

E. 24- THROUGH 83-PASSENGER BODY SPECIFICATIONS

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 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.2.9. for material requirements.) The stepwell shall not protrude beyond the side body line and shall be fully enclosed to prevent accumulation of ice, snow, and dust.

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

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

2.14.3.1. Shore 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.

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.).

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

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

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

2.15.5. Location and Operation -

2.15.5.1. Conventional Bus Doors - The entrance door for conventional buses shall be operated manually. 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. 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.

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

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 36-3/4 inches.

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

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.)

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2.19. WINDSHIELD AND WINDOWS -

2.19.1. General Design -

- 2.19.1.1. Emergency Door Windows - The emergency door shall be furnished with an upper and lower glass panels (see Par. E.2.5.1.4.) permanently closed, and set in rubber or sealed against rubber.
- 2.19.1.2. Rear Window - Rear windows (not emergency door windows)* shall be installed on each side of the rear emergency door. Each rear window glass shall have a minimum area of 140 square inches and shall be set solid in a waterproof manner. These windows shall be installed securely to prevent removal by hand.

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

- 2.19.1.3. Side Window, Driver's - The driver's window shall be a 2-piece window of either of the following types:
 - (i) Two-piece sliding-sash type - This type will be acceptable only when the bus is equipped with an adequate air scoop to draw outside air into the driver's compartment. When the driver's ventilation is drawn through the heater system, this air shall be shielded from the heat sources and a hot water cut-off valve shall be provided in the driver's compartment.
 - (ii) Other Type - This type of window shall have the front part opening either in or out and rear part lowering and raising by use of a regulating handle.

- 2.19.1.4. Side Windows, Passenger, Standard - There shall be one vertical opening side window for each passenger seat. These windows shall open from the top only and shall operate freely. All side windows except the driver's and the service door window, shall be the split sash type with positive latch. Side windows that can be latched in an uneven position are not acceptable. They shall be furnished with a latching mechanism which will allow each window to be latched in a position not more than six inches from the top. The passenger side windows shall provide an unobstructed opening 22 inches wide and between 9 and 10 inches high.

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

- 2.19.1.5. Side Windows, Passenger, Push-out Type - When so specified in the Invitation for Bids (See Option 43), 24-passenger buses shall be provided with one push-out type side passenger window on each side and 35- through 83-passenger buses shall be provided with two push-out type side passenger windows on each side in lieu of the standard side windows. 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.
- 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.

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- 2.19.2.2. Safety Plate Glass - When so specified in the Invitation for Bids (see Option 26), all windows shall have AS-2 grade or better grade laminated safety plate glass.
- 2.19.2.3. Side Windows, Passenger - The glass in all passenger side windows shall be a minimum of 1/8-inch safety plate glass and shall be AS-2 grade or better, as specified in ANSI Safety Code Z26.1 (see Par. E.2.19.2.4.).
- 2.19.2.4. Windshield - The windshield shall be minimum 7/32-inch thick safety plate glass and shall be heat-absorbent, laminated AS-1 safety glass meeting ANSI Standard Z26.1, as amended.

2.19.3. Tinting -

- 2.19.3.1. Side Windows, Passenger - When so specified in the Invitation for Bids (see Option 10), passenger side windows only shall be tinted to minimum 30%, maximum 40% light transmittance using AS-3 grade glass or better. This is defined as "dark tinting" and is not permitted on the windshield or any window used for driving purposes.
NOTE: All safety glazing materials must be approved by the Department of Public Safety.
- 2.19.3.2. Windshield - The windshield shall have a horizontal gradient band (tinted) starting slightly above the driver's line of vision with approximately 90% light transmittance and gradually decreasing to a minimum of 70% light transmittance at the top of the windshield, or the entire windshield shall be tinted to meet the requirements of FMVSS No. 205.

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E.3. ACCESSORIES, REQUIRED AND OPTIONAL -

- 3.1. ACCESS PORT** - An access port with cover plate shall be installed above the fuel sending unit. It shall be of sufficient size to service fuel sending units and fuel pumps installed in the fuel tank. An access port is not required on the 24-passenger bus or on buses with front-mounted wheelchair lifts (see G.1.8.3.).
- 3.2. BACKUP ALARM** - An automatic, audible backup warning alarm meeting the requirements of Type C, 97 dB(A), SAE J994 (except for 12-volt system) shall be installed behind the rear axle.
- 3.3. DEFROSTERS** - Defrosting equipment shall keep the windshield, the window to the left of the driver, and the glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103. Any circulating fan used in defogging and installed on the curb side of the bus front shall be mounted on the windshield header so as to protect the fingers, hair, and clothing of entering and departing passengers.
- 3.4. EMERGENCY EQUIPMENT** - 24- through 83-passenger school buses shall be equipped with the following emergency equipment:
- 3.4.1. Body Fluid Cleanup Kit** - Each bus shall be provided with a removable and moisture-proof body fluid cleanup kit. It shall be properly mounted and identified as a body fluid cleanup kit. This kit shall contain as a minimum, the following items mounted in a removable metal or hard plastic kit:
- 2 - pr. rubber gloves
 - 1 - whisk broom and dust pan
 - 1 - 12 oz. bottle disinfectant spray
 - 3 - pks or 1 can solidity powder (minimum 15 oz)
 - 2 - waterproof disposal bags of different colors
 - 3 - heavy-duty shop (cleanup) disposable towels
 - 4 - hand wipe packages or 1 bottle hand cleaner (4 oz)
 - 1 - can deodorizer spray (min 12 oz)
- 3.4.2. Fire Extinguishers** - School buses shall be equipped with one of the fire extinguishers listed below:
- 3.4.2.1. Standard Fire Extinguishers** - Each bus shall be equipped with at least one refillable stored pressure Multipurpose Dry Chemical type (or approved equal) fire extinguisher of minimum 5-pounds capacity, mounted in an extinguisher manufacturer's automotive type bracket, and located in the driver's compartment in full view of and readily accessible to the driver. The fire extinguisher shall bear the Underwriters Laboratory Listing Mark of not less than 2A 20-B:C rating. Extinguishers shall be furnished with a hose, pressure gauge, and metal head.
- 3.4.2.2. Halon type Fire Extinguisher** - An approved equal fire extinguisher is the American Safety Products (ASP) Model 13000, 2A 40-B:C Rating. (For those who prefer this type, this fire extinguisher is available with a 13-pound charge of combined halon gas. It is not permissible to transport these units after refilling; therefore, the manufacturer offers a five-year warranty and replacement of discharged units with a new unit at half price.)
- 3.4.3. First Aid Kit** - Buses shall have a removable metal first aid kit container mounted in an accessible place within the driver's compartment. The compartment shall be marked to indicate the location of the kit. Number of units and contents for each kit shall be as follows:
- 2 - 1 in x 2 1/2 yds. adhesive tape rolls
 - 24 - sterile gauze pads 3 in x 3 in
 - 100 - 3/4 in x 3 in adhesive bandages
 - 12 - 2 in bandage compress
 - 12 - 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

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3.6. HEATERS AND RELATED COMPONENTS -

- 3.6.1. Bleeder Valves - Any heater(s) installed by the body manufacturer shall have accessible air bleeder valves installed in the return lines.
 - 3.6.2. Heater, Standard - Each bus shall be equipped with a heavy-duty combination fresh air and recirculating air heater(s). The heater(s) shall be a hot water type. The BTU/hr rating shall be in accordance with Standard SBMI No. 001. These standard heaters shall have minimum free flow output ratings as follows:
 - 3.6.2.1. 24- and 35-passenger Buses - 45,000 Btu/hr.
 - 3.6.2.2. 47-passenger and Larger Buses - 80,000 Btu/hr.
 - 3.6.3. Heater, Auxiliary - When so specified in the Invitation for Bids (see Option 11), a second recirculating heater shall be furnished. It shall be mounted near the rear of the bus and in such a manner so as not to interfere with the securing of seats to the floor, as specified in Par. E.2.13.2.2. The BTU/hr rating shall be in accordance with SBMI Standard No. 001. Heated conduits inside the buses shall be insulated or shielded to prevent injury to the driver or passengers. The heater shall have a minimum output rating (recirculating air rating - not fresh air intake rating) as follows:
 - 3.6.3.1. 24- and 35-passenger Buses - 40,000 Btu/hr.
 - 3.6.3.2. 47-passenger and Larger Buses - 60,000 Btu/hr.
- NOTE:** Auxiliary heaters on diesel-powered buses shall be furnished with a water circulating pump.
- 3.6.4. Installation - The standard heater shall be installed near the front of the bus body with the controls readily accessible to the driver; the auxiliary heater shall be installed near the rear of the bus. Heater hose connections shall be installed above the floor of the bus body and through the firewall to the engine compartment. Heated conduits inside the bus shall be insulated or shielded to prevent injury to the driver or passengers. The length of the hot water hoses shall be as short as possible consistent with good installation practices; however, the hoses shall not be installed in such a manner so as to interfere with normal engine maintenance operations, such as the removal of the engine air cleaner. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any motor function, such as the spark advance of an automatic distributor. Heater hose shall conform to SAE 20R3, Class C, as defined in SAE Standard J20e. Each heater installation shall include two all brass shutoff valves or cocks. Installation of the shutoff valves or cocks shall be as close as possible to the water pump and motor block outlets. The hoses shall be adequately supported to guard against excessive wear due to vibration. These cutoff valves or cocks shall be installed as follows:
 - 3.6.4.1. One between the heater hose connection and the water pump outlet, and
 - 3.6.4.2. One between the heater hose connection and the engine block.
 - 3.6.5. Service Accessibility - Heater motors, cores, and fans shall be readily accessible for service. Access panels (removable without removing driver's seat) shall be provided as required for maintenance.

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

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

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

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

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

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

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

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

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

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

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

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- 3.8.5. Rearview Mirror system - the rearview mirror system shall be capable of providing a view along the left and right sides of the bus which will provide the driver with a view of the rear tires at ground level, a minimum of 200 feet to the rear of the bus and at least 12 feet perpendicular to the side of the bus at the rear axle line.
- 3.9. MIRRORS, INTERIOR - A clear-vision, interior rearview mirror conforming to FMVSS No. 111, with at least 6" x 30" size vision area, affording a good view of the road to the rear as well as of the passengers, shall be furnished and installed. The mirror shall be made of safety glass and have rounded corners and protected edges.
- 3.10. MUD FLAPS - When so specified in the Invitation for Bids, (see Option 14), 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.
- 3.11. REVOLVING STROBE LIGHT - When so specified on Invitation for Bids (see Option 22), an optional white flashing strobe light meeting the following requirements shall be provided:
- 3.11.1. Design - The lamp shall have a single clear lens emitting light revolving 360 degrees around a vertical axis. The light source shall be minimum of 50 candlepower and flash 60-120 times per minute. The base of the lamp shall be metal or approved equal and installed by a method which seals out dust and moisture. A manual switch is required for operation and a pilot light to indicate when the light is in operation shall be included. Wiring shall be installed inside the bus walls.
- 3.11.2. Mounting - The strobe light shall be permanently installed near the centerline on the school bus roof and not more than one-third of the body length forward from the rear edge of the bus roof. It shall not extend above the roof more than approximately 6.5 inches.
- 3.12. SEAT BELTS, PASSENGER - When so specified in the Invitation for Bids (see Option 18), seat belts conforming to FMVSS Nos. 209 and 210 shall be provided for each passenger position. The seat belts shall meet the following requirements:
- 3.12.1. 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.
- 3.12.2. 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.
- 3.13. 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.
- 3.14. STOP ARM - When so specified on Invitation for Bids (see Option 21), a school bus stop arm meeting SAE J1133 and the following requirements shall be provided:
- 3.14.1. Design - The sign shall be octagon-shaped, constructed of zinc-coated steel or aluminum and painted with a polyurethane finish. It shall have a minimum 1/2-inch wide white border and the word "STOP" in white letters at least 6 inches high against a red background on both sides. Double-faced red, alternately flashing lamps, one each at the top and bottom (visible from each side of the structure) shall be connected to and flash with the required school bus red flashing signal lamp circuit when the arm is extended. The arm mechanism may be activated by air pressure, electricity, or by vacuum. The school may specify a reflectorized surface if desired.

