on the right side of the body **(forward side for rear engine buses)**, shall open outward, and shall be designed to permit opening from both inside and outside of the bus. It shall be properly sealed against moisture and dust.

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

- 2.5.1.3 **Door Holding Device -** A means (device) shall be provided to hold the swing-out type door(s) in the fully opened position (90° minimum).
- 2.5.1.4 **Glass Panels** The glass in the emergency door shall have an area of not less that 299 square inches and shall be set solid in a waterproof manner (see Par. E.2.19.1.1). The installation of glass in the lower portion of the door is required and shall meet the same requirements (lower glass panels not required in the emergency doors of rear engine buses). The lower glass panels shall be the body manufacturer's standard size. These glass panels shall be installed securely to prevent removal by hand.
- 2.5.1.5 **Header Board** The head impact area on the inside at the top of the emergency door shall be protected by an energy-absorbing, padded header board, 3 inches wide and one inch thick, extending the full width of the emergency door to prevent injury when accidentally impacted.
- 2.5.1.6 Latch The emergency door shall be equipped with a slide bar rack and pinion (cam) operated latch. The slide bar shall be approximately 1-1/4 inches wide and 3/8-inch thick and shall have a minimum stroke of 1-1/8

inches. The slide bar shall be spring loaded so as to retain the bar in the closed position and have a minimum of one inch of horizontal bearing surface beyond the edge of the door frame when the door lock is in a latched position.

- 2.5.1.7 Latch Handle The movement of the lock handle through its full arc of operation shall not be obstructed by, or extended into the area behind the rear seats at the emergency door. The handle, when in the closed position, shall meet the requirements of FMVSS No. 217. The design of the latch handle shall allow quick release, but shall offer protection against accidental release. Control of the fastening devices from the driver's seat shall not be permitted. A pull handle shall be installed on the inside of the emergency door so that the door can be securely closed for positive fastening. Provisions for opening from the outside shall consist of a handle (device) designed to prevent "hitching a ride" yet allowing the door to be opened when necessary. The outside handle, when in the closed position, shall extend vertically downward from its pivot center.
- 2.5.1.8 **Switch** The emergency door latch shall be equipped with a heavy-duty electric plunger-type switch connected to a warning buzzer located in the driver's compartment. The switch shall be enclosed in an adequately protected case, and wires leading from the switch shall be concealed in the walls. The switch shall be mounted plumb, parallel, and perpendicular to the striker plate of the lock slide bar. The switch shall be installed so that the buzzer will sound before the door handle is turned far enough to permit the door to open. The switch shall be Cole-Hersee's No. 9118, having an upset end (knob) on the plunger head.

2.5.2 Emergency Exit Requirements

Type A, B, C, and D vehicles shall be equipped with a total number of emergency exits as follows for the indicated capacities of vehicles. Exits required by FMVSS 217 may be included to comprise the total number of exits specified.

0 to 42 Passenger = 1 emergency exit per side and 1 roof hatch.

43 to 78 Passenger = 2 emergency exits per side and 2 roof hatches.

79 to 90 Passenger = 3 emergency exits per side and 2 roof hatches.

Each emergency exit above shall comply with FMVSS 217. These emergency exits are in addition to the rear emergency door or exit.

In addition to the audible warning required on emergency doors by FMVSS 217 additional emergency exits may also be equipped with an audible warning device.

2.6 **FLOORS** - The floor system (see Par. E.2.1.1.3) shall be of the type, grade, and thickness of steel specified in Table No. 9 or approved equal (see Par. E.3.1 for requirements for access port to fuel sending unit).

- 2.6.1 **Construction and Installation** The floor panels shall run the full width of the floor and shall be supported on all outside edges by a longitudinal frame member. The floor panels shall be welded, riveted, or bolted to the main and auxiliary cross members and shall be joined so as to form a leakproof and dustproof floor. The main and auxiliary cross members shall extend the full interior width of the floor panels. The side posts or bow frames shall be securely welded, riveted, or bolted to the floor system and to the longitudinal frame members or gussets.
- 2.6.2 **Cross Members** The cross members shall be spaced not more than 10 inches center-to-center. The floor panels and cross members shall be designed so as to completely and adequately support all fixed and changeable loads under all operating conditions without deformation of the underbody structure, strains to body, or fractures of member joints. The design and strength of the understructure shall be sufficient to eliminate the necessity of installing outriggers attached to the chassis except at the front entrance. The undersurface of the entire floor structure, including wheelhousing and stepwell, shall be sprayed with material at least 1/8-inch thick conforming to that specified in Par. E.1.11.
- 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 must be permanently bonded to floor and must not crack when subjected to sudden changes in temperature. bonding or adhesive material shall be waterproof and shall be a type recommended by the manufacturer of floor-covering material. All seams must be sealed with waterproof sealer.
- 2.7.3 **Trim** Seams shall be covered with extruded aluminum metal strips of a minimum 3/16 inches high and 1 inch wide that shall be installed on each side of the aisle, the full length of the aisle, so as to secure both the edges of the aisle covering and adjoining edges of the underseat covering. Each aisle strip shall consist of not more than three pieces of the metal stripping. The strips shall be secured to the flooring with flush-mounted flat or low profile oval head screws; holes for the screws shall be countersunk. The screws shall be placed not more than 9-inches apart for the full length of the metal strips except that the ends of each piece of stripping shall have screws placed at not more than 3/4 inches from each end. Screws may be placed 9-1/2 inches apart only to avoid interference with floor sill members.
- 2.7.4 **Underseat Material** The floor in the underseat area (including wheelwells, and the areas under the driver's seat, wheelchairs, and toeboard except transmission

inspection plate) shall be covered with fire-resistant rubber floor covering or equivalent having minimum overall thickness of 1/8 inches. Floor covering on toeboard shall be held in place by trim strip or molding.

2.8 PANELS, EXTERIOR -

- 2.8.1 Attachment and Installation All exterior panels shall be attached to bow frames and strainers so as to act as an integral part of the structural frame. They shall be installed by lapping and riveting, lapping and bolting, or by flanging and bolting and in such a manner as to form watertight joints. The exterior side panels shall be installed either vertically or longitudinally. Vertical panels shall be one-piece and shall extend from the window line to or below the floor line. Longitudinal panels shall be installed starting at or below the floor line and extending upward to the window line with each ascending panel overlapping the preceding panel. Rub rails shall not be considered as part of the paneling for covering the side except for pressed-in window rails.
- 2.8.2 **Design -** The front and rear exterior panels shall be formed into the desired contours to give a smooth, pleasing appearance to the bus. The front and rear exterior roof panels shall be of not more than three pieces welded or riveted together to form a continuous piece over the front and rear frame.
- 2.8.3 Joints Joints shall meet the requirements of FMVSS No. 221.
- 2.8.4 **Material** All exterior panels (see Par E.2.1.1.2) 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 Holes 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. Driver's seat supplied by the body company shall be a high back suspension seat with a minimum seat back adjustment of 15 degrees, not requiring the use of tools, and with a head restraint to accommodate a 95th percentile adult male, as defined in FMVSS 208. The driver's seat shall be secured with nuts, bolts, and washers or flanged-headed nuts.
- 2.12.2 Driver's High Back Seat. Optional When so specified in the IFB, 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. Driver seat positioning and range of adjustments shall be designed o accommodate comfortable actuation of the foot control pedals by 95% of the male/female adult population.

- 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 IFB (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/or 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.**

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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).









SIDE VIEW

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.	2.0
Tensile Strength, lbs/square inch. Min	10
Tensile Elongation, %, Min	150
Tear Resistance, labs/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 <u>+</u> 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. Flip seats meeting the requirements of FMVSS 217 may be utilized at a location to accommodate side emergency exits as required by FMVSS 217. 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 minimums 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.
- 2.13.5.4 **Track Seating** Seats may be track mounted in conformance with FMVSS 222. if track seating is installed, the manufacturer shall supply minimum and maximum seating spacing dimensions applicable to the bus, which comply with FMVSS 222. This information shall be on a label permanently affixed to the bus.
- 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. A suitable device (or devices) shall be designed and installed to prevent injury or fatality of passengers from being dragged. At least one such device shall assist passengers during entry or egress, and be designed to eliminate entanglement.
- 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). The design shall provide a smooth installation which would eliminate the possibility of clothing or other articles becoming caught upon ingress or egress from the vehicle.
- 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 two piece 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 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 IFB(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 IFB (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 IFB (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 the rearward window 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.
 - 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. These windows shall include a metal stop pin, bar, or similar device to ensure that the windows can be lowered only within the mandatory limit. These latches and related mechanism (excluding the thumb regulator) shall be manufactured of metal. When in a closed position, all windows shall be weather-tight.
 - **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 IFB (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.
 - 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 (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.

