

Charles J. Hood

FLORIDA SCHOOL BUS SPECIFICATIONS

REVISED NOVEMBER 1980

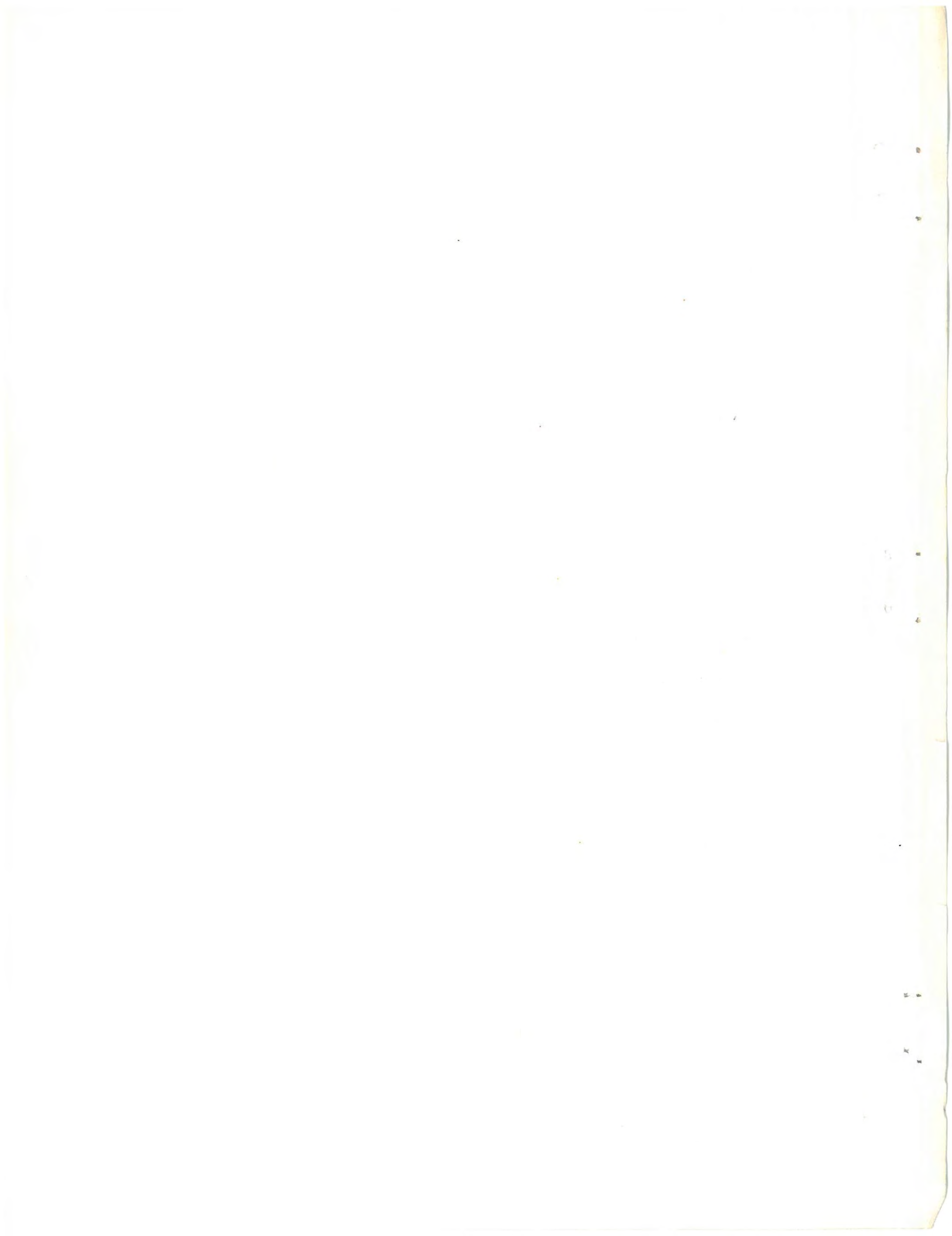


FLORIDA DEPARTMENT OF EDUCATION
SCHOOL TRANSPORTATION MANAGEMENT
TALLAHASSEE, FLORIDA

State of Florida
Department of Education
Tallahassee, Florida
Ralph D. Turlington, Commissioner
Affirmative action/equal opportunity employer