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

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 Invitation for Bids (see Option 31), a metal container of adequate strength and capacity shall be provided for storage of tire chains, tow chains, and such tools as may be necessary for minor emergency repairs. This storage container shall be located either inside or outside the passenger compartment. However, if it is located inside the passenger compartment, it shall be provided with a separate cover; a seat cushion shall not be used as this cover. This tool compartment shall be capable of being securely latched and shall be fastened to the floor in the right front or the right rear of the bus.

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

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

4.1. **SUBMISSION OF REQUEST** - Submit a written request that 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-91.

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

4.2. **REVIEW OF REQUEST** - The Specification Section 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 Specifications Section 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 Specification Section will issue a letter to the manufacturer listing the model as approved for the capacities requested. If found not suitable, the Specification Section 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.

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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 35 for each size chassis are minimum requirements (see Par. A.4.5.). The requirements are for school buses with standard equipment. The added weights of optional equipment, such as air conditioning, luggage racks, lifts for the physically impaired or other heavy accessories were not considered in establishing the capacity ratings to be certified for the chassis. If additional optional equipment is ordered which necessitates increased capacity ratings of either axles, springs or tires, it is the responsibility of the vendor to furnish them so that proper certification can be made on the vehicle.
- 1.2. **COLOR** - The chassis, including bumpers and wheels shall be painted black (Color 17038); cowl, fenders, and hood shall be painted school bus yellow (Color 13432).

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

2.1. AXLES -

- 2.1.1. **Axle Capacities** - Axle capacities and gross axle weight ratings (GAWRs) shall be as specified in Table Nos. 12 through 35 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** - When so specified in the Invitation for Bids (see Option 13), automatic moisture ejectors shall be furnished and installed (for air brake equipped buses only; not applicable to 83-passenger buses).
 - 2.2.1.4. **Automatic Slack Adjusters** - When so specified in the Invitation for Bids (see Option 19), four automatic slack adjusters shall be furnished and installed, two at the front and two at the rear (for air brake equipped buses only).
 - 2.2.2. **Hydraulic Brakes** - The 24-, 35-, 47- and 53- passenger school bus chassis shall have as standard, hydraulic service brakes, emergency stopping system, and parking brakes meeting the requirements of FMVSS No. 105-83. If so specified in the Invitation for Bids (see Option 5), the 59-, 65-, 71-, and 77-passenger school buses shall be equipped with hydraulic brakes.
- 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:

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

- 2.3.1. Accu-Trak, Standard Car Truck, Park Ridge, IL 60068.
- 2.3.2. Engler Instruments, 250 Culver Ave., Jersey City, NJ 07305.
- 2.3.3. Veeder-Root, Hartford, CT 06102.
- 2.4. **SHOCK ABSORBERS** - Two front heavy-duty, double-acting shock absorbers shall be installed.
- 2.5. **SPRINGS** - Springs or suspension assemblies shall be of ample resiliency under all load conditions and of adequate strength to sustain the loaded bus without evidence of overload. Springs or suspension assemblies shall be designed to carry their proportional share of the gross vehicle weight as shown in Tables Nos. 12 through 35. Rear springs shall be of the progressive type. If leaf type front springs are used, stationary eyes shall be protected by a fullwrapper leaf in addition to the main leaf.
- 2.6. **TIRES AND WHEELS** -
 - 2.6.1. **Tires** - All standard tires shall be the steel belted radial tubeless type. All tires shall be new and the tread style furnished shall be the tire manufacturer's standard design and the brand normally furnished on regular production orders unless otherwise specified in the Invitation for Bids. All tires shall be "Original Equipment Line Quality." Schools may order tube type steel belted radial, or tubeless type bias belted, or tube type bias belted tires as optional equipment on 35- through 77-passenger buses. For tire size and load range for each size chassis, see Table Nos. 12 through 35 and the major components chart.
 - 2.6.2. **Wheels** - Each chassis shall be equipped with 6 standard steel disc type wheels. When so specified in the Invitation for Bids (see Options 32, 33), the following optional wheels and carrier shall be furnished on the chassis as indicated:
 - 2.6.2.1. **Wheels, Chassis, Cast Spoke (All Wheels)** - (for 35- through 77-passenger bus).
 - 2.6.2.2. **Wheel, Spare, Mounted (with Carrier but not tire (or tube); for 35- through 83-passenger only; see Option No. 33).** NOTE: Carrier not available for 24-passenger bus; spare wheel only is available on this option.
 - 2.6.2.3. **Wheel, Spare, Unmounted (without Carrier, Tire, (or Tube))** - (for 24- through 77-passenger buses; see Option No. 32).

F.3. CHASSIS FRAME AND RELATED COMPONENTS -

- 3.1. **BUMPER, FRONT** - The front bumper shall be furnished by the chassis manufacturer and must extend to the outer edges of the body at the bumper top line (to assure maximum fender protection). The front bumper shall be heavy duty transit type, not less than 3/16 inches by 9-1/2 inch steel (9-3/4 inches for the 83-passenger bus). It must be of sufficient strength to permit pushing a vehicle of equal gross weight without permanent distortion to the bumper, chassis, or body. The bumper shall be painted black (color No. 17038).
- 3.2. **CHASSIS FRAME SIDE MEMBERS** - Each frame side member shall be of one-piece construction. If the frame side members are extended, such extension shall be designed, furnished, and guaranteed by the installing manufacturer. The installation shall be made by either the chassis or body manufacturer. Extensions of frame lengths are permissible only when such alterations are welded on behind the hanger of the rear spring. This specification does not permit wheelbase extensions. Any welding, heating (for frame straightening or repairs), or the drilling of holes in chassis frame members shall be in accordance with chassis manufacturer's recommendations.
- 3.3. **FUEL TANKS** - Standard and auxiliary fuel tanks shall meet FMVSS No. 301-75 as applicable to school buses and shall meet the current design objectives of the SBMI. Fuel tanks installed on Texas school buses shall have a minimum "draw" of 83% of capacity.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

- 3.3.1. **Fuel Tanks, Standard** - The standard fuel tank for 47- through 83-passenger school buses shall have a minimum capacity of 60 gallons, except the 47-passenger forward control bus may have a minimum capacity of 45 gallons. The 24- and the 35-passenger buses shall have fuel tanks with minimum capacities of 20 and 30 gallons, respectively. The tank(s) shall be mounted, filled, and vented entirely outside the body (see Par. F.4.5.3.).
- 3.3.2. **Fuel Tank(s), Auxiliary** - When so specified in the Invitation for Bids (see Option 9), the 24- and the 83-passenger buses shall be furnished with minimum capacity fuel tank or tanks of 30 and 90 gallons, respectively. The auxiliary fuel tank for the 24-passenger bus shall be furnished and installed by the chassis manufacturer. 35- through 77-passenger buses do not have auxiliary fuel tanks available.
- 3.3.3. **Material** - Each tank (including auxiliary fuel tanks) shall be constructed of 16-gauge terneplate or equivalent and shall be equipped with baffles. Each tank may be mounted on either the right or left side of the chassis.
- 3.4. **HOOD, TILTING** - A forward-tilting hood, giving access to the engine compartment shall be furnished on conventional bus chassis (except 24- and 83-passenger buses).
- 3.5. **STEERING, POWER** - The bus shall be furnished with the chassis manufacturer's standard power steering which will provide safe and accurate performance at maximum load and speed. The mechanism must provide for easy adjustment for lost motion unless the unit doesn't require adjustment due to design. No changes shall be made in the power steering apparatus which are not approved by the chassis manufacturer.

F.4. ELECTRICAL SYSTEM AND RELATED COMPONENTS -

- 4.1. **ALTERNATORS** - The 12-volt alternators with rectifier shall have the electrical outputs and the minimum charging rates shown below when tested in accordance with SAE rating at the manufacturer's recommended engine idle speed. These alternators shall be ventilated and voltage controlled and, if necessary, current controlled. Dual belt drive or a single serpentine belt shall be used with the alternators provided on the 35- through 83-passenger buses:
 - 4.1.1. **Alternator, Standard** - The 24- through 83-passenger buses shall have a standard alternator with a minimum electrical output of 100 amperes.
 - 4.1.2. **Alternator, Optional** - When so specified in the Invitation for Bids, (see Option 3), the 24- through 83-passenger chassis shall have an alternator with a minimum electrical output of 130 amperes.
 - 4.1.3. **Alternators, Other** - School buses equipped with the following equipment shall have alternators meeting the following requirements:
 - 4.1.3.1. **Air-conditioned Buses** - Buses equipped with air conditioning shall have alternators with a minimum electrical output of 130 amperes.
 - 4.1.3.2. **Wheelchair Lift-equipped Buses** - Buses equipped with wheelchair lifts shall have alternators with a minimum electrical output of 130 amperes.
 - 4.1.3.3. **Air-conditioned and Wheelchair-equipped buses** - Buses equipped with both air conditioning and wheelchair lifts shall have alternators with a minimum electrical output of 160 amperes.
- 4.2. **BATTERY AND RELATED COMPONENTS** - The storage batteries furnished on each chassis shall have sufficient capacity to supply current for adequate operation of the engine starter, lights, signals, heater, and all other electrical equipment. The batteries for 24- through 83-passenger school buses shall have an potential of 6 or 12 volts and meet the following:
 - 4.2.1. **Battery, Diesel Engines** - Batteries shall be single or dual 12 volt or dual 6 volt as specified by the chassis manufacturer. The minimum performance level shall be a BCI cold cranking capacity (CCA) of not less than 450 amperes @ 0° F with a minimum 130-minute reserve capacity except for the 24-passenger bus which shall have 360 CCA and 100-minute reserve capacity.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

- 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 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.
- 4.2.4. Mounting - The preferred battery mounting location for gasoline-powered buses is outside the body shell under the hood in an adequate carrier and readily accessible for maintenance and removal from above or outside. (See Par. E.2.6. for requirements of diesel-powered buses and other battery mounting locations.)
- 4.3. HORNS - Each bus shall be equipped with horn or horns of standard make. Each horn shall be capable of producing audible sounds in the frequency range from 250 to 2,000 Hz and at an intensity range between 82 and 102 decibels. The sound level measurements shall be made at a distance of 50 feet directly in front of the vehicle in accordance with SAE J377.
- 4.4. INSTRUMENTS AND INSTRUMENT PANEL - The bus shall be equipped with the following nonglare illuminated instruments (controlled by an independent rheostat*), and gauges mounted for easy maintenance and repair and clearly visible to the seated driver. Indicator warning lights in lieu of gauges are not acceptable.
 - 4.4.1. Air Pressure Gauge (where air brakes are used)
 - 4.4.2. Ammeter (or Voltmeter) with graduated charge and discharge indications
 - 4.4.3. Fuel Gauge
 - 4.4.4. Glow Plug Indicator Light (for diesel buses with glow plugs only)
 - 4.4.5. High Beam Headlamp Indicator
 - 4.4.6. Odometer (6 digits, i.e., register to 99,999.9 miles)
 - 4.4.7. Oil Pressure Gauge
 - 4.4.8. Speedometer
 - 4.4.9. Vehicle manufacturer's standard keyed ignition switch
 - 4.4.10. Water temperature gauge
- *NOTE: If the intensity of the body-installed panel lamps is controlled, then the intensity control shall not be accomplished by the same rheostat that controls the chassis instrument lamps, 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.
- 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.

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

5.3.1. Diesel Engines - When so specified in the Invitation for Bids (see Option 7), 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 32 and in the Class 070-SB APL.