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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.
- 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

3.5 HEATERS AND RELATED COMPONENTS -

- 3.5.1 **Bleeder Valves -** Any heater(s) installed by the body manufacturer shall have accessible air bleeder valves installed in the return lines.
- 3.5.2 **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:
 - 3.5.2.1 24- and 35-passenger Buses 45,000 Btu/hr.
 - 3.5.2.2 47-passenger and Larger Buses 80,000 Btu/hr.
- 3.5.3 **Heater, Auxiliary When so specified in the IFB** (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:

- 3.5.3.1 **24- and 35-passenger Buses -** 40,000 Btu/hr.
- 3.5.3.2 47-passenger and Larger Buses 60,000 Btu/hr.
- **NOTE:** Auxiliary heaters on diesel-powered buses shall be furnished with a water circulating pump.

3.5.4 **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:

3.5.4.1 One between the heater hose connection and the water pump outlet,

and

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

- 3.5.5 **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.
- 3.6 **MUD FLAPS When so specified in the IFB** (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.**
- 3.7 **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:
 - 3.7.1 **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.

- 3.7.2 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 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.
- 3.7.3 Mirror Backing and Mounting, Stainless Steel, Optional When so specified in the IFB, exterior rearview mirror backs and mounting brackets shall meet or exceed all of the applicable requirements of Par. E.3.8.2 above except the mirror backing and mounting shall be made of stainless steel.
- 3.7.4 **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).
- 3.7.5 **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.
- 3.8 **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.
- 3.9 **REFLECTIVE MATERIAL When so specified in the IFB**(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:

- 3.9.1 Front and/or rear bumper may be marked diagonally 45 degrees down to centerline of pavement with 2 inch plus or minus 1/4 inch wide strips of non-contrasting reflective material.
- 3.9.2 Rear of bus body shall be marked with strips of reflective National School Bus Yellow (NSBY) material to outline the perimeter of the back of the bus using material which conforms with the requirements of FMVSS 571.131 Table 1. The perimeter marking of rear emergency exits per FMVSS 217 and/or the use of reflective "school bus" signs per 3.9.3 below partially accomplish the objective of this requirement. To complete the perimeter marking of he back of the bus, strips of at least 1-3/4 inch reflective NSBY material shall be applied horizontally above the rear windows and above the rear bumper extending from the rear emergency exit perimeter marking outward to the left and right rear corners of the bus; and vertical strips shall be applied at the corners connecting these horizontal strips.
- 3.9.3 "SCHOOL BUS" signs, if not lighted design, shall be marked with reflective National School Bus Yellow material comprising background for lettering of the front and/or rear "SCHOOL BUS" signs.
- 3.9.4 Side of bus body shall be marked with reflective National School Bus Yellow Material at least 1-3/4 inches in width, extending the length of the bus body and located (vertically) between the floor line and the beltline.
 - **NOTE:** Reflectivity of the stop signal arm is addressed under the Stop Signal Arm Section. If used, signs placed on the rear of the bus relating to school bus flashing signal lamps or railroad stop procedure may be reflective material as specified.
- 3.10 **STROBE LIGHT, Flashing When so specified on IFB** (see Option 26), an optional white flashing strobe light meeting the following requirements shall be provided:
 - 3.10.1 **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.
 - 3.10.2 **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.
- 3.11 **SEAT BELTS, PASSENGER When so specified in the IFB** (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:
 - 3.11.1 **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.

- 3.11.2 **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.
- 3.12 **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.
- 3.13 **STOP ARM -** A school bus stop arm meeting SAE J1133 and the following requirements shall be provided:
 - 3.13.1 **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. The 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.
 - 3.13.2 **Mounting** The stop arm shall be installed on the left side of the school bus near the front cowl section.
- 3.14 STUDENT SAFETY CROSSING ARM When so specified in the IFB (see Option No. 25), each bus shall be equipped with a student safety crossing arm which shall meet or exceed SAE Standard J 1133. It shall be extended and retracted simultaneously with stop arm by means of the stop arm control. It shall be mounted to the right side of the front bumper by means of a four-point mounting assembly. All components and connections shall be weatherproofed. The unit shall be easily removable for the purpose of towing of the bus. The unit shall be constructed of nonferrous material or treated as per the body sheet metal standard and shall contain no sharp edges or projections that could cause hazard or injury to students. The crossing arm shall extend 72-inches from the front bumper and shall not open more than 90 degrees when in the "extended" position. The mechanism may be activated by air pressure, electricity, or be vacuum.
- 3.15 **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.
- 3.16 **TOOL COMPARTMENT When so specified in the IFB** (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.

3.17 WINDSHIELD WASHERS AND WIPERS -

- 3.17.1 **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.
- 3.17.2 **Wipers -** A windshield wiping system, two-speed or variable speed, with an intermittent feature, shall be provided.

The wipers shall be operated by one or more air or electric motors of sufficient power to operate wipers. If one motor is used, the wipers shall work in tandem to give full sweep of windshield.

- 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 the 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-96.
 - 4.1.2 Literature and drawings See Par. A.6.5.
 - 4.2 **REVIEW OF REGUEST** 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.

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 Commission 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 **only** 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 **Axie 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 **standard** 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.

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- 2.2.1.5 Visual Brake Stroke Adjustment Indicators Visual Brake Stroke Adjustment Indicators shall be furnished at each brake location.
- 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 IFB (see Option 6), the 59-, 65-, 71-, and 77-passenger school buses shall be equipped with hydraulic brakes.
 - 2.2.2.1 The hydraulic braking system shall include the service brake, an emergency brake that is a part of the service brake system and controlled by the service brake control, and a parking brake.
- 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 IFB (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 not tire (or tube); for 35- through 83-passenger only; see Option No. 32).
 - **NOTE:** Carrier **not** available for 24-passenger bus; spare wheel only is available on this option.

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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.
 - 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 IFB (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. 71- and 77-passenger buses shall have 100 gallon capacity auxiliary fuel tanks.
 - 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, the requirements of FMVSS #304 and others, as applicable. 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

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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 IFB (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.

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- 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.2.3 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 (air brake equipped)
 - 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, **unless** 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. The intake air system for diesel engines shall have an air cleaner restriction indicator properly installed by the chassis manufacturer to meet manufacturer's engine specifications.
- 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.
- 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 IFB (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 IFB (see Option 3), the 24through 83 passenger buses shall be equipped by the chassis manufacturer (or approved designate) 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.5.3.5.7), 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 24through 83- passenger school buses shall be as follows:
 - 5.3.5.1 Submit to the Commission, a recent original computer SCAAN showing that the proposed engine meets or exceeds each requirement of Par. F.5.3.4 under the following conditions:

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- (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 the 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 greater 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.

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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 IFB (see Option No. 24), the bus shall be furnished with sufficient sound insulation to reduce the noise level to less than 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, unless 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 engine manufacturer. When engine is remotely located from driver, the governor shall be set to limit engine speed to maximum revolutions per minute recommended by engine manufacturer, and a tachometer shall be installed so the engine speed may be known to the driver.
- 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.
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 - 5.9 **TACHOGRAPH When so specified in the IFB** (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.
 - 5.10 **THROTTLE** The force required to operate the throttle shall not exceed 16 pounds throughout the full range of accelerator pedal travel.
- F.6 **TRANSMISSION AND RELATED COMPONENTS** The 24- through 77-passenger school buses shall | equipped with a manual or an automatic transmission **whichever is selected by the school district on the school bus requisition form. Note:** An electronic control or similar device may be installed | ensure that automatic transmissions cannot accidentally be moved out of the neutral or park gear position while the driver is not in the driver's seat.
 - 6.1 **AUTOMATIC TRANSMISSION, CHASSIS MANUFACTURER'S Unless otherwise specified in the IFB**, 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 IFE** 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 for AT-545 transmissions.
 - 6.3 **AUTOMATIC TRANSMISSION (ATD MODEL MT-643) Unless otherwise specified in the IFI** the 77- and 83-passenger forward control buses (and others, as required by increased torque rating of optional or standard engines), 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 IFB**, the manual type transmission shall be furnished on all 24- through 77-passenger buses (but not the 83-passenger bus, which require an automatic transmission). The transmission shall be the synchromesh (all gears except first and reverse) type. It shall be of sturdy construction, and th 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-passenge 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.