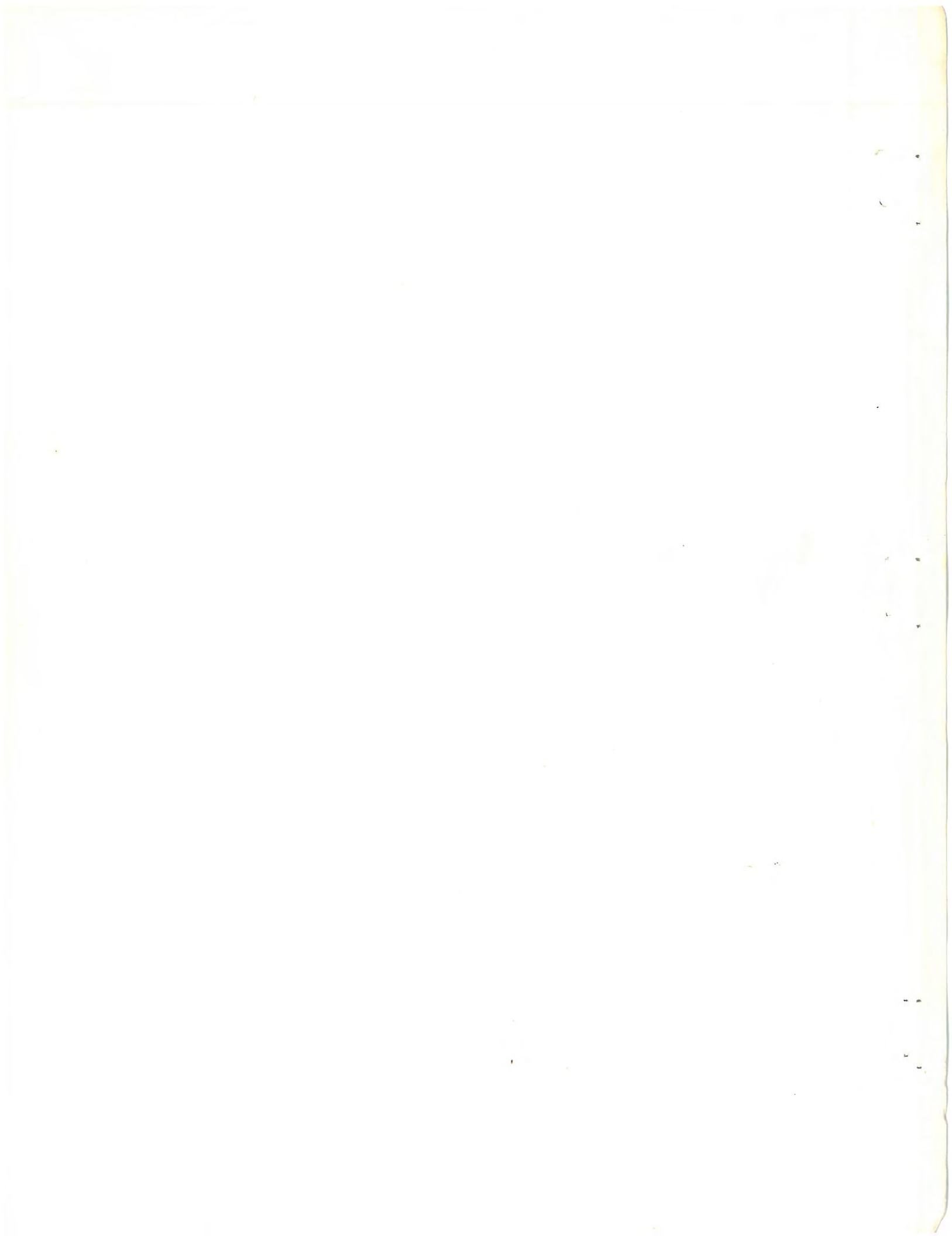
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PART I

MOTOR REQUIREMENTS



The minimum requirements for motors for conventional buses and acceptable differential ratios are as follows:

BUS CAPACITY	MINIMUM SIZE ENGINE		DIFFERENTIAL RATIO:1
	Gasoline	Diesel	
29	292 cu. inch		6.67, 6.8, 7.17, 7.20
35	292 cu. inch		6.67, 6.8, 7.17, 7.20
47	292 cu. inch		6.67, 6.8, 7.17, 7.20
53 & 59	345 cu. inch		6.50, 6.83, 7.17, 7.20
59		165 G.H.P.	4.88 through 5.86
65	345 cu. inch		6.50, 6.83, 7.17, 7.20
65		165 G.H.P.	4.88 through 5.86

The minimum requirements for motors for forward control and pusher type buses and acceptable differential ratios are as follows:

BUS CAPACITY	MINIMUM SIZE ENGINE		DIFFERENTIAL RATIO:1
	Gasoline	Diesel	
15 through 19	²⁹² 302 cu. inch	()	Compatible with Engine
22 through 33	302 cu. inch	()	4.50 through 4.99 ^{5.30}
71 through 89	427 cu. inch		5.83, 6.17, 6.57, 6.83, 7.16, 7.20
71 through 89		200 G.H.P.	4.63, 5.29, 6.83

7. (Engine governed speed and differential ratio shall provide for approximately 55 m.p.h. road speed in highest gear.

~~Additional requirements for diesel-powered conventional chassis follow on next page.~~