5.3.3. 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.4.1.4.8.), when tested at or above the GVWR required for a given bus capacity and with all accessories except air conditioning compressor on and operating:

5.3.3.1. Acceleration from 0 to 50 mph in 60 seconds or less.

5.3.3.2. Gradeability of 1.5% minimum at 50 mph.

5.3.3.3. Gradeability of 5.0% minimum at 25 mph.

5.3.3.4. Startability of 20% minimum.

5.3.3.5. Top speed of 55 mph minimum at the manufacturer's rated rpm for the governed engine.

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

5.3.4.1. Submit to the Specification Section, a recent computer scan (not the typed results of a scan) showing that the proposed engine meets or exceeds each requirement of Par. F.4.3.3. under the following conditions:

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

5.3.4.2. The Specification Section will review the scan and advise the vendor or manufacturer by letter of the results of this review. Copies will be furnished to the School Bus Committee.

5.3.4.3. If this review verifies that the engine meets the requirements of this specification, the vendor or manufacturer shall contact the SPGSC Purchaser to arrange for the 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).

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- 5.3.4.4. 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 SPGSC Specification Section on the form provided (see copy of the form entitled, "Three-Month Test of New School Bus Engines," on Page 96).
- 5.3.4.5. The vendor or manufacturer shall then contact the SPGSC Purchaser and TEA School Bus Committee Representative about ordering the school bus with the subject engine.
- 5.3.4.6. 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.
- 5.3.4.7. Upon receipt of the school district's report, the Specification Section will make a recommendation at the next meeting of the School Bus Committee that the engine be accepted or rejected.
- 5.3.4.8. The School Bus Committee will act on this recommendation and, if approved, the engine will be added to the Class 070-SB APL.

NOTES: Once an engine is approved in one horsepower and torque version, other power versions of this same engine need not be tested in a school bus prior to approval. For approval, the vendor or manufacturer shall follow Par. F.5.3.4.1. If the Specification Section finds the scan shows conformance with the "five criteria," the engine will be added to the APL which will show the SAE gross horsepower and SAE gross torque as well as the rear axle ratio used in the scan.

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.5.3.3. (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 (which may be also be visual) signals 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 nearest to the noise source in the bus. When so specified in the Invitation for Bids, (see Option No. 20), the bus shall be furnished with the noise level not exceeding 86 dB(A) measured at the same place.
- 5.5.3. Tailpipe - The tailpipe shall be constructed of seamless or electrically welded tubing of 16-gauge steel or equivalent, and shall extend at least 5-inches beyond the chassis frame. The size of the tailpipe shall not be reduced after it leaves the muffler.
- 5.5.4. Tailpipe Exit - The tailpipe of a gasoline-powered bus shall not exit the side of the bus anywhere within 12 inches of a vertical plane through the center of the fuel filler opening and perpendicular to the side of the bus, 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.

F. 24- THROUGH 83-PASSENGER CHASSIS SPECIFICATIONS

- 5.7. **GOVERNOR** - A governor set to the manufacturer's recommended maximum engine speed (RPM) shall be installed by the chassis manufacturer.
- 5.8. **OIL FILTER** - Each chassis shall be equipped with a factory-installed, minimum one-quart capacity oil filter with a replaceable element or cartridge type. It shall be connected by flexible oil lines if it is not of the built-in or engine-mounted design.
- 5.9. **TACHOGRAPH** - When so specified in the Invitations for Bids (see Option 24), a tachograph containing a combination clock/speedometer/recorder shall be installed on the dashboard. The tachograph shall be Argo Model 1310-6, Veeder-Root Model AB-1407, or approved equal.

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

- 6.1. **AUTOMATIC TRANSMISSION, CHASSIS MANUFACTURER'S** - Unless otherwise specified in the Invitation for Bids, the 24-passenger bus shall be furnished with a minimum three forward speed automatic transmission which shall be the chassis manufacturer's standard automatic transmission for this type of chassis.
- 6.2. **AUTOMATIC TRANSMISSION (ATD MODEL AT 545)** - Unless otherwise specified in the Invitation for Bids, the 35- through 71-passenger and the 77-passenger conventional buses shall be furnished with a minimum four forward speed automatic transmission. The transmission shall be the ATD Model AT 545, or approved equal (see Par. F.6. above), unless an ATD Model MT-643 is required to match engine torque. The application will conform to the manufacturer's recommended capacity limits of 30,000 GVWR and/or 445 lb.-ft. maximum torque rating.
- 6.3. **AUTOMATIC TRANSMISSION (ATD MODEL MT-643)** - Unless otherwise specified in the Invitation for Bids, the 77- and 83-passenger forward control buses shall be furnished with a minimum four forward speed automatic transmission. The transmission shall be the ATD Model MT-643, or approved equal.
- 6.4. **DRIVE SHAFT GUARD** - Each drive shaft section shall be equipped with protective metal guard or guards to prevent the shaft from whipping through the floor or dropping to the ground when broken.

NOTE: Drive shaft guard is not required on rear engine, rear-drive bus.
- 6.5. **MANUAL TRANSMISSIONS** - Unless otherwise specified in the Invitation for Bids, the manual type transmission shall be furnished on all 24- through 77-passenger buses (but not the 83-passenger bus, which requires an automatic transmission). The transmission shall be the synchromesh (all gears except first and reverse) type. It shall be of sturdy construction, and the input torque capacity shall be at least 10 percent above the maximum net torque developed by the engine. Its design shall provide for four or five forward and one reverse speeds for 24-, 35-, 47, and 53-passenger chassis, and five forward (direct in fifth) and one reverse speeds for 59-, 65-, 71-, and 77-passenger chassis.
- 6.6. **MANUAL TRANSMISSION CLUTCH** - The clutch in buses equipped with manual transmissions shall have a torque capacity not less than 10 percent in excess of the maximum net torque output of engine. The diameter of the clutches for the various sizes of buses equipped with manual transmissions shall be as follows:
 - 6.6.1. **12-Inch Clutch** - All chassis for the 24-, 35-, 47-, 53-, and 59-passenger buses with manual transmissions shall be equipped with a minimum 12-inch diameter clutch..
 - 6.6.2. **13-Inch Clutch** - All chassis for 65-, 71-, and 77-passenger buses with manual transmissions shall be equipped with a minimum 13-inch diameter clutch or a clutch with equivalent performance.

24-PASSENGER BUS TABLE

TABLE 12
24-PASSENGER BUS CHASSIS

24-Passenger ITEM	Refer to General Requirements, Page 4	
	1991 Min. Rqmts.	GMC/Chevrolet P31042/P31442
GVWR, lbs	14500	14500
GAWR, lbs - Front	5000	5000
- Rear	11000	11000
Axle Capacity, lbs - Front	5000	5000
- Rear	11000	11000
Wheelbase, in	133/157	133/157
Chassis Length, in	as shown	238.8/262.8
Track, in - Front	65.2	65.2
- Rear	66.7	66.7
Gasoline Engine CID*	**	350-V8EFI
SAE Gross Horsepower	**	201
SAE Gross Torque, lb-ft	**	318
Transmission:		
Automatic, Gears	3 spd	A40D
Manual, Fwd. Gears	4 spd	M4/NA
Tires, Steel Belted Radial Tubeless		
Size & Load Range	as shown	8R19.5E
Wheels, Rear	Dual	Dual
Alternator, amperes	105	105

*See diesel engine Option 7.

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

DIESEL ENGINES (Option 7)

24-Passenger ITEM	1991 Min. Rqmts.	GMC/CHEVROLET P31042/P31442
Engine Displacement, L.	**	6.2N-V8
SAE Gross Horsepower	**	164
SAE Gross Torque, lb-ft	**	286

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

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

The following bodies are available on stripped chassis:

24-PASSENGER BUS BODIES

24-Passenger ITEM	1991 Min. Rqmts.	AmTran/Ward Patriot	Blue Bird Mini-Bird	Carpenter Cadet	Thomas Mighty Mite
Interior Headroom, in	73	78	77	77	73
Interior Width, in	90	90	90.5	90	90
Service Door	as shown	Tall	Tall	Tall	Tall

35-PASSENGER CONVENTIONAL BUS TABLE

TABLE 13
35-PASSENGER CONVENTIONAL BUS

Refer to General Requirements, Page 4

CHASSIS		G	N	F
35-Passenger Conv.	1991	GMC/CHEVROLET	NIC	FORD
ITEM	Min.	B6P042	3700*	B600
	Reqs.			
GVMR, lbs	21500	22000	21500	23000
GAWR, lbs - Front	6000	7500	6000	8000
- Rear	15000	15000	15500	15000
Axle Capacity, lbs - Front	6000	7500	6000	8000
- Rear	15000	15000	15500	15000
Wheelbase, in	149	149	152	151
Cowl-to-Axle, in	125	125	127	127
Cowl-to-Frame End, in	217	228	217	231
Gasoline Engine CID**	***	366-V8EFI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	344	*	*
Transmission:				
Automatic, Gears/Model	4 spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 spd	M4	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31	15 x 1.43	15.38 x 1.53
- Rear Lining, in	as shown	14.75 x 1.31	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	6.75	6.75	6.75

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

35-Passenger	1991	GMC/Chevrolet	NIC	FORD
ITEM	Min.	B6P042	3700	B600
	Reqs.			
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	165
SAE Gross Torque, lb-ft	***	394	332	410
Front GAWR	6000	7500	6000	8000

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

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

The following Body/Chassis combinations are available as indicated:

35-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-17	1808/2005	77SB1808	0510/0600	1F1802
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

35-PASSENGER SEMI-FORWARD CONTROL BUS TABLE

TABLE 14
35-PASSENGER SEMI-FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS 35-Passenger ITEM	1991 Min. Rqmts.	G GMC/CHEVROLET B6P042	N NIC 3700*
GVWR, lbs	21500	22000	21500
GAWR, lbs - Front	6000	7500	6000
- Rear	15000	15000	15500
Axle Capacity, lbs - Front	6000	7500	6000
- Rear	15000	15000	15500
Wheelbase, in	149	149	152
Cowl-to-Axle, in	125	125	127
Cowl-to-Frame End, in	217	228	217
Gasoline Engine CID**	***	366-V8EFI	*
SAE Gross Horsepower	***	215	*
SAE Gross Torque, lb-ft	***	344	*
Transmission:			
Automatic, Gears/Model	4 spd	AT-545	AT-545
Manual, Fwd. Gears	4 spd	M4	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31	15 x 1.43
- Rear Lining, in	as shown	14.75 x 1.31	15 x 1.43
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual
- Rim Size, in	6.75	6.75	6.75

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

35-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC2206	----	WSCV2311	0511	----
Chassis Available	G		G	G	

47-PASSENGER CONVENTIONAL BUS TABLE

TABLE 15
47-PASSENGER CONVENTIONAL BUS

Refer to General Requirements, Page 4				
CHASSIS		G	N	F
47-Passenger	1991	GMC/Chevrolet	NIC	FORD
ITEM	Min.	B6P042	3700**	B600
	Rqmts.			
GVWR, lbs	21500	22000	21500	22500
GVWR, lbs - Front	6000	7000	6000	8000
- Rear	15000	15000	15500	15000
Axle Capacity, lbs - Front	6000	7500	6000	8000
- Rear	15000	15000	15500	15000
Wheelbase, in	189	189	193	193
Cowl-to-Axle, in	165	165	168	169
Cowl-to-Frame End, in	268	268	274	280
Gasoline Engine CID***	****	366-V8EFI	**	**
SAE Gross Horsepower	****	215	**	**
SAE Gross Torque, lb-ft	****	344	**	**
Transmission:				
Automatic, Gears/Model	4 Spd	AT-545	AT 545	AT-545
Manual, Fwd. Gears	4 Spd	M4	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31	15 x 1.43	15.38 x 1.33
- Rear Lining, in	as shown	14.75 x 1.31	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	6.75	6.75	6.75