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TABLE 1224-PASSENGER BUS CHASSIS[SEE PAR. B.1.2. ON REDUCED PASSENGER CAPACITY]

	Refer to General Requirements					
24-Passenger ITEM	1996 Min Rqmts.	GMC/Chevrolet P31042/P31442 P31062	Navistar 3600 Navistar 3400			
GVWR, Ibs	14500	14500	14500/ 16500			
GAWR, Ibs - Front	. 5000	5000	6000 6000			
- Rear	10500	11000	10500 10500			
Axle Capacity, Ibs - Front	5000	5000	6000 6000			
- Rear	11000	11000	13000 15000			
Wheelbase, in	133/152	133/157	138/152 154			
Chassis Length, in	as shown	238.8/262.8	252/258 259.8			
Track, in - Front	65.2	65.2	81.0 81.0			
- Rear	66.7	66.7	82.O 82.O			
Gasoline Engine, L.•	*	5.7L-V8	*			
SAE Gross Horsepower	-	180	•			
SAE Gross Torque, Ib-ft	+	295	:			
Transmission:						
Automatic, Gears	4 spd	4L80E/A4OD	AT-542/545 AT-542/545			
Manual, Fwd. Gears	4 spd	NA	NA NA			
Tires, Steel Belted Radial	Tubeless	· · · · · · · · · · · · · · · · · · ·				
Size & Load Range	as shown	8.00R19.5E	225/7OR19.5 225/7OR19.5F			
Wheels, Rear	Dual	Dual	Dual Dual			
Alternator, Amperes	100	100	100 105			

*See diesel engine, Option 8.

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

DIESEL ENGINES [Option 8]

24-Passenger ITEM	1996 Min. Rqmts.	Navistar 3600 Navistar 3400				
Engine Displacement, L.	+	7.3T-V8 T-444E				
SAE Gross Horsepower	+	175 175				
SAE Gross Torque, 1b-ft.	-	430 430				

**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 ITEM	1996 Min. Rqmts.	Blue Bird Mini-Bird MB-20	Carpenter Cadet	Thomas Minotaur GP/Vista	Midbus/SC 429	US Bus GP/Eagle	
Interior Headroom, in	73	74/77	77	73	79	78	
Interior Width, in	90	90.5	90	90	90	91	
Service Door	as shown	Tall	Tall	Tall	Tall	Tall	

24-PASSENGER BUS BODIES

TABLE 13 S5-PASSENGER CONVENTIONAL BUS**** [SEE PAR. B.1.2 ON REDUCED PASSENGER CAPACITY]

		[n n	N N	nemento, rage o
35-Passenger (ITEM	Conv.	1996 Min. Rqmts.	Blue Bird. CV200	Navistar 3800* 3600* 3400*	F Ford B800*
GVWR, Ibs		21500	23100	21500 21500 19500	23000
GAWR, Ibs	-Front	6000	8100	6000 6000 6000	8000
	-Rear	15000	15000	15500 15500 13500	15000
Axle Capacity, lbs	-Front	6000	8100	6000 6000 6000	8000
	-Rear	15000	15000	15500 15500 15500	15000
Wheelbase, in		151	157/175	152 170 170	151
Cowl-to-Axle, in		127	133/151	127 127 102	127
Cowl-to-Frame End, in		217	223/244	217 217 188	231
Gasoline Engine CID**		***	6.OL-V8	*	*
SAE Gross Horsepower			225	•	•
SAE Gross Torque, Ib-ft			340	•	•

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. See Option 3A.

Transmission	T			
Automatic, Gears/Model	4 spd	AT-545	AT-545 AT-545 AT-545	AT-545
Manual, Fwd. Gears	5 spd	М5	M5 M5 NA	М5
Brakes-Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.44 15 x 1.44 15 x 1.44	15.38 x 1.53
- Rear Lining, in	as shown	14.75 x 1.34	15 x 1.44 15 x 1.44 15 x 1.44	15.00 x 6.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 9R22.5F	9R22.5F	9R22.5F 9R22.5F 19.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual Dual Dual	Dual
- Rim Size, in	6.75	7.5	6.75 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 IFB.

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SS-Passenger ITEM	Rqmts.	CV200	Navistar 3600/3800 3400	B800	
Engine Displacement, L. SAE Gross Hosepower SAE Gross torque, lb-ft .	844 444 444	6.6T-I6 170 420	7.3T-V8 T-444E 175 175 430 430	5.9T-16 160 400	
Front GAWR	6000	8100	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).

35-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran	Blue Bird	Carpenter	Thomas	Midbus			
Models	SS-17	1808	WSCV2311	0510/0511/0600	SC-629			
Chassis Available	N,F	B,N,F	N,F	N-S,N,F	N			

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

Refer to General Requirements, Par							
CHASSIS		B	N	F			
47-Passenger Conv.	1996 Min. Rqmts.	Blue Bird. CV200	Navistar 3800* 3600* 3400*	FORD B800*			
GVWR, Ibs	21500	23100	21500 21500 21500	23000			
GAWR, Ibs - Front	6000	8100	6000 6000 6000	8000			
-Rear	15000	15000	15500 15500 15500	15000			
Axle Capacity, lbs-Front	6000	8100	6000 6000 6000	8000			
-Rear	15000	15000	15500 15500 15500	15000			
Wheelbase, in	193	193	193 193 202	193			
Cowl-to-Axie, in	168	169	168 168 134	169			
Cowl-to-Frame End, in	274	279	274 274 246	280			
Gasoline Engine CID**	***	6.0L-V8	* * *	*			
SAE Gross Horsepower		225	* *	*			
SAE Gross Torque, Ib-ft		340	*	•			

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. See Option 3A.

Transmission:				
Automatic, Gears/Model	4 spd	AT-545	AT-545 AT-545 AT-545	AT-545
Manual, Fwd. Gears	5 spd	М5	M5 M5 N/A	М5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.44 15 x 1.44 15 x 1.44	15.38 x 1.53
-Rear Lining, in	as shown	14.75 x 1.34	15 x 1.44 15 x 1.44 15 x 1.44	15.00 x 6.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 9R22.5F	9R22.5F	9R22.5F 9R22.5F 225/70R 19.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual Dual Dual	Dual
- Rim Size, in	6.75	7.5	6.75 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 IFB.

DIESEL ENGINES [Option 8]

47-Passenger ITEM	1996 Min. Rqmts.	Blue Bird. CV200	Navistar 3600/3800 3400	FORD B800			
Engine Displacement, L. SAE Gross Horsepower SAE Gross torque, lb-ft	444 446 446	6.6T-I6 170 420	7.3T-V8 T-444 175 175 430 430	5.9T-i6 160 400			
Front GAWR	6000	8100	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	Blue Bird	Carpenter	Thomas	Midbus
Models	SS-22	2311	SB2304	0701/0710	SC829
Chassis Available	N,F	B,N,F	N,F	N-S, N,F	N

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

CHASSIS			В	8	N	T-A
47-Passenger ITEM		1995 Min. Rqmts.	Blue Bird TCFE	Carpenter Counselor	NIC Gensis	Thomas Saf-T-Liner MVP-EF
GVWR, Ibs		26500	26500	30000	29500	30000
GAWR, Ibs	- Front	11340	11340	13200	12000	11340
	- Rear	15500	15500	17000	17500	19000
Axle Capacity, Ibs	- Front	12000	12000	13200	12000	13200
	- Rear	17000	17000	17000	17500	19000
Wheelbase, in		132	132	143	144	136
Cowi-to-Axle, in		NA	NA	NA	NA	NA
Cowl-to-frame end, in		NA	NA	NA	NA	NA
Gasoline Engine CID***	•	++++	7.0L-V8	++	•	++
SAE Gross Horsepower			235	-	-	-
SAE Gross Torque, Ib-ft			385	→	-	-

Note: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode, See Option 3A.

Transmission:					
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	n/a	n/a	n/a
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	14.75 x 2.5	15 x 1.44	16.5 x 5
- Rear Lining, in	as shown	15 x 1.438	15.4 x 2.88	15 x 1.44	16.5 x 7
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	10R22.5F	10R22.5G	11R22.5G	11R22.5G	10R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	8.25	8.25	7.50

*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	1996	Blue Bird	Carpenter	NIC	Thomas
ITEM	Min. Rqmts.	TC2000		Genesis	MVP-EF
Engine Displacement, L.	+ + +	5.9T-16	5.9T-16	7.6T-16	5.9T-16
SAE Gross Horsepower		190	190	175	190
SAE Gross Torque, 1b-ft		475	475	430	475
Front GAWR	10300	11340	13200	12000	11340

***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).

59-Passenger	1996 Min.		GM/Stewart-Stevenson
ITEM	Rqmts.		[mono/bi-fuel versions]
Engine Displacement, L.		5.6L	7.0L
SAE Gross Horsepower		190	195
SAE Gross Torque, 1b-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:

47-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran	Biue Bird	Blue Bird Carpenter	
Models	IS2700	TCFE2504	027-2609	0908
Chassis Available	N,S	В	С	T-A

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

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CHASSIS		В	N	N-8	F
53-Passenger Conv.	1995	Blue Bird.	NIC	NIC-SEMI****	FORD
ITEM	Min. Reputs.	CV200	3800*	3600	B800*
GVWR, Ibs	21500	23100	21500	21500	23000
GAWR, Ibs - 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	218	218	217
Cowi-to-Axle, in	187	187	193	193	193
Cowl-to-Frame End, in	305	307	305	305	323
Gasoline Engine CID**	#	6.0L-V8	•	•	•
SAE Gross Horsepower		225	•	+	•
SAE Gross Torque, Ib-ft		340	•	•	*

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. See Option 3A.