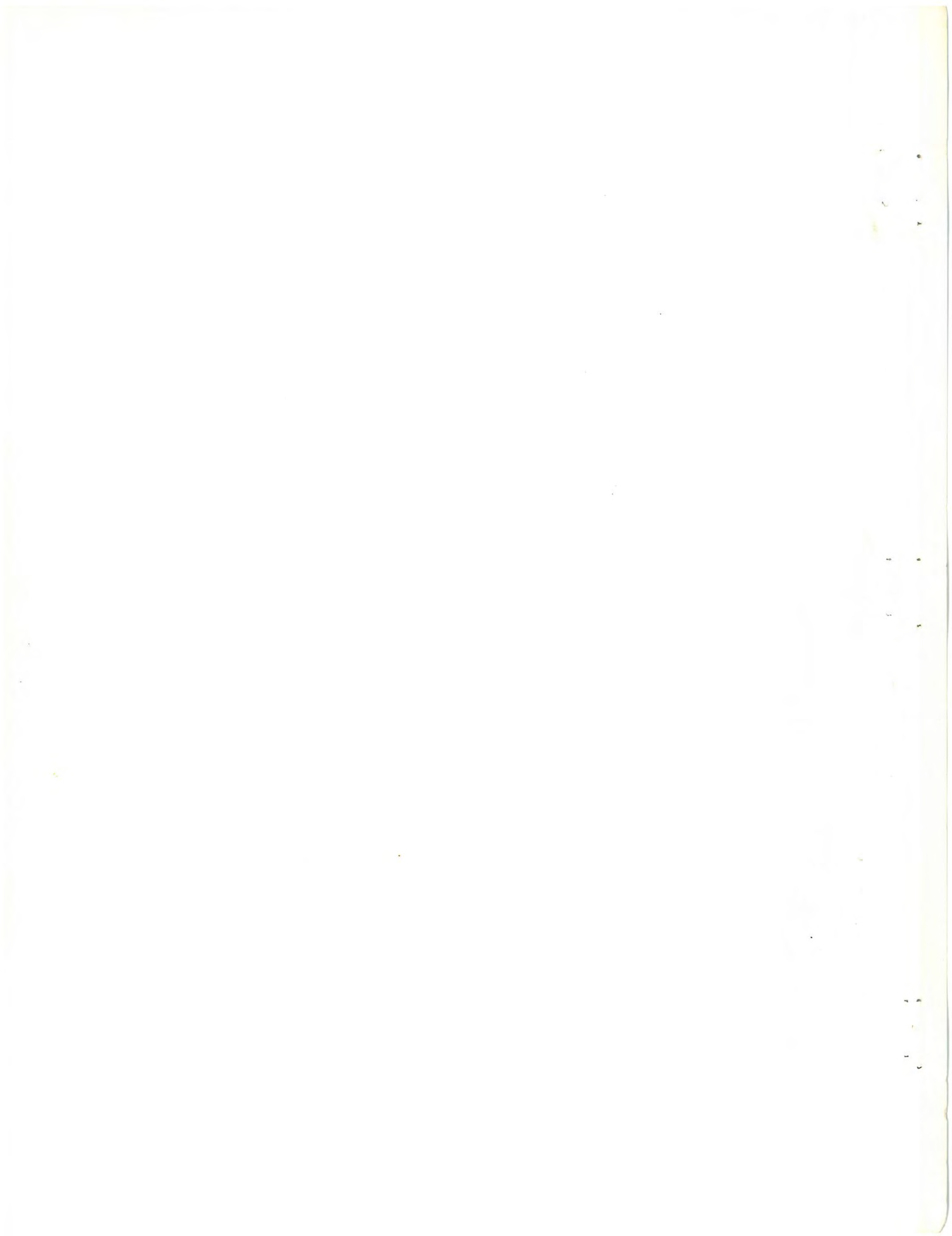
ADDITIONAL REQUIREMENTS FOR DIESEL-POWERED CONVENTIONAL CHASSIS

1. G.A.W.R.: Front - 8,000 lbs.
Rear - 17,500 lbs.
2. Axles: Front - 9,000 lbs.
Rear - 17,500 lbs.
3. Springs: Front - 4,500 lbs. at ground
Rear - 8,750 lbs. at ground
4. Tires: 9.00 x 20, 12 ply
5. Battery: Dual 12 volt,
Minimum 455 cold cranking amps.
per battery at 0°F.
6. Transmission: Automatic—Minimum 4 speed forward;
Allison AT 545 or approved equal.
An external filter in the transmission
oil cooler return line is required.

PART II

CHASSIS SPECIFICATIONS

CONVENTIONAL SCHOOL BUSES



BASIC MINIMUM SPECIFICATIONS FOR SCHOOL BUS CHASSIS
FOR MOUNTING CONVENTIONAL SCHOOL BUS BODIES
TYPE "C" SCHOOL BUS

1. Motor: (See page 4 for approved engines.)
Additional engine items required:
 - A. Oil bath or dry type air cleaner
 - B. Oil filter, 1 quart (full flow, replacement element type)

oil pressure gauge? KHV
2. Governor: ^{C.} Shall permit controlled engine RPM up to manufacturer's recommended maximum for engine used.
3. Exhaust System: Corrosion resistant muffler; extend 5 inches beyond chassis frame. (See National Standards.)
Exception: Exhaust may not exist in front of rear wheels.
4. Alternator Requirements: 100 amp. minimum rating; 50 amp. minimum output at manufacturer's recommended engine idle speed; dual belt, maximum ratio 2.5 to 1; sealed ball or roller bearings with an ammeter meeting National Minimum Standards.
5. Voltage: Regulator; solid state components excluding field cutout relay; readily accessible for service. Voltmeter or Ammeter: graduated scale.
6. Battery: 455 cold cranking amps. at 0°F, 12 volt; under-hood location required.
7. Directional Signals: Dash indicator light, self-canceling switch with lead wires on steering column for body manufacturer's attachment including 2-face front turn signal lights, fender mounted.
8. Horn: Dual, 120 decibels. (See National Standards.)
9. Headlights: Must meet S.A.E. and Federal Standards.
10. Wiring Harness: 100 amp. load and complete wiring for tail and stop lights; color-coded circuits.
11. Fuel Tank: 30 gallon 29-47 passenger unit; single 60 gallon required 53 capacity and larger chassis, spout located for ease in servicing. Gauge compatible with tank capacity meeting requirements of Federal Motor Vehicle Safety Standard 301.
12. Hood and Fenders: Painted National School Bus Chrome, Spec. #13432, Federal Standard #595.