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

47-Passenger	1991	GMC/Chevrolet	NIC	FORD
ITEM	Min.	B6P042	3700	B600
	Rqmts.			
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	165
SAE Gross Torque, lb-ft	***	394	332	410
Front GAWR	6000	7000	6000	8000

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

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

The following Body/Chassis combinations are available as indicated:

47-PASSENGER CONVENTIONAL BUS BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-22	2304	77SB2304	7010	1F2300
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

47-PASSENGER SEMI-FORWARD CONTROL BUS TABLE

TABLE 16
47-PASSENGER SEMI-FORWARD CONTROL BUS

Refer to General Requirements, Page 4

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

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

47-PASSENGER SEMI-FORWARD CONTROL BODIES

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

47-PASSENGER FORWARD CONTROL BUS TABLE

TABLE 17
47-PASSENGER FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS	B	S	N	
47-Passenger	1991	Blue Bird	Ward/Senator	NIC
ITEM	Min.	TC2000**	4000**	3900**
	Rqmts.			
GVWR, lbs	25800	25800 (air brake) 26500 (hyd brake)	26500	27800

GAWR, lbs - Front	10300	10300	10300	10300
- Rear	15500	15500 (air brake) 17000 (hyd brake)	17000	17500

Axle Capacity, lbs - Front	10800	12000	10800	11000
- Rear	17000	17000	17000	17500

Wheelbase, in	132	132	146	159

Cowl-to-Axle, in	N/A	N/A	N/A	N/A
Cowl-to-Frame End, in	N/A	N/A	N/A	N/A

Gasoline Engine CID***	****	**	**	**
SAE Gross Horsepower	****	**	**	**
SAE Gross Torque, lb-ft	****	**	**	**

Transmission:				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	4 Spd	M5	N/A	M5

Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15.00 x 4.00	15 x 2.88
- Rear Lining, in	as shown	15 x 1.438	65.50 x 6.00	15 x 2.88

Tires, Steel Belted Radial	Tubeless			
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	10R22.5F

Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.50	7.5

*Furnished with air brakes only.

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

47-PASSENGER FORWARD CONTROL BODIES

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

53-PASSENGER CONVENTIONAL BUS TABLE

TABLE 18
53-PASSENGER CONVENTIONAL BUS

		Refer to General Requirements, Page 4		
CHASSIS		G	N	F
53-Passenger	1991	GMC/Chevrolet	NIC	FORD
ITEM	Min.	B6P042	3700**	B600
	Rqmts.			
GVWR, lbs	21500	22500	21500	23000
GAWR, lbs - Front	6000	7500	6000	8000
- Rear	15000	15000	15500	15000
Axle Capacity, lbs - Front	6000	7500	6000	8000
- Rear	15000	15000	15500	15000
Wheelbase, in	217	218	218	217
Cowl-to-Axle, in	193	194	193	193
Cowl-to-Frame End, in	295	295	305	323
Gasoline Engine CID***	****	366-V8EFI	**	**
SAE Gross Horsepower	****	215	**	**
SAE Gross Torque, lb-ft	****	344	**	**
Transmission:				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	4 Spd	M4	M5	M5
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31	15 x 1.43	15.38 x 1.33
- Rear Lining, in	as shown	14.75 x 1.31	15 x 1.43	15.00 x 6.00
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	9R22.5F	9R22.5F	9R22.5F	9R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	6.75	6.75	6.75	6.75

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

53-Passenger	1991	GMC/Chevrolet	NIC	FORD
ITEM	Min.	B6P042	3700	B600
	Rqmts.			
Engine Displacement, L.	***	8.2N-V-8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	165
SAE Gross Torque, lb-ft	***	394	332	410
Front GAWR	6000	7500	6000	8000

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

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

The following Body/Chassis combinations are available as indicated:

53-PASSENGER CONVENTIONAL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-24	2508	77SB2508	0810	1F2503
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

53-PASSENGER SEMI-FORWARD CONTROL BUS TABLE

TABLE 19
53-PASSENGER SEMI-FORWARD CONTROL BUS

Refer to General Requirements, Page 4

CHASSIS	Q	N
53-Passenger	GMC/Chevrolet	NIC
ITEM	B6P042	3700**
	1991	
	Min.	
	Rmts.	
GVWR, lbs	21500	21500
GAWR, lbs - Front	6000	6000
- Rear	15000	15500
Axle Capacity, lbs - Front	6000	6000
- Rear	15000	15500
Wheelbase, in	218	218
Cowl-to-Axle, in	193	193
Cowl-to-Frame End, in	295	305
Gasoline Engine CID***	****	366-V8EFI
SAE Gross Horsepower	****	215
SAE Gross Torque, lb-ft	****	344
Transmission:		
Automatic, Gears/Model	4 Spd	AT-545
Manual, Fwd. Gears	4 Spd	M4
Brakes - Front Disc Rotor, in	as shown	14.75 x 1.31
- Rear Lining, in	as shown	14.75 x 1.31
Tires, Steel Belted Radial	Tubeless	
Size & Load Range	9R22.5F	9R22.5F
Rear Wheels - Rear	Dual	Dual
- Rim Size, in	6.75	6.75

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

53-Passenger	1991	GMC/Chevrolet	NIC
ITEM	Min.	B6P042	3700
	Rmts.		
Engine Displacement, L.	***	6.2N-V8	7.3N-V8
SAE Gross Horsepower	***	170	170
SAE Gross Torque, lb-ft	***	394	332
Front GAWR	6000	8000	6000

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

Engines listed on this page are approved to meet or exceed power requirements under normal operating conditions. Other engines must be submitted for approval by the School Bus Committee (see Par. F.4.1.3.).

The following Body/Chassis combinations are available as indicated:

53-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AmTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SFC2903	----	----	0801	----
Chassis Available	G,N	----	----	G,N	----

53-PASSENGER FORWARD CONTROL BUS TABLE

TABLE 20
53-PASSENGER FORWARD CONTROL BUS

Refer to General Requirements, Page 4					
CHASSIS	B	G	N	S	
53-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000**	GMC/Chevrolet S7T042	NIC 3900**	Ward/Senator 4000
GVWR, lbs	26500	26500	28380	27800	26500
GAWR, lbs - Front	10300	10300	10300	10300	10300
- Rear	17000	17000	18080	17500	17000
Axle Capacity, lbs - Front	11000	12000	12000	11000	10800
- Rear	17000	17000	19000	17500	17000
Wheelbase, in	146	146	161	159	146
Cowl-to-Axle, in	N/A	N/A	N/A	N/A	N/A
Cowl-to-Frame End, in	N/A	N/A	N/A	N/A	N/A
Gasoline Engine CID***	****	**	366-V8EFI	**	**
SAE Gross Horsepower	****	**	219	**	**
SAE Gross Torque, lb-ft	****	**	348	**	**
Transmission:					
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	4 Spd	M5	M5	M5	N/A
Brakes - Front Disc Rotor, in	as shown	15 x 1.438	15.00 x 1.50	15 x 2.88	15.0 x 4
- Rear Lining, in	as shown	15 x 1.438	15.00 x 1.50	15 x 2.88	16.5 x 6
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.50	7.50	7.50	7.50	7.50

*Furnished with air brakes only

**Furnished with diesel engine only, Option 7.

***See diesel engine option 7.

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

DIESEL ENGINES (Option 7)

53-Passenger ITEM	1991 Min. Rqmts.	Blue Bird TC2000	GMC/Chevrolet B6P042	NIC 3900	Ward/Senator 4000
Engine Displacement, L.	***	5.9T-I6	6.2N-V8	5.9TI6	5.9T-I6
SAE Gross Horsepower	***	180	170	170	180
SAE Gross Torque, lb-ft	***	445	394	400	445
Front GAWR	10300	10300	10300	10300	10300

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

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

The following Body/Chassis combinations are available as indicated:

53-PASSENGER FORWARD CONTROL BODIES

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

59-PASSENGER CONVENTIONAL BUS TABLE

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

Refer to General Requirements, Page 4

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

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

59-PASSENGER CONVENTIONAL BODIES

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

59-PASSENGER SEMI-FORWARD CONTROL BUS TABLE

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

Refer to General Requirements, Page 4

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

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

59-PASSENGER SEMI-FORWARD CONTROL BODIES

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

59-PASSENGER FORWARD CONTROL DIESEL BUS TABLE

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

Refer to General Requirements, Page 4						
CHASSIS	B	G	N	T	S	
59 Passenger FC	1991	Blue Bird	GMC/Chev	NIC	Thomas	Ward/Senator*
ITEM	Min.	TC2000	S7T042	3900	SAF-T-LINER	4000
	Rqmts.				MVP 3189***	
GVWR, lbs	26500	27800	28380	27800	28380	26500
GAWR, lbs - Front	10300	12000	10300	10300	10300	10300
- Rear	17000	17000	18080	17500	18080	17000
Axle Capacity, lbs - Front	10800	10800	12000	11000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	160	160	161	184	181	160
Engine Displacement, L.	*	5.9T-I6	8.2N-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	170	170	210/190	180
SAE Gross Torque, lb-ft	*	445	394	400	468/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 4	15.0 x 6
- Rear	16.5 x 6	16.5 x 7	16.5 x 7	16.5 x 6	16.5 x 7	16.5 x 6
Tires. Steel Belted Radial	Tubeless					
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5	7.5	7.5

*Furnished with air brakes only

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

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

***Rear Engine.

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

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

The following Body/Chassis combinations are available as indicated:

59-PASSENGER FORWARD CONTROL BODIES

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

65-PASSENGER CONVENTIONAL BUS TABLE

TABLE 24
65-PASSENGER CONVENTIONAL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4

CHASSIS		G	N	F
65-Passenger Conv.	1991	GMC/Chevrolet	NIC	Ford
ITEM	Min.	B6P042	3700*	B700
	Reqs.			
GVWR, lbs	25580	25580	27500	26500
GAWR, lbs - Front	7500	7500	10000	9000
- Rear	17500	18080	17500	17500
Axle Capacity, lbs - Front	7500	7500	10000	9000
- Rear	17500	19000	17500	17500
Wheelbase, in	254	254	254	255
Cowl-to-Axle, in	229	230	229	231
Cowl-to-Frame End, in	349	349	359	377
Gasoline Engine CID**	***	366-V8EFI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	315	*	*
Transmission:****				
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5
Brake Lining, in - Front	as shown	15.0 x 4.0	15.0 x 3.5	15.0 x 4.0
- Rear	as shown	16.5 x 7.0	16.5 x 6.0	16.5 x 7.0
Tires, Steel Belted Radial	Tubeless			
Size & Load Range	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

65-Passenger Conv	1991	GMC/Chevrolet	NIC	Ford
ITEM	Min.	B6P042	3700	B700
	Reqs.			
Engine Displacement, L.	***	8.2N-V8	7.3N-V8	6.6T-I6
SAE Gross Horsepower	***	170	170	165
SAE Gross Torque, lb-ft	***	394	332	410
Front GAWR, lbs	9000	9000	10000	9000

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

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

The following Body/Chassis combinations are available as indicated:

65-PASSENGER CONVENTIONAL BODIES

BODIES	AnTran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-29	3004/3001	77SB3004	1010	1F2905
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

65-PASSENGER SEMI-FORWARD CONTROL BUS TABLE

TABLE 25
65-PASSENGER SEMI-FORWARD CONTROL BUS
(Full Air Brake Standard)