Transmission:				1	
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	М5	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.34	15 x 1.43	15 x 1.44	15.38 x 1.53
- Rear Lining, in	as shown	14.75 X 1.34	· 15 X 1.43	15 x 1.44	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 IFB.

DIESEL ENGINES [Option 8]

53-Passenger	1996	B.B.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3800	B800
Engine Displacement, L.	0000	6.6T-16	7.3T-V8	5.9T-I6
SAE Gross Horsepower		170	175	160
SAE Gross Torque, lb-ft		420	430	400
Front GAWR	6000	8100	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).

PASSENGER	CONVENTIONAL BODIE	S
		_

BODIES	AmTran	Blue Bird	Carpenter	Thomas
Models	SS-24	2508	SB2508	0801/0810
Chassis Available	N.F	B.N.F	N,F	N-S,N,F

TABLE 17 **53-PASSENGER FORWARD CONTROL BUS** [SEE PAR. B.1.2 ON REDUCED PASSENGER CAPACITY]

CHASSIS		В	S	N	T-A
53-Passenger	1995	Blue Bird	Carpenter	NIC	Thomas
	Min. Rqmts.	TCFE	Counselor	Gensis	Saf-T-Liner MVP-EF
GVWR, Ibs	27800	27800	29000	30000	30000
GAWR, Ibs - Front	11340	11340	13200	12000	11340
- Rear	17000	17000	17000	17500	19000
Axle Capacity, Ibs - Front	12000	12000	13200	12000	13200
- Rear	17000	17000	17000	17500	19000
Wheelbase, in	136	146	143	144	136
Cowl-to-Axle, in	NA	NA	NA	NA	NA
Cowl-to-Frame End, in	NA	NA	NA	NA	NA
Gasoline Engine, L***	****	7.0L-V8	*	-	*
SAE Gross Horsepower	****	235	-	+	-
SAE Gross Torque, Ib-ft		385	-	-	-

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. See Option 3A

Transmission:					
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	NA	NA	NA
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	14.75 x 2.5	15x1.44	16.5 x 5
- Rear Lining, in	as shown	15 x 1.438	15.4 x 2.88	15x1.44	16.5 x 7
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	10R22.5F	10R22.5G	11R22.5G	11R22.5G	10R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.50	7.50	8.25	8.25	7.50

*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	1996	Blue Bird	Carpenter	NIC	Thomas
ITEM	Min. Rqmts.	TCFC		Genesis	MVP-EF
Engine Displacement, L.	****	5.9T-16	5.9T-16	7.6T-16	5.9T-16
SAE Gross Horsepower		190	190	175	190
SAE Gross Torque, Ib-ft		475	475	430	475
Front GAWR	10300	11340	13200	21000	11340

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

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59-Passenger	1996	Hercules	GM/Stewart-Stevenson
ITEM	Min. Rqmts.		[mono/bi-fuel versions]
Engine Displacement, L.		5.6L	7.0L
SAE Gross Horsepower		190	195
SAE Gross Torque, Ib-ft		440	315
Front GAWR	as shown	13200	11340

***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 para. F.5.3.4.).

The following Body/Chassis combinations are available as indicated:

53-PASSENGER FORWARD CONTROL BODIES

BODIES	AmTran	Blue Bird	Carpenter	Thomas
Models	171\$2806	TCFE2701	027-2711	0908
Chassis Available	N,S	В	С	T-A

TABLE 1859-PASSENGER CONVENTIONAL BUS****[SEE PAR. B.1.2 ON REDUCED PASSENGER CAPACITY][Full Air Brake Standard]

			Refer	to General Requ	uirements, Page 6
CHASSIS		В	N	N-S	F
59-Passenger Conv.	1995	Blue Bird.	NIC	NIC-SEMI****	FORD
ITEM	Min. Rqmts.	CV200	3800	3600*	B800*
GVWR, Ibs	25500	26180	25500	25500	26500
GAWR, Ibs - Front	8000	8100	8000	8000	9000
- Rear	17500	18080	17500	17500	17500
Axle Capacity, Ibs - 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	***	225	•	•	•
SAE Gross Torque, lb-ft		340	•	•	•

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. See Option 3A.

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	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 IFB.

DIESEL ENGINES [Option 8]

59-Passenger	1996	Blue Bird.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3800	B800
Engine Displacement, L.		6.6T-I6	7.3T-V8	5.9T-16
SAE Gross Horsepower		170	175	160
SAE Gross Torque, lb-ft		420	430	400
Front GAWR	8000	8100	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	Blue Bird	Carpenter	Thomas
Models	SS-26	2800	SB2800	0901/0910
Chassis Available	N,F	B,N,F	N,F	N-S,N,F

No. 070-SB-96 9/01/95

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

CHASSIS B N T s T-A 1996 Blue Bird NIC Thomas Carpenter Thomas 50 P nder FC Min. TCFE/TCRE* TITIM Genesis Saf-T-Liner Counselor Saf-T-Liner RE *** MVP-ER*** Romts. MVP-EF 27800 29500 GVWR. Ibs 27800/30340 28380 30000 30000 10300 GAWR, Ibs - Front 10300/11340 12000 10300 13200 11340 17000 17000/19000 17500 18080 17000 - Rear 19000 19000 Axle Capacity, Ibs - Front 12000 12000/12000 12000 13200 13200 13200 - Rear 17000 17000/19000 17500 19000 17000 19000 19000 155 160/193 162/168 181 164 155 Wheelbase, in ٠ 7.6T-I6/7.3-V8 Engine Displacement, L. 5.9T-I6 5.9T-16 5.9T-I6 5.9T-I6 190 175 190 190 190 SAE Gross Horsepower ٠ SAE Gross Torque, Ib-ft 475 430 475 475 475 Transmission: ** MT643/ MT643/ Automatic, Gears/Model 4 Spd MT-643 AT-545 AT-545 AT-545 AT-545 Manual, Fwd. Gears 5 Spd M5 NA M5 NA NA 15.0 x 4 15.0 x 4 15.0 x 4 15.5 x 5 16.5 x 5 Brake Lining, in - Front as shown as shown 16.5 x 7 - Rear Tires, Steel Belted Radial Tubeless Size & Load Range 10R22.5F 10R22.5G 11R22.5G 10R22.5F 11R22.5H 10R22.5G Wheels - Rear Dual Dual Dual Dual Dual Dual Rim Size, In 7.5 7.5 8.25 7.5 8.25 7.5

Direct in fourth gear (automatic); direct in fifth gear (manual). *Rear Engine.

*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).

DEDICATED CNG ENGINES [Option 3A]

59-Passenger ITEM	1996 MIN. ROMTS.	Hercules	GM/Stewart-Stevenson Blue Bird [mono/bi-fuel versions]
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft		5.6L 190 440	7.0L 195 315
Front GAWR	as shown	13200	10300

***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	Blue Bird	Carpenter	Thomas
Models	IS3009 RE3011	TCFE2905 TCRE3204	027-2908	1109/1008/110 H
Chassis Available	N	В	С	T/T-A

Refer to General Requirements, Page 6

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

Refer	to Gener	al Requirem	ents, Page 6

CHASSIS		В	N	N-S	F
65-Passenger Conv.	1996 Min.	Blue Bird.	NIC	NIC-Semi****	FORD
ITEM	Rqmts.	CV200	3800	3600*	B800*
GVWR, Ibs	26500	27080	27500	27500	26500
GAWR, Ibs - Front	9000	9000	10000	10000	9000
- Rear	17500	18080	17500	17500	1 7 500
Axle Capacity, lbs - Front	9000	9000	10000	10000	9000
- Rear	17500	19000	17500	17500	1 7 500
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	378
Gasoline Engine, L.** SAE Gross Horsepower SAE Gross Torque, lb-ft		6.0L-V8 225 340	•	•	*

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. [See Option 3A]

Transmission: Automatic, Gears/Model Manual, Fwd. Gears	4 spd 5spd	AT-545 M5	AT-545 M5	AT-545 M5	AT-545 M5
Brakes - Front Disc Rotor, in - Rear Lining, in	as shown as shown	15.00 x 4.00 16.50 x 7.00	15.0 x 4.00 16.5 x 7.00	15.0 x 4.00 16.5 x 7.00	15.00 x 4.00 16.50 x 7.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R2 2 .5F
Wheels - Rear - Rim Size, in	Dual 7.5	Dual 7.5	Dual 7.5	Dual 7.5	Dual 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 IFB

DIESEL ENGINES (Option	n 81
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65-Passenger ITEM	1996 Min. Rqmts.	Blue Bird. CV200	NIC 3600/3800	FORD B800
Engine Displacement, L.	***	6.6T-16	7.3T-V8	5.9T-16
SAE Gross Horsepower		170	175	160
SAE Gross Torque, Ib-ft	***	420	430	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).