13. Front Bumper: Must be black, full width, Channel type minimum 8 inches.
14. Shock Absorbers: Front and rear, double-acting; adequate size for axle load.
15. Rear Springs: Progressive type. Front Springs: Double-wrap sta. end. (See following chart, Items 29 and 30.)
16. Tire and Rim Spec.: Shall conform to current standards of Tire and Rim Association. (See following chart for size.)
17. Drive Shaft Guards and Shields: Required
18. Frame Side Member: One piece construction.
19. Power Steering: Chassis 29-65 capacity shall have factory installed power steering, integral type.
20. Brakes: Hydraulic and full air brakes shall be split type and include fail-safe emergency characteristics and shall meet the National Minimum Standards for School Bus Chassis (1980). Power assist meeting Federal Motor Vehicle Safety Standard 105 required on all hydraulic brake models. An approved desiccant or air-cooled dryer with automatic purge and drain cycle with ~~emphasis on a horizontal mounting~~ is required on all air brake models. A heating element is ~~not~~ required. Fifty-nine and sixty-five capacity chassis shall have a minimum brake shoe width of seven (7) inches on the rear axle.
21. Parking Brake: On hydraulic brake models an Orscheln type ~~control~~ mounted in easy access of the driver is required. On air brake models, a dash-mounted control valve to spring-set the parking brake on the rear wheels is required.
22. Transmission: Mechanical - Syncromesh except 1st and reverse gears. Fifty-nine to sixty-five capacity, 5-speed direct in 5th. Wide ratio only. Automatic - Minimum 3-speed forward through 47 capacity; minimum 4-speed forward 59-65 capacity, Allison AT 545 or approved equal. On vehicles equipped with automatic transmission with four forward speeds or more, an external filter in the transmission oil cooler return line is required.
23. Odometer: Accrued mileage including tenths of miles.

The following basic specifications differ according to size chassis for mounting various size school bus bodies.

PUPIL LOAD BODY SIZE BASED ON MINIMUM OF 12.8 INCHES PER PASSENGER SEATING POSITION

<u>Gasoline Powered</u>	<u>29</u>	<u>47</u>	<u>53</u>	<u>59</u>	<u>65</u>
24. Minimum G.A.W.R.					
A. Front	5,000	5,500	7,000	7,500	7,500
B. Rear	10,500	14,200	16,160	17,500	17,500
25. Cowl to axle, minimum	123"	162"	194"	211"	229"
26. Approximate wheel base	150"	190"	218"	239"	257"
27. Front Suspension (axle) lbs. min.	5,000	5,500	7,000	7,500	7,500
28. Rear axle lbs. min.	11,000	15,000	17,000	17,500	17,500
29. Ea. front spring at ground	2,500	2,750	3,500	4,000	4,000
30. Ea. rear spring at ground (progressive spring)	5,250	7,500	8,500	8,750	8,750
31. Service brake (min. sq. inch)					
Hydraulic	440	440	500	---	---
Full Air (7" shoe rear axle)	---	---	---	663	663
32. Tire Size:					
Tube Type-Nylon	7.50-20-8	8.25-20-10	9.00-20-10	9.00-20-12	9.00-20-12
Tubeless-Nylon	8-22.5-8	9-22.5-10	10-22.5-10	10-22.5-12	10-22.5-12
33. Advanced Rim Size:					
Tube Type	5.0	6.5	7.0	7.0	7.0
Tubeless	5.25	6.75	6.75	6.75	6.75
34. Clutch Diameter	---	12"	12"	12"	13"
35. Transmission Forward Speeds	4	4	4	5	5

36. Belt drive to components, such as alternator, air compressor, and power steering, shall deliver to rated requirements without drive slippage at maximum load.
37. Hydraulic brake models shall have dual frame mounted hydrovacs or an approved power assist unit. If vacuum power assist is furnished the following are required; (A) 1,000 cubic inch reserve tank; (B) check valves; (C) dash-mounted gauge; (D) vacuum manifold, tapped two fittings or Tee in line for 2nd vacuum tank installed by body company. Manifold of air brake models except diesels shall be tapped for vacuum attachment. All models shall have audible or visible warning device.
38. Reference to air brakes denotes full air brakes. Wet tanks, dry tanks, and chambers shall be adequate for each size bus. Units shall be equipped with quick release valves, rear; automatic pressure release; low pressure audible signal; air dryer and 7 cubic foot minimum compressor, engine oil-fed. Brake application valve shall respond to gradual foot pressure application and provide for smooth braking of vehicle. Brakes shall be wedge or cam actuated. If brakes on one axle are self-adjusting type, both axles shall have self-adjusting brakes. If cam is used, slack adjusters shall provide 360-degree adjustment on rear axle. Minimum lining thickness 3/8-inch front and 3/4-inch rear (except taper on brake blocks).

PART III

CHASSIS SPECIFICATIONS

TYPE "D" BUS WITH FRONT MOUNTED ENGINE

BASIC MINIMUM SPECIFICATIONS OF TYPE "B" AND "D"
SCHOOL BUS CHASSIS FOR MOUNTING SCHOOL BUS BODIES

1. Engine: (See page 4 for minimum size engines approved.)
Additional engine items required:
 - A. Air cleaner, oil bath or dry type.
 - B. Oil filter, 1 quart minimum, full flow, replacement element type.
 - C. Governor shall permit controlled engine RPM up to manufacturer's recommended maximum for engine used.
 - D. Oil pressure and coolant temperature gauge.
(Warning light accepted on bus sizes 22 through 33 capacity.)
 - E. Vacuum take-off connection on intake manifold except diesel.
2. Radiator Filler Tube: Located for ease in service from outside of bus.
3. Alternator: 100 amp. minimum rating, 50 amp. minimum output at manufacturer's recommended engine idle speed; dual belt drive maximum ratio 2.5:1*; ball or roller bearings on drive and slip ring ends and ammeter meeting National Minimum Standards. Exception: 22 through 33 capacity require a minimum of 80 amps.
4. Voltage Regulators: Solid state components excepting field cutout relay; readily accessible. Voltmeter or Ammeter: graduated scale on 71-89 capacity units.
5. Horns: 120 decibels, dual. (See National Standards.)
6. Directional Signals: Dash indicator light; self-canceling switch with lead wires on steering column for body manufacturer's attachment, connected to ignition switch.
7. Fuel Tank: Meeting requirements of F.M.V.S.S. 301.
(See item 23 for size tank required.)
8. Shock Absorbers: Front and rear double-acting; adequate size for axle load.
9. Power Steering: Integral type required.
10. Transmission: Automatic - 3-speed, 22 through 33 capacity; MT643 four forward speed, 71 through 89 capacity and having external filter in the transmission oil cooler return line.