Refer to General Requirements, Page 4			
CHASSIS	G	M	
65-Passenger Conv.	1991	GMC/Chevrolet	NIC
ITEM	Min.	B6P042	3700*
	Reqts.		
GVWR, lbs	25580	25580	27500
GAWR, lbs - Front	7500	7500	10000
- Rear	17500	18080	17500
Axle Capacity, lbs - Front	7500	7500	10000
- Rear	17500	19000	17500
Wheelbase, in	254	254	254
Cowl-to-Axle, in	229	230	229
Cowl-to-Frame End, in	349	349	359
Gasoline Engine CID**	***	366-V8EFI	*
SAE Gross Horsepower	***	215	*
SAE Gross Torque, lb-ft	***	315	*
Transmission:****			
Automatic, Gears/Model	4 Spd	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	5	5
Brake Lining, in - Front	as shown	15.0 x 4.0	15.0 x 3.5
- Rear	as shown	16.5 x 7.0	16.5 x 6.0
Tires, Steel Belts Radial	Tubeless		
Size & Load Range	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

65-Passenger Conv	1991	GMC/Chevrolet	NIC
ITEM	Min.	B6P042	3700
	Reqts.		
Engine Displacement, L.	***	8.2N-V8	7.3N-V8
SAE Gross Horsepower	***	170	170
SAE Gross Torque, lb-ft	***	394	332
Front GAWR, lbs	9000	9000	10000

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

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

The following Body/Chassis combinations are available as indicated:

65-PASSENGER SEMI-FORWARD CONTROL BODIES

BODIES	AnTran/Nard	Blue Bird	Carpenter Thomas	Wayne
Models	SFC3503	----	1001	----
Chassis Available	G,N	----	G,N	----

65-PASSENGER FORWARD CONTROL DIESEL BUS TABLE

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

Refer to General Requirements, Page 4						
CHASSIS	B	G	N	T	S	
65-Passenger FC	1991	Blue Bird	GMC/Chevrolet	NIC	Thomas	Ward/Senator*
ITEM	Min.	TC2000	87T042	3900	SAF-T-LINER	4000
	Rpts.				MVP 1109***	
GVWR, lbs	26500	27800	28380	27800	28380	26500
GAWR, lbs - Front	10300	11340	10300	10300	10300	10800
- Rear	17000	17000	18080	17500	18080	17000
Axle Capacity, lbs - Front	10800	12000	12000	11000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	174	174	182	197	181	180
Diesel Engine Displacement, L.	*	5.9T-I6	8.2N-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	170	170	180/190	180
SAE Gross Torque, lb-ft	*	445	394	400	445/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	as shown	15.0 x 4	16.5 x 5	15.0 x 4	15.0 x 4	15.0 x 4
- Rear	as shown	16.5 x 6	16.5 x 7	16.5 x 6	16.5 x 7	16.0 x 6
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	10R22.5F	10R22.5G	10R22.5F	10R22.5F	10R22.5F	10R22.5F
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5	7.5	7.5

*Furnished with Air Brakes only.

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

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

***Rear Engine.

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

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

The following Body/Chassis combinations are available as indicated:

65-PASSENGER FORWARD CONTROL BODIES

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

71-PASSENGER SWB CONVENTIONAL BUS TABLE

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

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

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

71S-PASSENGER CONVENTIONAL BODIES

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

TABLE 28
71L-PASSENGER CONVENTIONAL BUS
 (Long Wheelbase, Full Air Brake Standard)

Refer to General Requirements, Page 4

71-Passenger LWB Conv. ITEM	1991 Min. Rmts.	GMC/Chevrolet B6P042	NIC 3700*	Ford B700
GVWR, lbs	28000	28000	28000	28000
GAWR, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	21000
Axle Capacity, lbs - Front	9000	9000	9000	9000
- Rear	19000	19000	19000	21000
Wheelbase, in	274	274	276	275
Cowl-to-Axle, in	250	250	251	251
Cowl-Frame-End, in	368	368	387	387
Gasoline Engine CID**	***	366-V8EPI	*	*
SAE Gross Horsepower	***	215	*	*
SAE Gross Torque, lb-ft	***	344	*	*
Transmission:****				
Automatic, Gears/Model	4 Spd	AT-544	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5
Brake Lining, in - Front	15.0 x 4	16.5 x 5	15.0 x 4	15.0 x 4.0
- Rear	16.5 x 7	16.5 x 7	16.5 x 7	16.5 x 7.0
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 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

71L-PASSENGER CONVENTIONAL BODIES

BODIES	Amtran/Ward	Blue Bird	Carpenter	Thomas	Wayne
Models	SS-31	3208	77SB3208	1110	1F3200
Chassis Available	G,N,F	G,N,F	G,N,F	G,N,F	G,N,F

71-PASSENGER SWB SEMI-FORWARD CONTROL BUS TABLE

TABLE 29
71S-PASSENGER SEMI-FORWARD CONTROL BUS
(Short Wheelbase, Full Air Brake Standard)

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

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

71S-PASSENGER SEMI-FORWARD CONTROL BODIES

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

71-PASSENGER LWB SEMI-FORWARD CONTROL BUS

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

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

*Furnished with diesel engine only, Option 7.

**See diesel engine option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

71L-PASSENGER SEMI-FORWARD CONTROL BODIES

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

71-PASSENGER FORWARD CONTROL DIESEL BUS TABLE

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

Refer to General Requirements, Page 4						
CHASSIS		B	T	N	T	S
71-Passenger FC	1991	Blue Bird	GMC/Chevrolet	NIC	Thomas 1309	Ward/ Senator*
ITEM	Min. Rqmts.	TC2000	87T042	3900	MVP	4000
GVWR, lbs	26500	26500	30340	27800	30000	27000
GAWR, lbs - Front	10800	10800	11340	10800	11000	10800
- Rear	17000	17000	19000	17500	19000	17000
Axle Capacity, lbs - Front	10800	12000	12000	11000	13200	10800
- Rear	17000	17000	19000	17500	19000	17000
Wheelbase, in	195	195	201	197	209	195
Diesel Engine Displacement, L.	*	5.9T-I6	8.2T-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	180	185	210/190	180
SAE Gross Torque, lb-ft	*	445	410	435	468/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	AT-545	AT-545	AT-545	AT-545	AT-545
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	15.0 X 4	15.0 X 4	16.5 X 5	15.0 X 6	15.0 X 4	15.0 X 4
- Rear	16.5 X 6	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 6
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	10R22.5G	10R22.5G	10R22.5G	10R22.5G	10R22.5G	10R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	7.5	7.5	7.5	7.5	7.5	7.5

*Furnished with air brakes only.

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

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

***Rear Engine.

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

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

The following Body/Chassis combinations are available as indicated:

71-PASSENGER FORWARD CONTROL BODIES

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

77-PASSENGER CONVENTIONAL BUS TABLE

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

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

*Furnished with diesel engine only, Option 7.

**see diesel engine Option 7.

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

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

DIESEL ENGINES (Option 7)

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

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

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

The following Body/Chassis combinations are available as indicated:

77-PASSENGER CONVENTIONAL BODIES

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

77-PASSENGER FORWARD CONTROL DIESEL BUS TABLE

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

Refer to General Requirements, Page 4						
CHASSIS		B	T	N	G	S
77-Passenger FC	1991	Blue Bird All American	GMC/Chevrolet	NIC	Thomas 1309	Ward/ Senator*
ITEM	Min. Rqmts.	3611/ TC-2000*	87T042	3900	MVP	4000
GVMR, lbs	29500	33280/30000	31080	29500	30000	29800
GAWR, lbs - Front	11000	12080/12000	12080	11000	11000	12000
- Rear	18500	21200/19000	19000	18500	19000	19000
Axle Capacity, lbs - Front	11000	13200/12000	14600	11000	13200	12000
- Rear	19000	23000/19000	19000	19000	19000	19000
Wheelbase, in	212	223/216	217	212	238	216
Diesel Engine Displacement, L.	*	5.9T-I6	8.2T-V8	5.9T-I6	8.2T-V8/ 5.9T-I6	5.9T-I6
SAE Gross Horsepower	*	180	180	185	210/190	180
SAE Gross Torque, lb-ft	*	445	410	435	468/475	445
Transmission:**						
Automatic, Gears/Model	4 Spd	MT-643 ^a /AT-545	MT-643 ^a	AT-545	AT-545	MT-643 ^a
Manual, Fwd. Gears	5 Spd	M5	M5	M5	M5	N/A
Brake Lining, in - Front	16.5 X 5/ 15.0 X 4	15.0 X 4	16.5 X 5	15.0 X 4	15.0 X 4	15.0 x 4
- Rear	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 7
Tires, Steel Belted Radial	Tubeless					
Size & Load Range	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G	11R22.5G
Wheels - Rear	Dual	Dual	Dual	Dual	Dual	Dual
- Rim Size, in	8.25	8.25	8.25	8.25	8.25	8.25

*Furnished with air brakes only.

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

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

***Rear Engine.

^a = or, as required.

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

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

The following Body/Chassis combinations are available as indicated:

77-PASSENGER FORWARD CONTROL BODIES

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

83-PASSENGER FORWARD CONTROL (FRONT ENGINE) DIESEL BUS TABLE

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

		Refer to General Requirements, Page 4			
CHASSIS		B	C	N	
83-Passenger FC (Front Engine)	1991	Blue Bird	CMC/Chevrolet	NIC	
ITEM	Min.	All American	87T042	3900	
	Reqs.	3903			
GVWR, lbs	33280	36200	34220	33280	
GAWR, lbs - Front	13200	13200	13220	12080	
- Rear	21000	23000	21000	21200	
Axle Capacity, lbs - Front	13200	13200	14600	14000	
- Rear	21000	23000	21000	21000	
Wheelbase, in	229	245	237	229	
Engine Displacement, L.	*	8.2T-V8	8.2T-V8	5.9T-I6	
SAE Gross Horsepower	*	210	210	185	
SAE Gross Torque, lb-ft	*	468	468	485	
Transmission, Automatic**	MT643	MT643	MT643	MT643	
Brake Lining, in - Front	16.5 X 5	16.5 X 5	16.5 X 5	16.5 x 5	
- Rear	16.5 X 7	16.5 X 7	16.5 X 7	16.5 x 7	
Tires, Steel Belted Radial	Tubeless				
Size & Load Range	11R22.5H	11R22.5H	11R22.5H	11R22.5H	
Wheels - Rear	Dual	Dual	Dual	Dual	
- Rim Size, in	8.25	8.25	8.25	8.25	

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

**Direct in fourth gear.

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

The following Body/Chassis combinations are available as indicated:

83-PASSENGER (FRONT ENGINE) BODIES

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

83-PASSENGER FORWARD CONTROL (FRONT ENGINE) DIESEL BUS TABLE

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

83-Passenger FC (Rear Engine) ITEM	Refer to General Requirements, Page 4		
	1991 Min. Reqs.	Blue Bird All American AARE	Thomas Pusher 3885
GVWR, lbs	36200	36200	36200
GAWR, lbs - Front	13200	13200	13200
- Rear	23000	23000	23000
Axle Capacity, lbs - Front	13200	13200	13200
- Rear	23000	23000	23000
Wheelbase, in	267	284	267
Engine Displacement, L.	*	8.3T-I6	8.3T-I6/ 10.4T-V8
SAE Gross Horsepower	*	210	210/215
SAE Gross Torque, lb-ft	*	605	605/600
Transmission, Automatic**	MT643	MT643	MT643
Brake Lining, in - Front	16.5 x 5	16.5 x 5	16.5 x 6.0
- Rear	16.5 x 7	16.5 x 7	16.5 x 8.6
Tires, Steel Belted Radial	Tubeless		
Size & Load Range	11R/22.5H	11R2.5H	11R22.5H
Wheels - Rear	Dual	Dual	Dual
Wheels, Rim Size, in	8.25	8.25	8.25

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

**Direct in fourth gear.

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

G. WHEELCHAIR LIFT SPECIFICATION

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

- G.1. GENERAL REQUIREMENTS** - When so specified in the Invitation for Bids (see Options 34, 35, and 36), 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 34, 35, and 36) shall be a floor-mounted, 12 V-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 swingout 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.1.6. 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.
- 1.2.5. Installation** - Doors constructed by the body manufacturer shall be installed using piano or butt type hinges and attached to body by means of rivets or bolts, nuts, and lock washers. Neither metal screws nor self-tapping bolts are acceptable except for alignment purposes; when used for this purpose these types of fasteners shall be tack-welded at the head.
- 1.2.6. 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.2.4. and E.2.4.
- 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** - A minimum output rating of 100 amperes.
- 1.3.1.2. 24- Through 77-passenger Buses** - A minimum output rating of 130 amperes.