	65-PASSENGER	CONVENTIONAL BODIES
-		

BODIES	AmTran	Blue Bird	Carpenter	Thomas
Models	SS-29	3004	SB3004	1001/1010
Chassis Available	N.F	B,N,F	N,F	N-S,N,F

TABLE 2165-PASSENGER FORWARD CONTROL DIESEL BUS[SEE PAR. B.1.2 ON REDUCED PASSENGER CAPACITY][Full Air Brake Standard]

				Refer to G	eneral Require	ments, Page 6
CHASSIS		В	N	T	8	T-A
65-Passenger FC	1996 Min. Rqmts.	Blue Bird TCFE/TCRE***	NIC Genesis RE***	Thomas Saf-T-Liner MVP-ER***	Carpenter Counselor	Thomas Saf-T-Liner MVP-EF
GVWR, Ibs	27800	27800/30340	29000 30000	28380	30000	30000
GAWR, Ibs - Front - Rear	10300 17000	11340/11340 17000/19000	12000 17500 19000	10300 18080	13200 17000	11340 19000
Axle Capacity, lbs - Front - Rear	12000 17000	12000 17000/19000	12000 17500 19000	13200 19000	13200 17000	13200 19000
Wheelbase, in	174	174/221	180/222	181	185	174
Diesel Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	•	5.9T-16 190 475	7.6T-16 7.3-V8 175 430	5.9T-16 190 475	5.9T-16 190 475	5.9T-16 190 475
Transmission:** Automatic, Gears/Model Manual, Fwd. Gears	4 Spd 5 Spd	AT-545/MT-64 3 M5	AT-545	MT643/ AT-545 M5	AT-545 NA	MT643/ AT-545 NA
Brake Lining, in - Front - Rear	as shown as shown	15.0 x 4 16.5 x 7	15.0 x 4 16.5 x 6	15.0 x 4 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5F	10R22.5G	11R22.5G	10R22.5F	11R22.5H	10R22.5G
Wheels - Rear Rim Size, in	Dual 7.5	Dual 7.5	Dual 8.25	Dual 7.5	Dual 8.25	Dual 7.5

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

**Direct in fourth gear (automatic); direct in fifth gear (manual).

***Rear Engine.

65-Passenger

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]				
	1996 Min. Rqmts.	Hercules	GM/Stewart-Stevenson Blue Bird imono/bi-fueled versions	

ITEM	Min. Rqmts.		[mono/bi-fueled versions)	
Engine Displacement, L.	***	5.6L	7.0L	
SAE Gross Horsepower	***	190	195	
SAE Gross Torque, Ib-ft	***	440	315	
Front GAWR	as shown	132000	11340	

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

65-PASSENGER	FORWARD	CONTROL	BODIES

BODIES	AmTran	Blue Bird	Carpenter	Thomas
Models	RE3302/IS3300	3007/3204	027-3207	1209/1108/120H
Chassis Available	N	В	С	T/T-A

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

				Refer to General F	Requirements, Page 6
CHASSIS		N	N-S	F	В
71S-Passenger Conv.	1996 Min. Rqmts.	NIC 3800	NIC-Semi**** 3600*	FORD B800*	BlueBird CV200
GVWR, lbs	28000	28000	28000	28000	28000
GAWR, Ibs - Front - Rear	9000 19000	10000 19000	10000 19000	9000 19000	9000 19000
Axle Capacity, lbs - Front - Rear	9000 19000	10000 19000	10000 19000	9000 19000	9000 19000
Wheelbase, in	254	254	254	255	274
Cowl-to-Axle, in Cowl-to-Frame End, in	229 349	229 349	229 349	231 378	250 405
Gasoline Engine, L.** SAE Gross Horsepower SAE Gross Torque, Ib-ft	\$440 1140 \$440	* * *	*	•	6.OL-V8 225 340

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. [See Option 3A.]

Transmission: Automatic, Gears/Model Manual, Fwd. Gears	4 spd 5 spd	AT-545 M5	AT-545 M5	AT-545 M5	AT-545 M5
Brakes - Front Disc Rotor, in - Rear Lining, in	as shown as shown	15.0 x 4.00 16.5 x 7.00	15.0 x 4.00 16.5 x 7.00	15.00 x 4.00 16.50 x 7.00	15.00 x 4.00 16.50 x 7.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear - Rim Size, in	Dual 8.25	Dual 8.25	Dual 8.25	Dual 8.25	Dual 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 IFB.

DIESEL ENGINES [Option 8]						
71S-Passenger	1996	NIC	FORD	Blue Bird		
ITEM	Min. Rqmts.	3600/3800	B800	CV200		
Engine Displacement, L.	690	7.3T-V8	5.9T-16	6.6T-16		
SAE Gross Horsepower	644	175	160	170		
SAE Gross Torque, Ib-ft	104	430	400	420		
Front GAWR	9000	10000	9000	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).

	71S-PASSENGER CONVENTIONAL BODIES					
BODIES	AmTran	Carpenter	Thomas	Blue Bird		
Models	SS-31	SB3201	1100/1101	3201		
Chassis Available	N,F	N,F	N,F	B,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 6

CHASSIS		B	N	N-8	F
71L-Passenger Conv.	1996 Min.	Blue Bird,	NIC	NIC-Semi****	FORD
	Romts.	CV200	3800	3600*	B800*
GVWR, Ibs	28000	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	10000	10000	9000
- Rear	19000	19000	19000	19000	19000
Axle Capacity, lbs - Front	9000	9000	10000	10000	9000
- Rear	19000	19000	19000	19000	19000
Wheelbase, in	274	274	276	276	275
Cowl-to-Axle, in	250	250	251	251	251
Cowl-to-Frame End, in	387	405	387	387	387
Gasoline Engine, L.** SAE Gross Horsepower SAE Gross Torque, Ib-ft		6.0L-V8 225 340	*	*	•

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. [See Option 3A.]

Transmission: Automatic, Gears/Model Manual, Fwd. Gears	4 spd 5 spd	AT-545 M5	AT-545 M5	AT-545 M5	AT-545 M5
Brakes - Front Disc Rotor, in - Rear Lining, in	as shown as shown	15.00 x 4.00 16.50 x 7.00	15.0 x 4.00 16.5 x 7.00	15.0 x 4.00 16.5 x 7.00	15.00 x 4.00 16.50 x 7.00
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear - Rim Size, in	Dual 8.25	Dual 8.25	Dual 8.25	Dual 8.25	Dual 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 IFB.

DIESEL ENGINES [Option 8]				
71L-Passenger	1996	Blue Bird.	NIC	FORD
ITEM	Min. Rqmts.	CV200	3600/3800	B800
Engine Displacement, L.		6.6T-I6	7.3T-V8	5.9T-16
SAE Gross Horsepower		170	175	175
SAE Gross Torque, Ib-ft		420	430	420
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).

71L-PASSENGER CONVENTIONAL BODIES					
BODIES AmTran Blue Bird Carpenter Thomas					
Models	SS31	3310	SB3208	1101/1110	
Chassis Available	N.F	B,N,F	N,F	N-S,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 Gen	eral Requirer	nents. Page 6
CHASSIS		В	N	Ť	S	T-A
71-Passenger FC ITEM	1996 Min. Rqmts.	Blue Bird TCFE/TCRE***	NIC Genesis RE***	Thomas MVP-ER***	Carpenter Counselor	Thomas Saf-T-Liner MVP-EF
GVWR, Ibs	27800	27800/30340	29500 30000	30000	30000	30000
GAWR, Ibs - Front - Rear	10300 17000	11340 17000/19000	12000 17500 19000	11000 19000	13200 17000	11340 19000
Axle Capacity, lbs - Front - Rear	12000 17000	12000 17000/19000	12000 17500 19000	13200 19000	13200 17000	13200 19000
Wheelbase, in	193	195/249	198/222	238	199	193
Diesel Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, lb-ft	•	5.9T-16 190 475	7.6T-16 7.3-V8 190 485	5.9T-16 190 475	5.9T-16 190 475	5.9T-16 190 475
Transmission:** Automatic, Gears/Model Manual, Fwd. Gears	4 Spd 5 Spd	AT-545/MT-64 3 M5	AT-545 NA	MT643/ AT-545 M5	AT-545 NA	MT643/ AT-545 NA
Brake Lining, in - Front - Rear	as shown as shown	15.0 x 4 16.5 x 7	15.0 x 4 16.5 x 7	15.0 x 4 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5G	10R22.5G	11R22.5G	10R22.5G	10R22.5H	10R22.5G
Wheels - Rear Rim Size, in	Dual 7.5	Dual 7.5	Dual 8.25	Dual 7.5	Dual 8.25	Dual 7.5

*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).