*Single belt approved if and only if one drive pulley and one driven pulley with no added pulleys are included and the combined belt wrap of the drive and driven pulley is 360 degrees. Direct gear driven alternator is an approved equal.

11. Service Brakes:

- A. Hydraulic brake models shall be split type with vacuum or hydraulic power assist and include fail-safe emergency characteristics, meeting 1980 National School Bus Standards and F.M.V.S.S. 105.
- B. Air brake models shall have shoes actuated by wedge or "S" cam; 750 square inch lining minimum area; and air dryer, desiccant or air-cooled type with emphasis on a horizontal mount, with automatic purge and drain cycle. A heating element is not required. Air brake models shall also have 12 C.F.M. compressor, engine oil-fed; audible low pressure warning device; rear quick release valve; pressure gauge on dash; and shall be split type incorporating fail-safe emergency characteristics and meet 1980 National School Bus Standards. If cam brake actuators are furnished, slack adjusters shall provide for 360 degree adjustment on rear axle. Actuators front and rear shall be of the same type and have manual release on spring chambers at rear axle.

12. Parking Brake: Hydraulic brake models, Orscheln type control, foot operated or hand operated; air brake models, dash mounted control valve to spring-set parking brakes on rear wheels.
13. Drive Line Guards: Required to prevent drive shaft from falling to ground if broken.
14. Frame Side Members: One piece construction, between front and rear spring hangers. Extension of frame length is permissible only when such alterations are not for purposes of extending or reducing wheelbase.
15. Odometer: Accrued mileage, tenth mile calibrations.
16. Wiring: 100 amp. capacity; color-coded circuits.
17. Exhaust: Corrosion resistant muffler and tailpipe.
18. Battery:
- A. Gasoline powered units shall have 12 volt, minimum 455 cold cranking amps. at 0°F, mounted under hood.
 - B. Diesel units shall have dual, 12 volt, minimum 455 cold cranking amps. per battery, mounted in slide-out tray in body skirt.
19. through 23. See following page.

BUS SIZES

	<u>22</u>	<u>27-33</u>	<u>71 Gas</u>	<u>71 Diesel</u>	<u>77 Diesel</u>	<u>83 Gas</u>	<u>83 Diesel</u>	<u>89 Diesel</u>
19. Minimum Gross Axle Weight Rating:								
A. Front	4,000	4,000	10,860	12,000	12,000	12,000	12,600	13,000
B. Rear	7,900	9,840	18,500	18,500	18,500	18,500	19,000	23,000
20. Tires - Minimum Size Acceptable (Dual Rear Required)	7.50x 16-8	8x19.5 -10	1000x 20-12	1000x 20-14	1000x 20-14	1000x 20-14	1000x 20-14	1100x 20-14
21. Disc Wheels - Minimum Rim Width	6.0 in	6.0 in	7.5 in.	7.5 in.	7.5 in.	7.5 in.	7.5 in.	8.0 in.
22. Minimum Wheelbase	125 in.	125 in.	191 in.	191 in.	208 in.	230 in.	230 in.	245 in.
23. Minimum Size Fuel Tank (Meeting Requirements of F.M.V.S.S. 301)	30 gal.	30 gal.	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.

PART IV

CHASSIS SPECIFICATIONS

TYPE "D" BUS WITH REAR MOUNTED ENGINE

BASIC MINIMUM SPECIFICATIONS OF TYPE "D" SCHOOL BUS
CHASSIS FOR MOUNTING SCHOOL BUS BODIES

1. Engine: (See page 4 for minimum size engines approved.)
Additional engine items required:
 - A. Air cleaner, oil bath or dry type.
 - B. Oil filter, 1 quart minimum, full flow, replacement element type.
 - C. Governor shall permit controlled engine RPM up to manufacturer's recommended maximum for engine used.
 - D. Oil pressure and coolant temperature gauge.
 - E. Vacuum take-off connection intake manifold except diesel.
2. Radiator Filler Tube: Located for ease in service from engine compartment.
3. Alternator: 100 amp. minimum rating, 50 amp. minimum output at manufacturer's recommended engine idle speed; dual belt drive maximum ratio 2.5:1*; ball or roller bearings on drive and slip ring ends and ammeter meeting National Minimum Standards.
4. Voltage Regulators: Solid state components excepting field cutout relay; readily accessible. Voltmeter or Ammeter: graduated scale.
5. Horns: 120 decibels, dual. (See National Standards.)
6. Directional Signals: Dash indicator light; self-canceling switch with lead wires on steering column for body manufacturer's attachment, connected to ignition switch.
7. Fuel Tank: Meeting requirements of F.M.V.S.S. 301. Minimum capacity 60 gallons.
8. Shock Absorbers: Front and rear double-acting; adequate size for axle load.
9. Power Steering: Integral type required.
10. Transmission: Automatic; MT643 four forward speed, and having external filter in transmission oil cooler return line.

*Single belt approved if and only if one drive pulley and one driven pulley with no added pulleys are included and the combined belt wrap of the drive and driven pulley is 360 degrees. Direct gear driven alternator is an approved equal.