G. WHEELCHAIR LIFT SPECIFICATIONS

- 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, 12VDC type, equipped with shaft bearings.
- 1.4. **ELECTRO-MECHANICAL SYSTEMS** - Electro-mechanical 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, toe board, 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, useable width, unobstructed by the required handrail (See Par. G.1.5.2.2. below). The minimum clear length of the platform between the outer edge barrier and the inner edge shall be 40 inches. Any portion of platform in the folded (travel) position which obstructs window vision shall be covered with expanded metal.
 - 1.5.2.2. **Hand Rail** - The lift platform shall be equipped with at least one handrail for security. The handrail shall be approximately 25-3/4 inches in height and a minimum 18 inches in length and designed to fold when in stowed position so as not to add to the overall lift projection into the bus.
 - 1.5.2.3. **Lift Action** - Action of the lift must be power-up and controlled descent with slow (gentle) movement. Design of the platform shall be such that it will be level at all times during the raising and lowering action. A load switch shall be installed on the platform to prevent accidental folding while loading wheelchair passengers.
 - 1.5.2.4. **Safety Rails** - The platform shall be equipped with safety rails on both sides of minimum 0.125-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. **Toe Board** - A toe board 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 0.75 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.

G. WHEELCHAIR LIFT SPECIFICATIONS

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

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

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

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

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

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

1.7.1. Fuel Access Port (see Par. E.3.1.) - A fuel access port is required on all 35-through 63-passenger buses except front wheelchair equipped buses.

1.7.2. Level Test - The sides of any bus provided with a wheelchair lift shall be within ± 2 inches of each other when measured from comparable points on each side to the ground with the bus empty and parked on a level hard surface (such as concrete). Chassis springs and suspension shall be adjusted as necessary to provide a level bus when the additional weight of a wheelchair lift is installed (see Paragraphs A.4.4., D.1.1., and E.1.1.).

1.7.3. Mounting - The lift shall be mounted on the front right (curb) side (see Option No. 35) or front or rear (see Option 34) 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 36) in order to place the required minimum 30-inch wide aisle in the rear portion of the bus. 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.

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. WHEELCHAIR LIFT SPECIFICATIONS

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

- 2.1. **FLOOR COVERING** - The floor in the wheelchair area and the area in the lift entryway shall be smooth and free of projections. Aisle floor covering shall be the same as required in Par. E.2.13.
- 2.2. **FLOORING** - Any plywood flooring used to cover the existing steel floors (e.g., see Par. C.2.5.) 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.1.4.4.2.
- 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.1.8. 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.1.8.
- 2.6. **UNIVERSAL HANDICAP SYMBOLS** - School buses with wheelchair lifts shall display the Universal Handicapped Symbols on the front of one side and the rear of the other side below the window line of the bus. These emblems shall be white on a blue background, shall not exceed 12 inches in size, and may be of a high intensity reflectorized material meeting U.S. Department of Transportation FHWA FP-85 Standards.

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

- 3.1. The school bus body shall be designed for positioning and securement of mobile seating devices and occupants in a forward-facing orientation. Securement system hardware and attachment points for the forward-facing system shall be provided.
- 3.2. Mobile seating device securement system shall utilize four-point tie-downs, with a minimum of two body floor attachment points located at the rear of the space designated for the mobile seating devices and a minimum of two body floor attachment points at the front of the space.
- 3.3. A Type 2 Occupant Securement System shall provide for securement of the occupant's pelvic lap area and upper torso area.

G. WHEELCHAIR LIFT SPECIFICATIONS

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

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

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

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

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

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

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

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

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

G.4. SUPPORT EQUIPMENT AND ACCESSORIES - The following is recommended by the National Standards for School Buses for support equipment and accessories. 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 Invitation for Bids.)

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

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

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

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

E. AIR CONDITIONING SPECIFICATIONS

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

- 1.1. **ALTERNATOR** - Type A buses equipped with air conditioning shall be furnished with an alternator with a minimum output rating of 100 amperes. Types B, C, and D buses equipped with air conditioning shall be furnished with an alternator with a minimum output rating of 130 amperes. Type A and Type B, C, and D buses equipped with air conditioning and wheelchair lifts shall be furnished with alternators with a minimum output rating of 130 amperes and 160 amperes, respectively.
- 1.2. **INSULATION** - Minimum 5/8-inch nominal thickness plywood shall be installed over the existing or manufacturer's standard steel floor for insulation (see Par. C.2.12. for plywood requirements including installation requirements). Air-conditioned buses shall have the equivalent of 1.5 inches of fiberglass or other insulation in the ceilings and walls including the interior of hat-shaped bows. The insulation shall have a minimum R-factor value of 5.77.
- 1.3. **TINTING** - The windshield and all windows of air-conditioned school buses must be tinted to reduce the heat load of the system, meeting the requirements of Option No. 10 for dark tinting. (NOTE: It is not necessary to order Option 10; it must be furnished.)
- 1.4. **WHITE ROOF** - When so specified in the Invitation for Bids, the roofs of buses equipped with air conditioning shall be painted white, meeting the requirements of Option No. 42 and Paragraphs C.1.8.2. and E.1.9.2.

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

TABLE 36

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

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

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

H. AIR CONDITIONING SPECIFICATIONS

2.2. INSTALLATION -

- 2.2.1. **Installing Dealer** - Installation of the air conditioning system(s) shall be by the bus body company or by an authorized factory air conditioning dealer who normally stocks, sells, installs, and services a unit of the type being furnished.
- 2.2.2. **Workmanship** - Poor, shoddy installation will be grounds for immediate rejection of the complete bus.

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

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

- 3.1. **BLOWER UNIT** - The blower unit shall be of heavy-duty, commercial design and shall circulate air over the evaporator(s) to cool the passenger compartment. Fans shall be of the centrifugal or axial type and quiet in operation. Unless they are self-contained, fan motor(s) shall have bearings of the permanent lubrication type and designed to operate on the 12V-DC system of the school bus. The blower unit(s) shall not increase the ambient noise level of the unloaded school bus while parked with the engine idling more than 5 dB. when measured in the center of the bus.
- 3.2. **COMPRESSORS** - Compressors shall be of the air conditioning or chassis manufacturer's standard design. Lubrication of all moving parts shall be accomplished automatically. An automatic (electric) clutch shall be provided on each compressor. The compressor size shall be as required to meet the performance requirements above. Compressor(s) shall be compatible with the engine speed.

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

- 3.3. **CONDENSERS** - The condenser(s) shall be as recommended by the manufacturer of the unit. The air conditioning manufacturers shall use their standard condenser fabrication and installation practices.
- 3.4. **DASH OUTLETS** - Unless otherwise specified in the Invitation for Bids, air conditioners on 16- through 19-passenger school buses will not have in-dash air outlets. In-dash outlets are required on 15-passenger buses equipped with air conditioning.
- 3.5. **EVAPORATOR (COOLING COIL)** - Air conditioning manufacturers shall use their standard cooling coil, fabrication and installation practices.
- 3.6. **REFRIGERANT DRYER** - A dryer with a minimum of 10 oz of desiccant shall be installed in the refrigerating circuit. The system shall be designed and installed in accordance with the manufacturer's standard practice to insure optimum performance and ease of service/replacement.

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

H. AIR CONDITIONING SPECIFICATIONS

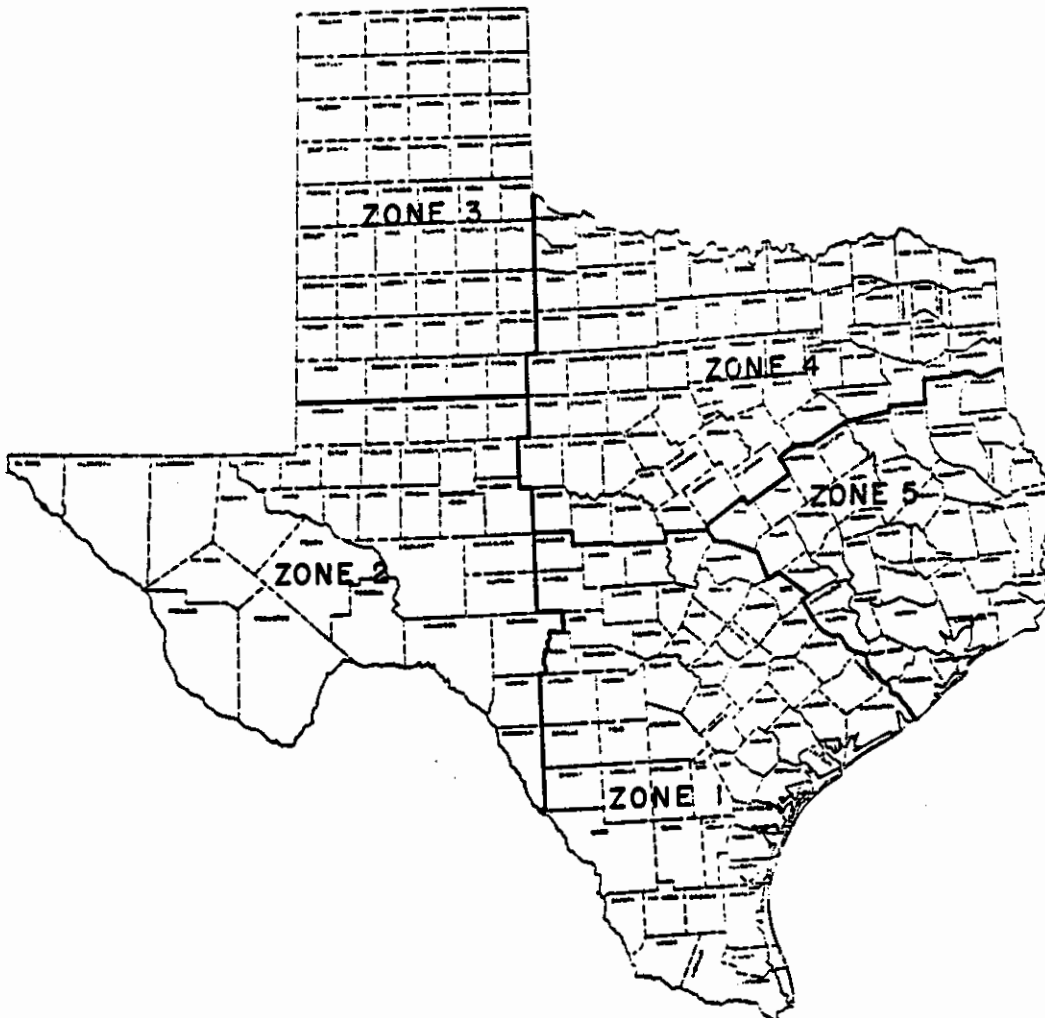
H.5. OTHER REQUIREMENTS -

- 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



H. AIR CONDITIONING SPECIFICATIONS

- 5.2. INSTRUCTION BOOKS** - One copy of complete maintenance and operating instructions shall accompany each air conditioned bus upon delivery. If a parts list is required by the ordering agency, the agency 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 on the smallest rating of any component in the system.
 - 5.3.3. Recirculation and ventilation of air quantity (in CFM).
- 5.4 WARRANTY** - The complete air conditioning system, including all components, shall be warranted for a period of one year, unlimited mileage, from the date of delivery.