DEDICATED CNG ENGINES [Option 3A]					
71-Passenger ITEM	1996 Min. Rqmts.	Hercules	GM/Stewart-Stevenson Blue Bird [mono/bi-fueled versions]		
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	***	5.6L 190 440	7.0L 195 315		
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	Blue Bird	Carpenter	Thomas	
Models	IS3503 RE3505	TCFE3408 TCRE3700	027-3404	1309/1208/130H	
Chassis Available	N	В	С	T/T-A	

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

	·····		Refer to General Reg	uirements, Page (
CHASSIS		В	N	F
77-Passenger Conv. ITEM	1996 Min. Rqmts.	Blue Bird CV200	NIC 3800/3600	FORD B800*
GVWR, Ibs	28000	28000	28000	28000
GAWR, lbs - Front - Rear	9000 19000	9000 19000	10000 19000	9000 19000
Axle Capacity, Ibs - Front - Rear	9000 19000	9000 19000	10000 19000	9000 19000
Wheelbase, in	274	274	276	275
Cowl-to-Axle, in Cowl-to-Frame End, in	250 387	250 405	251 387	251 387
Gasoline Engine, L.** SAE Gross Horsepower SAE Gross Torque, Ib-ft		60L-V8 225 340	• ÷	* #

NOTE: This gasoline engine is available in a bi-fuel (CNG/Gasoline) mode. [See Option 3A.]

Transmission:**** Automatic, Gears/Model Manual, Fwd. Gears	4 Spd 5 Spd	AT-545 M5	AT-545 M5	AT-545 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 Size & Load Range	Tubeless 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 IFB.

DIESEL ENGINES [Option 8]				
77-Passenger Conv. ITEM	1996 Min. Rqmts.	Blue Bird. CV200	NIC 3800	Ford B800
Engine Displacement, L.	•••	6.6T-I6	7.3T-V8	5.9T-16
SAE Gross Horsepower		170	175	175
SAE Gross Torque, Ib-ft		420	430	420

***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	Blue Bird	Carpenter	Thomas	
MODEL	SS-33	3310	SB3310	1200/1201	
Chassis Available	N,F	B,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]

				Kelei to Gel		ments, Page 0
CHASSIS		В	<u>N</u>	<u> </u>	S	T-A
77-Passenger FC ITEM	1996 Min. Rqmt s .	Blue Bird All American TCFC/RE***	NIC Genesis RE***	Thomas MVP-ER***	Carpenter Counselor	Thomas Saf-T-Liner MVP-EF
GVWR, Ibs	30000	35480/30000	30000	30000	32200	30000
GAWR, Ibs - Front - Rear	11000 19000	12480/12000 23000/19000	12000 19000	11000 19000	13200 19000	11340 19000
Axle Capacity, lbs - Front - Rear	12000 17500	13200/12000 23000/19000	12000 19000	13200 19000	13200 19000	13200 19000
Wheelbase, in	212	220/277/216	216/249	238	227	212
Diesel Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	*	8.3T-16/5.9T-16 210/190 605/484	7.6T-16 7.3-V8 190 485	5.9T-16 190 475	5.9T-16 190 475	5.9T-16 190 475
Transmission:** Automatic, Cears/Model Manual, Fwd. Gears	4 Spdi 5 Spd	MT-643*/AT-545 M5	AT-545 NA	MT643/ AT-545 M5	MT-643" NA	MT643/ AT-545 NA
Brake Lining, in - Front - Rear	as shown as shown	15.0 x 4 16.5 x 7	15.0 x 4 16.5 x 7	15.0 x 4 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 10R22.5G	11R22.5G	11R22.5G	10R22.5G	11R22.5H	10R22.5G
Wheels - Rear Rim Size, in	Dual 7.5	Dual 8.25	Dual 8.25	Dual 7.5	Dual 8.25	Dual 7.5

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

**Direct in fourth gear (automatic); direct in fifth gear (manual).

***Rear Engine.

*= 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).

DEDICATED CNG ENGINES [Option 3A]

77-Passenger IIEM	1996 Min. Rqmts.	Hercules	GM/Stewart-Stevenson Blue Bird [mono/bi-fueled versions]
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	*** *** ***	5.6L 190 440	7.0L 195 315
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	Blue Bird	Carpenter	Thomas
Models	IS3706 RS3708	AAFC3611 TCRE3700 TCFC3700	027-3608	1309/1308/130H
Chassis Available	N	В	С	T/T-A

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 6

CHASSIS		B	8	N	T-A
83-Passenger FC (Front Engine) ITEM	1996 Min. Rqmts.	Blue Bird TCFC/AAFC	Carpenter Counselor	NIC Genesis RE***	Thomas Saf-T-Liner MVP-EF
GVWR, Ibs	32200	34200/36200	34200	32200	32200
GAWR, Ibs - Front - Rear	13200 19000	13200 23000	13200 21000	13200 19000	13200 19000
Axle Capacity, lbs - Front - Rear	13200 19000	13200 23000	13200 21000	13200 19000	13200 19000
Wheelbase, in	229 nom.	237/242	241	234/276	231
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	•	8.3T-16 210 605	5.9T-16 210 520	7.6T-16 7.3-V8 190 485	5.9T-16 210 520
Transmission, Automatic**	MT-643	MT-643	MT-643	MT-643	MT-643
Brake Lining, in - Front - Rear	as shown as shown	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R22.5H	11R22.5H	11R22.5H	11R22.5H	11R22.5G
Wheels - Rear - Rim Size, in	Dual 8.25	Dual 8.25	Dual 8.25	Dual 8.25	Dual 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).

83-Passenger ITEM	1996 Min. Rqmts.	Hercules	GM/Stewart-Stevenson Blue Bird [mono/bi-fueled versions]
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft		5.6L 190 440	7.0L 195 315
Front GAWR	as shown	13200	12000

DEDICATED CNG ENGINES [Option 3A]

***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	Blue Bird	Carpenter	Thomas
Models	IS3909 RE3911	3904/3903	027-3900	1408
Chassis Available	N	В	С	T-A

TABLE 2883-PASSENGER FORWARD CONTROL DIESEL BUS[SEE PAR. B.1.2 ON REDUCED PASSENGER CAPACITY][Rear Engine. Full Air Brake Standard]

· · · · · · · · · · · · · · · · · · ·				Re	fer to General Rec	uirements, Page 6
83-Passenger FC (Rear Engine) ITEM	1996 Min. Rqmts.	Blue Bird All American AARE3903	Blue Bird TCRE3904	Thomas Saf-T-Liner MVP-ER 1405/140H	Carpenter Coach SPT3908	Genesis RE3911
GVWR, Ibs	35200	36200	36200	36200	35200	36200
GAWR, Ibs - Front - Rear	13200 23000	13200 23000	13200 23000	13200 23000	14600 23000	13200 23000
Axle Capacity, Ibs - Front - Rear	13200 23000	14600 23000	13200 23000	13200 23000	14600 23000	13200 23000
Wheelbase, in	263	270	277	267	263	276
Engine Displacement, L. SAE Gross Horsepower SAE Gross Torque, Ib-ft	*	8.3T-I6 210 605	5.9T-16 210 484	8.3T-I6 210 605	8.3T-i6 210 605	7.3-V8 210 605
Transmission, Automatic**	MT-643	MT-643	MT-643	MT643	MT643	MT643
Brake Lining, in - Front - Rear	as shown as shown	16.5 x 5 16.5 x 7	16.5 x 5 16.5 x 7	16.5 x 6.0 16.5 x 8.6	16.5 x 6.0 16.5 x 10.0	16.5 x 6.0 16.5 x 8.5
Tires, Steel Belted Radial Size & Load Range	Tubeless 11R22.5H	11R22.5H	11R22.5H	11R22.5H	11R22.5H Frt. 12R22.5H Rear	11R22.5G
Wheels - Rear Wheels, Rim Size, in	Dual 8.25	Dual 8.25	Dual 8.25	Dual 8.25	Dual 8.25	Dual 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	1996 Min. Rqmts.	Hercules
Engine Displacement, L.	***	5.6L
SAE Gross Horsepower	***	190
SAE Gross Torque, Ib-ft	***	440
Front GAWR	as shown	13200

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

133G. WHEELCHAIR LIFT SPECIFICATION

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

- G.1 GENERAL REQUIREMENTS When so specified in the IFB (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.