11. Service Brakes: Air brake models shall have shoes actuated by wedge or "S" cam; 750 square inch lining minimum area; and air dryer, desiccant or air-cooled type with emphasis on a horizontal mount, with automatic purge and drain cycle. A heating element is not required. Air brake models shall also have 12 C.F.M. compressor, engine oil-fed; audible low pressure warning device; front and rear quick release valve; pressure gauge on dash; and shall be split type incorporating fail-safe emergency characteristics and meet 1980 National School Bus Standards. If cam brake actuators are furnished, slack adjusters shall provide for 360 degree adjustment. Actuators front and rear shall be of the same type and have manual release on spring chambers at rear axle.
12. Parking Brake: Dash mounted control valve to spring-set parking brakes on rear wheels.
13. Drive Line Guards: Required to prevent drive shaft from falling to ground if broken.
14. Frame Side Members: One piece construction, between front and rear spring hangers. Extension of frame length is permissible only when such alterations are not for purposes of extending or reducing wheelbase.
15. Odometer: Accrued mileage, tenth mile calibrations.
16. Wiring: 100 amp. capacity; color-coded circuits.
17. Exhaust: Corrosion resistant muffler and tailpipe.
18. Battery:
 - A. Gasoline powered units shall have 12 volt, minimum 455 cold cranking amps. at 0°F.
 - B. Diesel units shall have dual, 12 volt, minimum 455 cold cranking amps. per battery, mounted in engine compartment or slide-out tray in body skirt.
19. through 23. See following page.

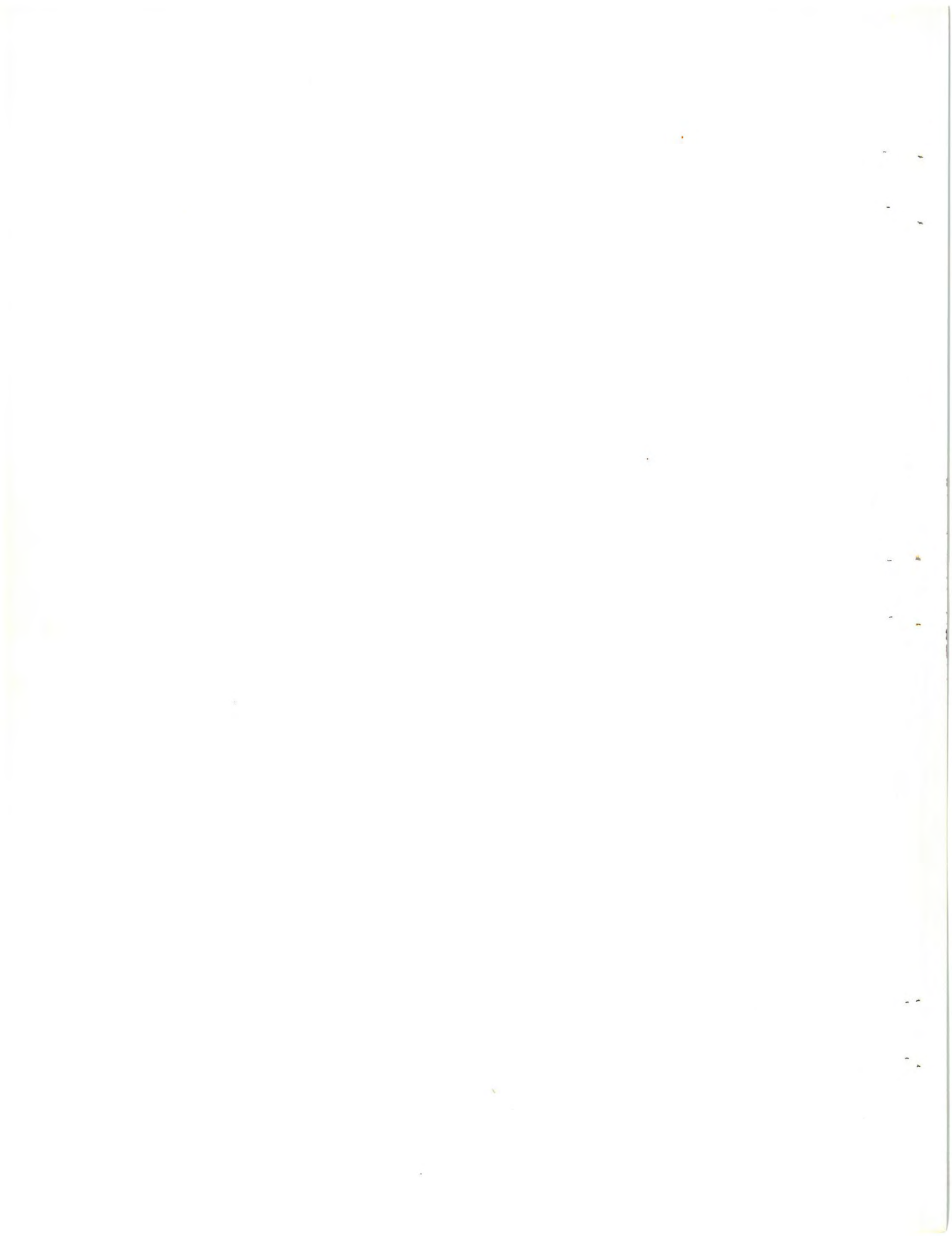
BUS SIZES

	<u>72 Gas</u>	<u>72 Diesel</u>	<u>78 Gas</u>	<u>78 Diesel</u>	<u>84 Gas</u>	<u>84 Diesel</u>
19. Minimum Gross Axle Weight Rating:						
A. Front	12,000	12,000	12,000	12,000	12,000	12,000
B. Rear	21,200	21,200	21,200	21,200	23,000	23,000
20. Tires - Minimum Size Acceptable (Dual Rear Req.)	1000X 20-14	1000X 20-14	1000X 20-14	1000X 20-14	1100X 20-14	1100X 20-14
21. Disc Wheels—10 Stud Minimum Rim Width	7.5 in.	7.5 in.	7.5 in.	7.5 in.	8.0 in.	8.0 in.
22. Minimum Wheelbase	200 in.	200 in.	230 in.	230 in.	260 in.	260 in.
23. Minimum Size Fuel Tank (Meeting Req. of F.M.V.S.S. 301)	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.	60 gal.