I.1. AVAILABILITY OF SPECIFICATIONS -

Copies of this specification may be obtained from:

SPECIFICATION SECTION
State Purchasing and General Services Commission
P. O. Box 13047
Austin, Texas 78711-3047
Phone (512) 463-3411

SCHOOL BUREA

Date _____ Name of School District _____

Texas _____

Address _____ City _____ (Zip) _____
Phone Number _____ Name to Contact _____

(Area Code) _____
BC Number _____ Date Delivered _____

Passenger Capacity (Please circle one): 15 16 18 19 20 24 35 47 53 59 65 71 77 83
Body Make (Please check): Blue Bird Carpenter Collins Lewis Thomas Ward Wayne VanCon
Make (Please check): Blue Bird Chevrolet Dodge Ford GMC

Thomas _____ Navistar _____

Contacted	Firm (Dealer) and Name of Person

[illegible]

Please mail to: SPECIFICATIONS/INSPECTIONS SECTION
State Purchasing and General Services Commission
P.O. Box 13047
Austin, Texas 78711

**THREE MONTH TEST OF NEW SCHOOL BUS ENGINES**

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

New Engine Evaluation

(Please check or complete appropriate item)

Description

Engine size: _____ CID _____ Liters, _____ Rear Axle Ratio, _____ Gas _____ Diesel
Manufacturer _____, _____ Turbocharged _____ Naturally Aspirated
Dodge, Ford, GMC, NIC

_____ Automatic _____ Manual Transmission, _____ Air conditioner, _____ Wheelchair lift

_____ Air or _____ Hydraulic Brakes, _____ Tire Size, Luggage Rack _____ Top _____ Bottom

Installed in _____ passenger _____ bus body

(Body Manufacturer's Name)

BEGIN DATE _____ DISTRICT _____ END DATE _____

Tests

Loaded with approximately 125 pounds for each passenger space with an approximate 150-pound driver, please conduct the following five tests if possible:

(We will need to know if criteria different from that recommended are used.)

1. Acceleration - 0 to 50 MPH in 60 seconds or less: From a standing start on a level stretch of asphalt or concrete highway, record with a stop watch the time required to reach 50 MPH. _____ Time in seconds rounded to the nearest 0.1 second.
2. * Grade of 1.5% minimum @ 50 MPH: From a running start, drive the bus at 50 MPH up a grade of approximately 1.5%. Most federal highways have maximum grades of 3.0% except overpasses which are steeper. Record the speed at the summit _____ Miles per hour.
3. * Grade of 5.0% minimum - @ 25 MPH: From a running start, drive the bus at 25 MPH up a grade of approximately 5.0%. Most state highways have maximum grades of 7.0%. Record the speed at the summit _____ Miles per hour.
4. Startability - 20.0%: If possible locate a grade of approximately 20.0 degrees. (Your local Highway Department engineering may be able to help you locate grades.) Park the bus on the foot of the hill facing upward then start the engine and drive up the hill. If no 20.0% grade is available, use the steepest hill in the district. Est. grade _____ %.
* Grades of 1.5% and 5.0% rise 1.5 and 5.0 feet, respectively, in a 100 foot distance.
5. Speed - 55 MPH: With the engine speed governor connected and operating, determine if the bus will reach a minimum of 55 MPH on a level stretch of asphalt or concrete highway.
Complies: _____ Yes _____ No

Documentation

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

Operation on a Regular Route

Average daily mileage: _____ Miles Starting: _____ O.K. _____ Hard to start
Acceleration: _____ Adequate _____ Poor, Comments: _____

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

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

Operation on an Activity Trip

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

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

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

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

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

Signatures _____ Date _____
Superintendent Transportation Director

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

Jack Edwards
TEA

Pat Martin
SPGSC

Ken Hailey
DPS

TEXAS SCHOOL BUS COMMITTEE

ADDITIONAL REMARKS:

Return To: **Specification/Inspection Section**
State Purchasing and General Services Commission
P.O. Box 13047
Austin, TX 78711-3047

MAJOR COMPONENTS CHART - SMALL BUS
MAJOR COMPONENTS CHART - 1991 MODEL YEAR
SMALL SCHOOL BUSES

		PASSENGER CAPACITY					
MAJOR COMPONENTS		15	16	18	19	20	PAGE NO.
ALTERNATOR:							
Amps, Min - Std-Gas/Diesel	75/65	75/65	75/65	75/65	75/65	75/65	40
- Opt-Type A/B	100/130	100/130	100/130	100/130	100/130	100/130	40
- w WC Lift-A/B	100/130	100/130	100/130	100/130	100/130	100/130	40,109
- w A/C-A/B	100/130	100/130	100/130	100/130	100/130	100/130	40,114
- w both-A/B	130/160	130/160	130/160	130/160	130/160	130/160	40
BATTERY:							
Diesel Engine -							
CCA, Amp, Min	MS	MS	MS	MS	MS	MS	40
Reserve. Minutes, Min	MS	MS	MS	MS	MS	MS	40
Gasoline Engine -							
CCA, Amp, Min	360	360	360	360	360	360	40
Reserve, Minutes, Min	100	100	100	100	100	100	40
BRAKES: Standard							
Optional	Hyd	Hyd	Hyd	Hyd	Hyd	Hyd	39
	NA	NA	NA	NA	NA	NA	--
ENGINES: Diesel							
Gasoline	Opt	Opt	Opt	Opt	Opt	Opt	41
	Std	Std	Std	Std	Std	Std	41
EMERGENCY DOOR GLASS, LOWER							
	N/A	N/A	N/A	N/A	N/A	N/A	--
FUEL TANK, Gal, Min - Std							
- Opt	21	21	21	21	21	21	40
	30	30	30	30	30	30	40
HEATER, Btu/hr - Std							
- Opt Aux.	MS	MS	MS	MS	MS	MS	35
	MS	MS	MS	MS	MS	MS	35
KNEE SPACING, Min - Std							
- Opt	24	25	26	25	25	25	19
	27	27	27	28	28	28	19
TILT HOOD							
	N/A	N/A	N/A	N/A	N/A	N/A	--
TIRES:							
Truck Steel Belt Radial -							
Tubeless	MS	MS	MS	MS	MS	MS	39
Size	MS	MS	MS	MS	6R19.5E	MS	39
Tube Type	NA	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	NA	--
Bias Belt -							
Tubeless	NA	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	NA	--
Tube Type	NA	NA	NA	NA	NA	NA	--
Size	NA	NA	NA	NA	NA	NA	--
TRANSMISSIONS/CLUTCHES:							
Automatic -	Std	Std	Std	Std	Std	Std	39
Model	MS	MS	MS	MS	MS	MS	39
Standard -							
Fwd. Gears	NA	NA	NA	NA	NA	NA	--
Clutch Size, in, Min	NA	NA	NA	NA	NA	NA	--
U-BOLTS, NO., Min							
	NA	NA	NA	NA	4	4	23
WHEELS: Steel Disc							
Cast Spoke	Std	Std	Std	Std	Std	Std	39
	NA	NA	NA	NA	NA	NA	39

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

MAJOR COMPONENTS CHART - LARGE BUS

MAJOR COMPONENTS CHART

LARGE SCHOOL BUSES

PASSENGER CAPACITY										
MAJOR COMPONENTS	24	35	47	53	59	65	71	77	83	PAGE
ALTERNATOR: Amps, Min - Std	90	90	90	90	90	90	90	90	100	80
- Opt	130	130	130	130	130	130	130	130	130	80
- w WC Lift or AC	130	130	130	130	130	130	130	130	130	80,109
- w WC Lift & AC*	160	160	160	160	160	160	160	160	160	80,114

BATTERY: Diesel Engine -										
CCA, Amp, Min	450	450	450	450	450	450	450	450	450	80
Reserve, Minutes, Min	130	130	130	130	130	130	130	130	130	80
Gasoline Engine -										
CCA, Amp, Min	360	360	360	360	360	360	360	360	NA	80
Reserve, Minutes, Min	100	100	100	100	100	100	100	100	NA	80

BRAKES: Standard	Hyd	Hyd	Hyd	Hyd	Air	Air	Air	Air	Air	78
Optional	NA	NA	NA	NA	Hyd	Hyd	Hyd	Hyd	NA	78

ENGINES: Diesel	Opt	Opt	Opt**	Opt**	Opt**	Opt**	Opt**	Opt**	Std	82
Gasoline	Std	Std	Std	Std	Std	Std	Std	Std	NA	82

EMERGENCY DOOR GLASS, LOWER	Std	Std	Std	Std	Std	Std	Std	Std	Std	60

FUEL TANK, Gal, Min - Std	30	30	60	60	60	60	60	60	60	80
- Opt	30	NA	NA	NA	NA	NA	NA	NA	90	80

HEATER, Btu/hr - Std	45,000	45,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	73
- Opt Aux.	40,000	40,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	73

KNEE SPACING, Min - Std	24	25	25	25	25	25	24.75 ^a	25	24.75	50
- Opt	27	28	28	27.75	28	27.75	27.50 ^b	27.75	27.75	50

TILT HOOD, CONV. CHASSIS:	NA	Std	Std	Std	Std	Std	Std	Std	NA	80

TIRES: Steel Belt Radial -										
Tubeless	Std	Std	Std	Std	Std	Std	Std	Std	Std	79
Size	8R	9R	9R	9R	10R	10R	11R	11R	11R	
Tube Type	19.5.E	22.5F	22.5F	22.5F	22.5F	22.5F	22.5G	22.5G	22.5H	79
Size	NA	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	79
	NA	8.25R	8.25R	8.25R	9.00R	9.00R	10.00R	10.00R	10.00R	
		20F	20F	20F	20F	20F	20G	20G	20H	79

Bias Belt -										
Tubeless	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	79
Size	8-	9-	9-	9-	10-	10-	10-	10-	11-	
Tube type	19.5E	22.5E	22.5E	22.5E	22.5F	22.5F	22.5F	22.5F	22.5G	79
Size	opt	opt	opt	opt	opt	opt	opt	opt	opt	79
	8.00x	7.50x	8.25x	8.25x	9.00x	9.00x	10.00x	10.00x	10.00x	79
	19.5E	20E	20E	20E	20F	20F	20F	20F	20G	79

TRANSMISSIONS/CLUTCHES:										
Automatic -	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Opt	Std	84
Model	MS	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545	AT-545 ^c	MT-643	84
Standard -										
Fwd. Gears	M4	M4	M4	M4	M5	M5	M5	M5	NA	84
Clutch Size, in, Min	12	12	12	12	12	13	13	13	NA	84

U-BOLTS, NO., Min	4	6	6	6	6	8	8	8	8	56

WHEELS: Steel Disc	Std	Std	Std	Std	Std	Std	Std	Std	Std	79
Cast Spoke	NA	Opt	Opt	Opt	Opt	Opt	Opt	Opt	NA	79

LEGEND:	AC = Air Conditioning; Amp = Amperes; Aux. = Auxiliary; CCA = Cold Cranking Amperes; Fwd. = Forward; Hyd = Hydraulic; M4/M5 = Manual 4-spd/5-spd Transmission; Min = Minimum; MS = Manufacturer's Standard; NA = Not Available/Not Applicable; Opt = Optional; Std = Standard;									
NOTES:	^a = 25.00" on 71-passenger Long Wheelbase School Bus; ^b = 27.75" on 71-passenger Long Wheelbase School Bus; ^c = MT 643 on 77-passenger Forward-control School Bus or where required to match engine torque.									

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

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

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1991

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STATE OF TEXAS

EXECUTIVE DIRECTOR
LIAS B. "BUBBA" STEEN

NOTICE TO PROSPECTIVE BIDDERS

Enclosed are Texas specification(s) for items listed on your Mailing List Application or Texas specifications which you have requested.

If you plan to offer products in response to a State of Texas Invitation for Bids, please be sure that your product meets or exceeds each of the requirements listed in the referenced Texas specification.