- (G. cont.)
- 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 and Type B buses equipped with wheelchair lifts shall have alternators with a minimum electrical output of 100 amperes and 130 amperes, respectively.
 - 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

(G. cont.)

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.

- (G. cont.)
- 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 35through 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 \pm 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 **rear** 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.2.12.4.1. 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 **return-to-off** 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 **and**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 **substantially** open.

(G. cont.)

- 1.8.2.2 **Warning Light** A flashing **amber** 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.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.

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- 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 spouts passes through a vertical transverse plane intersecting the 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.
- 3.5 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.

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

H. AIR CONDITIONING SPECIFICATIONS

- H.1 **SPECIAL REQUIREMENTS** Unless otherwise noted, all school buses ordered with air conditioning shall be furnished with the following:
 - 1.1 **ALTERNATOR** Type A and Type B buses equipped with air conditioning shall be furnished with an alternator with a minimum output rating of 100 amperes and 130 amperes, respectively. Types 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 IFB (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 IFB** (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-

(H. cont.)

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)

H.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:

	Aux COI	DITIONING C		and requirements	2
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	l-skirt mtd. (or eng.comp.)	1-Front & rear
16-20 pass.	40,000	1,200	1	1-skirt mtd.	l-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

TABLE 29 AIR CONDITIONING COMPONENTS [minimum requirements]

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

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 IFB**, air conditioners on 16through 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 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.

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H.5 OTHER REQUIREMENTS -

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

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

FIGURE 3

REQUIRED SERVICE FACILITY ZONES WITHIN THE STATE OF TEXAS



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H. AIR CONDITIONING SPECIFICATIONS

- 5.2 **INTRODUCTION 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.

1.1 AVAILABILITY OF SPECIFICATIONS

Copies of the specification may be obtained from:

General Services Commission P.O. Box 13047 Austin, Texas 78711-3047 Phone (512) 463-1374



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	
· · · · · · · · · · · · · · · · · · ·	City		(Zip)		
Phone Number			Name to Con	tact	
	(Area Code)				
Passenger Capac	eity (Please circle	one): 15 16 1	8 19 20 24 3	5 47 53 59 65 7	1 77 83
Body Make (Plea	se check):	_Blue Bird	Chevrolet	Dodge	Ford GMC
	· · · · · · · · ·	_Thomas	Navistar	Crane Carrier	TransiCorp
l have]	have not (Please o	check one) cont	acted body vene	dor or chassis dealer	r for assistance.
			Firm (Dealer) and Name of	Person Contacted
				ou call)	
		. <u></u>		····	
					<u></u>
				·	
		. <u></u>		=	
(Use additional s	heets, if required)			
Please mail to:	Purchaser U General Service Purchasing Div P. O. Box 1304 Austin, TX 787	es Commission rision 7 11-3047			



THREE-MONTHS TEST OF NEW SCHOOL BUS ENGINES

Note to School District: It would be helpful in our deliberation on approval of school bus engines if he attached form could be completed at the end of the test period on the bus engine you have agreed o 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: Liter	s or, Engine type:	_Gasoline (mono)
		_Diesel (mono)
Engine Manufacture_		Naturally aspiratedTurbocharged
Chassis Manufacture		_Dedicated alternative fuel (indicate type):
(Mon	o)(bi)Compressed Nat	ural Gas (CNG)Liquefied Natural Gas (LNG)
(Mon	o)(bi)Liquefied petrole	um gas (LPG)
	Other (specify)	_
AutomaticManual	Transmission,Air conditi	oner,Wheelchair lift,Air orHydraulic Brakes,
		Tire Size, Luggage RackTopBottom
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.)

- 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
THREE-MONTHS TEST OF NEW SCHOOL BUS ENGINES (continued)

steepest hill in the district. Estimated grade ____%.

*Grades of 1.5% and 5.0% rise 1.5 and 5.0 feet, respectively, in a 100 foot distance.

 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

- 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:AdequatePoor,	Comments:
Temperatures: RunsO.KHot	Adequate power fully loaded?YesNo
Oil Consumption:Miles/qt.	Regular Route Fuel Consumption:Miles/gal.

Operation on an Activity Trip

Maintain 50 mph loaded?YesNo	Comments:
Oil Consumption:Miles/qt. Maximum Lawful Speed up Steepest Hill: List any problems or comments concerning ope	Activity Trip Fuel Consumption: Miles/gal. MPH Power: O.K. Need more eration on an Activity Trip:
	<u></u>

THREE-MONTHS TEST OF NEW SCHOOL BUS ENGINES (continued)

Is this engine suitable for transportation needs in your District? _____Yes _____No

Signatur	es				Date	
0		Superintendent	Т	ransportation D	irector	
We than	k you for yo	ur cooperation ;	and assistance in	providing writte	n results of this engine tes	st and
	the re	commendations	s of your Administ	ration, Drivers a	and Mechanics.	
S	am Dixon	Dan Roberts	Tommy Crowe	Bill Kyser	Debbie Goertz	
	TEA	TAPT	GSC	TAPT145	DPS	
		TF	XAS SCHOOL BU	JS COMMITTEE	6	
1						
Additio	mal Remark	.s:				
	<u></u>	······		······································		

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

District Man	OPEN M School Bus Purch	IARKET	ition						
District Name	Texas Specification Effectiv	ve 3/96	5-90		County District No.				
GSC Req. #	GENERAL SERVIO Purchasing P. O. Box	CES COMI Division 13047	AISSION	Estimate	ed Total \$				
	Austin, Texas Attention: 1	s 78711-30 Purchaser I	47 J						
Typed Name and Title of Con	tact Person	Mailing Address							
Telephone		Bus Delive	y Address if D	ifferent fro	om Above				
Typed Name of Superinter	ndent	Date	Telep	one	Signature				
NOTE: THE SIGNATURE OF THE SUPER	INTENDENT IS REQUIR	ED TO PRO	CESS THIS R	EQUISIT	ION.				
School Districts have the right to review the b relative to this review process (see Par. B.2.1. Do you wish to review bids received?	ids received prior to award 4.) YesNo	in order to	determine fund	s availabil	lity. Please note time constraints				
Instructions: For information on bus options, see t For further information, contact Purchaser "U" (51	he current Texas School Bus S 2) 463-3369.	pecifications	The completed	form shoul	d be submitted as indicated below.				
Section 1 - Bus Requirements				-					
Quantity	Automatic Tran	smission	Yes	No	Type: Conventional				
Size:Passenger School Bu	us (For 24 thru 77	passengers)			Forward Control				
(San Dar, D. 1.2 for Peduced Personger Conne	ities)								
Section II - Regular Bus Options: Check al	l regular options to be inclu	Ided	T	- f - () Di					
. Air conditioning, standard cool	ng	10. 17	Laminated S	alery Pla	ALE GLASS				
nass buses)		17.	Mud Flans	vith Brac	kets. Mounted				
3. Alternative fuel engines, O.E.I	M. Supplied	19.	Reflective M	aterial	Acts, Mouned				
(Select from A or B)		20.	School Name	Letteri	ng (type EXACTLY as				
3A. Compressed Natural	Gas (CNG)		required:						
monobi fuel		21.	Seat Backs,]	Increased	d Height				
3B. Liquefied Petroleum	Gas (LPG)	22.	Seat Belts (st	andard o	n all 15-20 passenger buses)				
4. Alternator, Increased Capacity		23.	Security Sys	tem Loci	k, All Doors				
5. Axle, Rear, Two Speed (24-71	pass. buses only)	24.	Sound Abate	ement In	sulation				
(N/A with automatic transmission)	1	25.	Student Safe	ty Cross	ing Gate				
6. Brakes, Hydraulic (59-77-pass	, Duses only)	20.	Strobe Light	, rooi-mo	Dunted				
/. Chassis, Long wheelbase conv	entional 24 and 71	2/.	Tachometer	(to indice	ate engine RPM)				
8 Diesel Engine, Minimum HP		20.	Tires. Mud s	and Snov	v Tread				
9. Differential. No-spin (24-71 pa	uss. buses only)		Tool Compa	rtment	, i loud				
10. Door, Powered Service (n/a wi	th automotive type door)	31.	Wheel, Spar	e (withou	t carrier and tire/tube)				
11. Door, Service, Automotive sed	an-type, manually	32.	Wheel, Spar	e, Mount	ted (with carrier, but without				
Side Mounted (24-71 pass. buse	s only; with		tire/tube)						
wheelchair positions. Will redu	ce seating capacity.	33.	Wheelchair	Lift, Fold	ling Platform Type, Front				
12. Fuel Tank, Increased Capacity	y (15-24 83 pass. buses		Curb Side M	lounted ((24-71 pass. buses only; with				
only).			wheelc	hair posit	tions. Will reduce seating				
13. Glazing, Dark Tint Passenger	Slide Windows (min.	~ /	capacity.						
30%, max. 40% light transmitta	nce).	34.	wheelchair	Lift, Fold	ing Platform Type, Rear				
14. Heater, Kear (auxiliary)	• • • •		Curd Side M	iounted (24-/1 pass. buses only; with				
15. Knee Spacing (maximum; requ (6 positions) of seats which will	res deleting one row reduce seating capacity)	·.	wheeld capacity.	nair posit	ions. Will reduce seating				

No. 070-SB-96

- _____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. Windshield Wipers, Intermittent
- _____ 38. White Roof
- 39. Windows, Push-out, additional, for emergency exit. Indicate extra number requested, per side _____.
- 40. **Passenger Seats**, specialized with integral child restraint system (indicate number of seats desired) _____.
- NOTES: **Discard all previous additions of this form**. Use only this form to order school buses. NA means Not Available/Not Applicable. Forward this form and any attachments to GSC at the address shown above.