NOTE: Maximum length of vehicle shall not exceed 40 feet, bumper to bumper.

PART V

BODY SPECIFICATIONS



FLORIDA SCHOOL BUS BODY SPECIFICATIONS

The specifications set forth are descriptive of Types "B", "C" and "D" school buses. Special exceptions for Types "B" and "D" bodies are on page 37. The design of school bus bodies is to provide for the safety and comfort of pupils and for economical transportation as required by Florida Statutes and the National Highway Traffic Safety Administration. The National Minimum Standards for School Buses, 1980 Revised Edition, is applicable for items not specified in this document—storage compartment excepted.

WARRANTY

Bids submitted under this specification shall include a warranty covering materials and workmanship for a period of at least one year.

PUBLICATIONS

Each Florida school board that is delivered one or more bus bodies shall be furnished a parts catalog and a parts price list.

INSPECTION

Purchase of school buses or bus bodies under this specification shall include the right to inspection of the product before, during and after manufacture by any state agency or county agency of the State of Florida.

BODY SIZES

The maximum overall length of any bus shall be 40 feet; maximum overall outside width of all bodies shall be 96 inches. Height of body from top of finished floor to underside of ceiling, at center of body, shall be a minimum of 72 inches.

DESIGN SPECIFICATIONS AND GRADE OF STEEL

1. Details of design shall have a direct relationship to specifications for grades of steel in the latest edition for the design of Light Grade Cold-Formed Steel Structural Members of the American Iron and Steel Institute. Material used in the body frame structure shall conform to chemical and mechanical requirements of the listed specifications or other published specifications, including tensile and yield points, which establish properties and suitability of the steel for school bus body test code and safety requirements.
2. All welds used in construction of body shall conform to latest applicable specifications of the American Welding Society.
3. Welds, rivets, or high-strength bolts may be used in connecting parts of the structural body. All bolts shall have provision to prevent loosening under vibratory loads. All bolts, nuts, washers, and screws used throughout the body shall be approved size, cadmium or zinc plated, or thoroughly treated in an approved manner for prevention of rust.
4. All metal used in construction of bus body shall be zinc or aluminum coated before construction; provided that for metals 12-gauge or less in thickness, either zinc or aluminum coating shall be mill-applied for these components: (a) service door panels, (b) emergency door panels, (c) guard rails, (d) all exterior body panels, (e) wheelhousing, (f) body posts and roof bows, (g) side strainers, (h) roof strainers, (i) window caps, (j) window visors where used, (k) all floor section panels and floor sills; excluded are door handles, interior decorative parts, and other interior plated parts. All metal parts that will be painted shall be chemically cleaned, etched, zinc-phosphate-coated, and zinc-chromate or epoxy-primed, or conditioned by equivalent process. Any areas from which primer is removed for any purpose, as sanding, grinding, welds, etc., must be thoroughly cleaned and treated as specified and primer applied. Rivets used in assembly shall be zinc-phosphate treated unless coated with rust prevention material and also primed as specified. In providing for these requirements, particular attention shall be given to lapped surfaces, welded connections or structural members, cut edges, metal in which holes are punched or drilled, closed or box sections not vented or drained, and surfaces subjected to abrasion during vehicle operation.

Galvanized steel, as Galvanite or Zinc-Grip, or aluminum each designed to near equal stiffness, as determined by inspection to give adequate support to glass, shall be used for window frames.

As evidence that above requirements have been met, samples of materials used in construction of the bus body, when subjected to 1,000-hour salt spray test as provided for in latest revision of A.S.T.M. Designation: B 117, "Standard Method of Salt Spray (Fog) Testing," shall not lose, after rubbing to remove corrosion, more than 10 percent of material by weight.

BODY FLOOR

1. Floor shall be of prime commercial quality steel of at least 14-gauge or other metal at least equivalent in strength to 14-gauge steel. Floor shall be level from front to back and from side to side except for wheel-housings, toeboard, and driver's seat platform areas.
2. (a) Floor Sills - There shall be one main body sill at each side post and two (2) intermediate body sills on approximately 10-inch centers. All sills shall be of equal height not to exceed three (3) inches. All sills shall extend the width of body floor except where structural members or features restrict area.

Main body sill shall be equivalent to or heavier than 10-gauge and each intermediate body sill shall be equivalent to or greater than 16-gauge, or each of all body sills shall be equivalent to or heavier than 14-gauge. All sills shall be permanently attached to floor.

(b) Connections between sides and floor system shall be capable of distributing loads from vertical posts to all floor sills.

3. Driver's compartment plate on conventional body shall be removable, installed on level with bus floor. All components requiring servicing must be readily accessible. Openings in bus floor to meet this requirement shall be reinforced so as to maintain full strength of unpunctured floor.

WHEELHOUSINGS

Wheelhousings shall be constructed of 18-gauge or heavier steel and be rigidly reinforced, shall be attached to floor and side panels in such manner as to prevent water or dust from entering body, and shall be designed for easy removal of tires. For materials, see Grades of Steel; for covering, see Floors.

ENTRANCE STEP WELL AND GRAB HANDLE

A step well of at least two (2) steps shall be built in right front assembly enclosed with doors extending to bottom step. Each step shall be covered with ribbed rubber, 3/16 inch thick, bonded to metal base and otherwise constructed so as to provide substantial support, including the leading edge which shall be white or a light color. Entrance to step shall extend below floor line about 14 inches from the ground.