Please retain the enclosed for future bidding purposes. Should you need additional copies of the enclosed or other Texas specifications, please write us at the above address or phone 512-463-3411.

Troy C. Martin

Troy C. Martin
Specifications/Inspections Chief

Enclosure(s)



STATE OF TEXAS

State Purchasing and General Services Commission

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LIAS B. "BUBBA" STEEN

DIRECTOR FOR PURCHASING
RON ARNETT

June 6, 1991

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

RE: Amendment # 3

Please remove the following pages from your copy of this Texas Specification: 1-2, 13-16, 27-28, 33-34, 59-60, 63-64, 71-72, and 115-116, and replace them with the attached sheets correspondingly numbered.

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

"06/06/91 - Changed by Am. # 3"

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

Thank you for your cooperation.

Sincerely,

A handwritten signature in cursive script that reads "Troy C. Martin".

Troy C. Martin
Specifications/Inspection Chief

TCM:RCD

Enclosures

c: Ray Brewer
Pat Martin
Ralph Simonson
School Bus Committee



EFFECTIVE DATE:
January 1, 1991

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

TEXAS SCHOOL BUSES

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.1. SCOPE -

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

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

(Short WB)

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

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

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

***Diesel only.**

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

A. GENERAL INFORMATION, REQUIREMENTS, AND CONDITIONS

A.2. DEFINITIONS -

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

A.3. APPLICABLE SPECIFICATIONS AND STANDARDS -

- 3.1 **FEDERAL HIGHWAY SAFETY PROGRAM STANDARD** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the Highway Safety Program Standard No. 17. All requirements of this specification must be met unless they are in conflict with Standard No. 17 as it applies to school buses:
 - 3.1.1. **Federal Highway Safety Program Standard No. 17, Pupil Transportation Safety** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
- 3.2. **FEDERAL MOTOR VEHICLE SAFETY STANDARDS** - School bus bodies and chassis shall meet or exceed the minimum requirements of this specification and shall also meet all applicable requirements of the Federal Motor Vehicle Safety Standards (FMVSS). All requirements of this specification must be met unless they are in conflict with the FMVSS as they apply to school buses:
 - 3.2.1. **Federal Motor Vehicle Safety Standards (Public Law 89-563)** - Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402:
 - (1) FMVSS No. 103 - Windshield Defrosting and Defogging Systems.
 - (2) FMVSS No. 105 - Brakes, Hydraulic Service, Emergency and Parking.
 - (3) FMVSS No. 108 - Lamps, Reflective Devices, and Associated Equipment.
 - (4) FMVSS No. 111 - Rearview Mirrors - Passenger Cars and Multipurpose Passenger Vehicles.
 - (5) FMVSS No. 121 - Air Brake Systems - Buses and Trailers.
 - (6) FMVSS No. 125 - Warning Devices.
 - (7) FMVSS No. 205 - Glazing Materials.
 - (8) FMVSS No. 208 - Occupant Crash Protection.
 - (9) FMVSS No. 209 - Seat Belt Assemblies - Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses.
 - (10) FMVSS No. 210 - Seat Belt Assembly Anchorages.
 - (11) FMVSS No. 217 - Bus Window Retention and Release.
 - (12) FMVSS No. 220 - School Bus Rollover Protection.
 - (13) FMVSS No. 221 - School Bus Body Joint Strength.
 - (14) FMVSS No. 222 - School Bus Seating and Crash Protection.
 - (15) FMVSS No. 301 - Fuel System Integrity.
 - (16) FMVSS No. 302 - Flammability of Interior Materials - Passenger Cars, Multipurpose Passenger Vehicles, Trucks, and Buses.

B. ORDERING INFORMATION

B.5. REGULAR OPTIONS -

15- THROUGH 20-PASSENGER BUSES

REGULAR OPTION NO.

DESCRIPTION

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

Regular Seating Capacity	15	16	18	19	20
Rows of Seats	3	3	4/5	3	3
Minimum Knee Space, inches	27	27	27	28	28
17. School Name Lettering, both sides of bus (see Par. C.1.4.10.).
20. Sound Abatement Insulation (shall reduce interior noise 4 dB(A), minimum; see Par. C.1.5).
21. Stop Arm, left side of bus (see Par. C.3.8.).

Note: Reflectorized surface must be specified, if required (see Par. 3.8.1.).
22. Strobe Light, Roof-mounted (see Par. C.3.7.).
23. System, Security Lock, All doors (requires ignition disconnect on emergency door).
24. Tachograph, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/speedometer/recorder; see Par. D.5.6.).
26. Laminated Safety Plate Glass, AS-2 or better (see Par. C.2.19.2.2.).
27. Powered Service Door, manufacturer's standard (N/A on Sedan type door) (see Par. C.2.14.3.)
31. Tool Compartment (see Par. C.3.10.).
32. Wheel, Spare (without carrier, tire, or tube; see Par. D.2.6.2.).
34. Wheelchair Lift, Folding Platform Type (floor-mounted on curb side of bus in front of or behind the rear wheelwell, at manufacturer's option; see Par. G.).

NOTE: For Option 34, the school district must specify number of wheelchair positions required on bus.
37. Wheelchair Restraints, Webbed-belt Type (for unusual wheelchairs which cannot otherwise be restrained; see Par. G.3.)
42. White Roof (see Par. C.1.4.2.)
43. Windows, push-out, additional (for emergency exit), (indicate quantity per side) (see Par. C.2.19.1.2.)

B. ORDERING INFORMATION

REGULAR OPTIONS

24- THROUGH 77-PASSENGER BUSES

REGULAR OPTION NO.

DESCRIPTION

1. Air Conditioning, Standard Cooling (see Par. H.).
NOTE: Special Requirements - Option 1 requires a minimum 130 ampere alternator and 5/8" nominal thickness plywood installed over the steel floor.
 2. Air conditioning, extra cooling (N/A on 77-passenger buses) (See Par. H.1.5.)
 3. Alternator, 130 ampere minimum (required with option(s) 1, 35 or 36; see Par. F.4.1.2.)
 4. Axle, Rear, Two-speed.
 5. Brakes, Hydraulic (for 59-, 65-, 71-, and 77-passenger buses only).
 6. Chassis, Long Wheelbase (requires minimum 274-inch wheelbase for 71-passenger conventional bus only; or 157-inch wheelbase for 24-passenger bus only).
 7. Diesel Engine (for 24- through 77-passenger buses; see conventional buses in Tables 12 through 32).
 8. Differential, No-spin.
 9. Fuel Tank, Increased Capacity (for 24-passenger buses only; see Par. F.3.3.2.).
 10. Glazing, Dark Tint Passenger Side Windows, Minimum Light Transmittance of 30% and maximum Light Transmittance of 40% (see Par. E.2.19.3.1.).
 11. Heater, Rear (see Par. E.3.6. for size and installation requirements).
 12. Luggage Rack (mounted on top of the bus; see Par. E.3.7.).
 13. Moisture Ejectors, Automatic (for 59- through 77-passenger buses with air brakes only; see Par. F.2.2.1.3.).
 14. Mud Flaps, with Brackets, Mounted (see Par. E.3.10.). There shall be no advertisement on the mud flaps.
 16. Knee Spacing (maximum allowed by FMVSS no. 222; requires deleting one row of seats which will reduce seating capacity).
- | Regular Seating Capacity | 24 | 35 | 47 | 53 | 59 | 65 | 71-S | 71-L | 77 |
|----------------------------|----|----|----|-------|----|-------|------|-------|------|
| Rows of Seats | 4 | 5 | 7 | 8 | 9 | 10 | 11 | 11 | 12 |
| Minimum Knee Space, inches | 27 | 28 | 28 | 27.75 | 28 | 27.75 | 27.5 | 27.75 | 27.5 |
17. School Name Lettering, both sides of bus (see Par. E.1.4.8.).
 18. Seat Belts (for each passenger seating position; see Par. E.3.12.).
 19. Slack Adjusters, Automatic, Two at front and two at rear (for buses with air brakes only; see Par. F.2.2.1.4.).
 20. Sound Abatement Insulation (shall reduce interior noise by 4 dB(A), minimum).
 21. Stop Arm, left side of bus (see Par. E.3.14.).
Note: Reflectorized surface must be specified, if required (see Par. 3.14.1.).
 22. Strobe Light, Roof-mounted (see Par. E.3.11.).
 23. System, Security Lock, All Doors (with ignition disconnect on emergency door).
 24. Tachograph, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/speedometer/recorder; see Par. F.5.9.).

B. ORDERING INFORMATION

- 25. Tachometer (to indicate engine RPM).
 - 26. Laminated Safety Plate Glass, AS-2 or better (see Par. E.2.19.2.2.).
 - 27. Powered Service Door, manufacturer's standard (see Par. E.2.15.5.)
 - 30. Tires, Mud and Snow Tread (for Rear Wheels only).
 - 31. Tool Compartment (see Par. E.3.16.).
 - 32. Wheel, Spare (without carrier, tire, or tube; see Par. F.2.6.2.3.).
 - 33. Wheel, Spare, Mounted (with carrier but not tire and tube; carrier not available on 24-passenger bus; see Par. F.2.6.2.2.).
 - 35. Wheelchair Lift, Folding Platform Type, Front Curb Side Mounted (for 24-through 71-passenger bus only; see Par. G.).
 - 36. Wheelchair Lift, Folding Platform Type, Rear Curb Side Mounted. Same as Option 35 above except floor-mounted on rear curb side of bus (see Par. G.). This option is recommended only for buses which will have a regular attendant in addition to the driver.
- NOTE: For Option Nos. 35 and 36, the school district must specify the number of wheelchair positions required on bus.
- 37. Wheelchair Restraints, Webbed-belt Type (for unusual wheelchairs which cannot otherwise be restrained; see Par. G.3.).
 - 39. Wheels, Cast Spoke, All Wheels (see Par. F.2.6.2.1.) 35-77 passenger buses only.
 - 41. Seat Backs, Increased Height (see Par. E.2.13.1.).
 - 42. White Roof (see Par. E.1.4.1.)
 - 43. Windows, push-out, additional (for emergency exit), (indicate quantity per side) (see Par. E.2.19.1.5.)

B. ORDERING INFORMATION

REGULAR OPTIONS

83-PASSENGER BUSES

REGULAR OPTION NO.

DESCRIPTION

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

Regular Seating Capacity	83
Rows of seats	13
Minimum Knee Space, inches	27
17. School Name Lettering, both sides of bus (see Par. E.1.4.8.).
18. Seat Belts, Passenger (for each passenger seating position (see Par. E.3.12.).
19. Slack Adjusters, Automatic, two at front and two at rear (see Par. F.2.2.1.4.).
20. Sound Abatement Insulation (shall reduce interior noise by 4 dB(A), minimum).
21. Stop Arm, left side of bus (see Par. E.3.14.).
Note: Reflectorized surface must be specified, if required (see Par. 3.14.1.).
22. Strobe Light, Roof-mounted (see Par. E.3.11.).
23. System, Security Lock, All Doors (with ignition disconnect on emergency door).
24. Tachograph, 0-80 mph, 12 volt (with 7-day 4-7/8 inch disc chart and electronic clock/ speedometer/recorder; see Par. F.5.9.).
26. Laminated Safety Plate Glass, AS-2 or better (see Par. E.2.9.2.2.)
27. Powered Service Door, manufacturer's standard (see Par. E.2.15.5.)
30. Tires, Mud and Snow Tread (for Rear Wheels only).
31. Tool Compartment (see Par. E.3.16.).
33. Wheel, Spare, Mounted (with carrier but not tire and tube (see Par. F.2.6.2.3.).
41. Seat Backs, Increased Height (see Par. E.2.13.1.).
42. White Roof (see Par. E.1.4.1.)
43. Windows, push-out, additional (for emergency exit), (indicate quantity per side) (see Par. C.2.19.1.5.)