SECTION III - Special Options:

List any requested additional options that do not appear in current state specifications.

A .	 F
B.	 G
С	 H
D.	 I
E.	 J

APPROVED PRODUCTS LIST - SCHOOL BUS ENGINES TEXAS SPECIFICATION NO. 070-SB-96

GASOLINE ENGINES CAPACITY

MANUFACTURER																· · · · · · · · · · · · · · · · · · ·				
	15	16	18	19	20	24	35	47	53	59C	59FC	65C	65FC	71SC	71LC	71FC	77C	77FC	83FE	83RE
DODGE Displacement SAE Gross hp Axle Ratio Trans. Auto.***	5.9L 190 3.54 A727		5.9L 190 3.54 A727																	
G.M.C. Displacement SAE Gross hp Axle Ratio Tran. Auto.***	5.7L 201 400	5.7L 201 400	5.7L 201 400	5.7L 201 400	5.7L 201 400	5.7L 201 400	6.0L 225 7.17 AT545	6.0L 225 7.17 AT545	6.0L 225 7.17 AT545	6.0L 225 7.17 AT545	7.0L 255 ** AT545	6.0L 215 7.17 AT545	7.0L 255 ** AT545	6.0L 215 7.17 AT545	6.0L 215 7.17 AT545	7.0L 255 ** AT545	6.0L 215 7.17 AT545	7.0L 255 ** AT545		

NATURAL GAS ENGINES (OEM-FURNISHED)

CAPACITY

MANUFACTURER																		_		
	15	16	18	19	20	24	35	47	53	59C	59FC	65C	65FC	71SC	71LC	71FC	77C	77FC	83FE	83RE
HERCULES Displacement SAE Gross hp Axle Ratio Trans. Auto.***							5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** ÅT545	5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** AT545	5.6T 190 ** AT545				
TEGCON/GMC (7.0L-mono-fuel) - Bluebird/Stewart & Stevenson (6.01 bi- and mono-fuel) Displacement SAE Gross hp Axle Ratio Trans, Auto.***							6.0L 210 ** AT545	7.0L 195 ** AT545	6.0L 210 ** AT545	6.0L 210 ** AT545	7.0L 195 ** AT545	6.0L 210 ** AT545	7.0L 195 ** AT545	6.0L 210 ** AT545	6.0L 210 ** AT545	7.0L 195 ** AT545	6.0L 210 ** AT545	7.0L 195 ** AT545*	7.0L 195 ** MT643	7.0L 195 ** MT643

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DIESEL GAS ENGINES CAPACITY

MANUFACTURER																				
	15	16	18	19	20	24	35	47	53	59C	59FC	65C	65FC	71SC	71LC	71FC	77C	77FC	83FE	83RE
CATERPILLAR Displacement SAE Gross hp Axle Ratio Trans. Auto.***				-	-		6.6T 170-200 ** AT545	6.6T 170-200 ** AT545	6.6T 170-200 ** AT545	6.6T 170-200 ** AT545		6.6T 170-200 ** AT545		6.6T 170-200 ** AT545	6.6T 170-200 ** AT545		6.6T 170-200 ** AT545			
CUMMINS/ FORD DIESEL Displacement SAE Gross hp Axle Ratio Trans, Auto.***							5.9T 160-190 ** AT545	5.9T 160-190 ** AT545	5.9T 160-190 ** AT545	5.9T 160-190 ** AT545	5.9T 180 ** AT545	5.9T 160-190 ** AT545	5.9T 180 ** AT545	5.9T 160-190 ** AT545	5.9T 160-190 ** AT545	5.9T 180 ** AT545	5.9T 160-190 ** AT545	5.9T 190 ** MT643	8.3T 235 ** MT643	8.3T 235 ** MT643
FORD/NAVISTAR Displacement SAE Gross hp Axle Ratio Trans, Auto.***	7.3N 180 **	7.3N 180 **	7.3N 180 **																	
N.I.C. (T444E) Displacement SAE Gross hp Axle Ratio Trans, Auto.***						7.3T 160-190 ** AT542/5	7.3T 160-190 ** AT545	7.3T 160-190 ** AT545	7.3T 160-190 ** AT545	7.3T 160-190 ** AT545		7.3T 160-190 ** AT545		7.3T 160-190 ** AT545	7.3T 160-190 ** AT545		7.3T 160-190 ** AT545			
N.I.C. (PT466) Displacement SAE Gross hp Axle Ratio Trans, Auto.***							7.6T 170-210 ** AT545	7.6T 210 ** MT643	7.6T 210 ** MT643											

- or, as required

** - Rear axle ratio, as required

*** - Minimum acceptable transmission listed. Transmission MUST be adequately matched with engine torque and approved by the engine manufacturer.

LEGEND: C-Conventional Bus, FC-Forward Control Bus, FE-Front Engine Bus, RE-Rear Engine Bus, SC-Short Wheelbase Conventional Bus, LC-Long Wheelbase Conventional Bus

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APPROVED PRODUCTS LIST - SCHOOL BUS BODIES TEXAS SPECIFICATION NO. 070-SB-96

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Bus Size	Configuration/Mfg.	Blue Bird	Carpenter	Collins	Mid Bus	Thomas	U.S. Bus	Van Com	Ward (Amtran)
15	Van Conversion or Cutaway	Micro Bird	-	Bantam Econobus SuperBantam	Guide	0402 0412	Universe	V-15	VSS
16	Commercial Cutaway	Micro Bird MB-20	SCL1706 SCL1801	-	Guide	0406	SturdiBus	-	VSS
18	Van Conversion		-	Bantam SuperBantam	Guide	-	SturdiVan	V-18	
19	Commercial Cutaway	Micro Bird MB-20	SCL1706 SCL1801	-	Guide	0406 0416	SturdiBus	-	VSS
20	Stripped Chassis	Mini Bird MB-20	WSCV1808	-	-	0404, 0417 0407	Eagle	-	VSS
24	Conventional Semi-Fwd-Control	2103 2307 MB-20	WSCV2100 WSCV2107	-	-	0500 041G 0501	Eagle	÷	-
35	Conventional Semi-Fwd-Control	1808, 2005	SB1808 WSCV2311	-	-	0510, 0600 0501	Eagle	-	SS-17
47	Forward Control Conventional Semi-Fwd-control	TC2000 2304 -	SFT2902 SB2304 -	-	-	0908 0710 0701	-	-	IS SS-22
53	Forward Control Conventional Semi-Fwd-control	TC2000 2508 -	SFT2902 SB2508	-	-	0908 0810 0801	•	-	IS SS-24
59	Forward Control Conventional Semi-Fwd-control	TC2000 2800, 2807 -	SFT3303 SB2800	-	-	1008/1108 0910 0901	•	-	IS SS-26
65	Forward Control Conventional Semi-Fwd-control	TC2000 3004, 3011 -	SFT3303 SB3004	-	-	1205, 1108 1010 1001	-	-	IS SS-29
715	Forward Control Conventional Semi-Fwd-control	TC2000 3201	SFT3507 SB3201	-	-	1309, 1203 1100 1101	-	-	1S SS-31
71L	Forward Control Semi-Fwd-control	3208 -	SB3201 -	-	-	1110 1101	-	-	IS SS-31
77	Forward Control Conventional Semi-Fwd-control	3604, 3611 33 <u>1</u> 0 -	SFT3711 - -	-	-	1305, 1308 1200 1201	-	-	IS SS-33
83	Forward Control	3,907	SFT3906/SPT3908	-	•	1318, 1405	-	-	IS

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