A suitable grab handle or rail shall be provided at the front entrance, securely mounted inside of body and within reach of small children upon entering bus.

Grab handles shall be made of round stainless steel, one (1) inch O.D., tubing minimum of 18-gauge, or stainless architectural tubing minimum .018-inch thickness over 18-gauge steel insert.

FLOOR COVERING

1. Floor in underseat area, including tops of wheel housings and toeboard, shall be covered with smooth surfaced fire-resistant rubber covering, or approved equal, having a minimum thickness of .125 inch.
2. Covering from toestep landing area to emergency door shall be ribbed aisle-type fire-resistant rubber, non-skid, wear-resistant. Minimum overall thickness shall be .1875 inch measured from top of ribs. Rubber floor covering shall meet Federal Specification ZZ-M-71d.
3. Floor covering must be permanently bonded to floor and resist cracking when subjected to sudden changes in temperature. Adhesive material used shall be waterproof and also of the type recommended by manufacturer of floor covering material.
4. Landing area at top of steps shall be ribbed rubber which shall extend to and join the ribbed aisle cover at an angle and its leading edge (curbed fillets excepted) white or a light color.
5. All joints shall be covered with non-ferrous metal, minimum one (1) inch wide and .095 inch thick, weight .09 per linear foot, providing driver's compartment, except at cowl, shall have a special approved molding. Attaching screws shall be countersunk.

6. Holes around transmission cover shall be adequately sealed.

BODY FRAME

1. Upper body structure shall consist of frames extending from floor to one (1) side to floor on opposite side, at each window post, which may be composed of posts and roof bows or a continuous bow frame and members running from front to rear of body known as strainers.
2. Design shall provide for: (a) a formed longitudinal member having a combined function of supporting floor plates, providing impact resistance, and of supporting exterior ends of seats; or (b) a longitudinal member located about seat line, securely fastened to body posts, and a continuous separate member of a strength equal to a $1\frac{1}{4}$ x $1\frac{1}{4}$ x $1/8$ inch angle securely attached for support of seats.
3. A roof bow shall be located at least at each post to form a bow frame and spaced on approximately 27-inch centers, excepting they may be spaced a maximum of $36\frac{1}{2}$ inches, provided sufficient supports are installed to maintain integrity of roof structure. Roof bows shall not be buckled or distorted out of cross section during bending processes to curved shape. Bow frames may be formed as one (1) piece or may be joined at window header by connections developing full strength of cross section. Each post shall be securely connected to floor beams directly through gussets or indirectly through side rails. (See Grades of Steel.)
4. The front end assembly shall be sufficiently heavy to withstand vibrations transmitted to it through chassis cowl. Windshield or corner posts must be of sturdy construction, designed so that they will not be so wide as to unnecessarily obstruct driver's view. Body shall be fastened to chassis cowl in an approved waterproof manner. (See Grades of Steel.)
5. Rear Corner Reinforcements: Rear corner framing of bus body between floor and window sill and between emergency door post and rear side post shall consist of at least three (3) structural members applied horizontally or vertically or in another combination to provide additional impact and penetration resistance equal to that provided by frame members

6. Side Strainers: There shall be three (3) (See Item 2 above) or more side strainers or longitudinal members to connect vertical structural members and to provide impact and penetration resistance in the event of contact with other vehicles or objects. Such strainers shall be formed (not in flat strip) from metal of at least 16-gauge and 3 inches wide.

Strainer at roof line or window header shall extend all around the bus.

Side strainer shall be installed in area near bottom of seat frame and shall extend completely around bus body except for door openings and body cowl panel. Side strainers specified above shall be fastened to each vertical structural member in any one or any combination of the following methods as long as stress continuity of members is maintained.

- A. Installed between vertical members.
- B. Installed behind panels but attached to vertical members.
- C. Installed outside exterior panels.

Fastening method employed shall be such that strength of strainers is fully utilized.

Strainer immediately below windows shall extend around body except for door openings and shall be securely joined to vertical members. This strainer shall be secured longitudinally to outside of body posts for length of body and have the bending and penetration characteristics of a rub rail (see below) and may be formed as a channel, lipped channel, box or hat section if installed on vertical members behind panels or as a rub rail if applied outside of body panels. No portion of side strainer or longitudinal member, except at seat level, is to occupy same vertical position as required for rub rails.

RUB RAILS

1. There shall be one rub rail on each side of bus approximately at seat level which shall extend from entrance door post around bus body (except for emergency door) to point of curvature near cowl on left side.
2. There shall be rub rails located approximately at the floor line and bottom of outer skirt which shall cover same longitudinal area as upper rub rail, except at wheelhousings, and shall extend only to radii of right and left corner corners.

3. Rub rails shall be attached twice at each body post and at all other upright structural members.
4. Rub rails shall be four (4) inches or more in width, shall be of 16-gauge steel, and shall be constructed in corrugated or ribbed fashion.
5. Rub rails shall be applied outside of body panels. Pressed-in or snap-in rub rails do not satisfy this requirement.

EXTERIOR PANELING

1. Exterior paneling includes all sheet metal skin forming exterior surface of body.
2. Exterior paneling should be of 20-gauge steel minimum thickness and shall be attached to bow frames and strainers so as to act as an integral part of structural frame. Roof panel design may include two (2) types:
 - (1) panels extending full width of top and joined to window headers on each side of bus body and each of main roof bows;
 - (2) panel section of a length sufficient to extend across three (3) or more main roof bows and joined to window header and supported by and joined to a longitudinal strainer of special design.

All joints of roof panels shall be lapped the full width of supporting members and shall be attached along each side of supporting member to form a water-tight joint. (See Grades of Steel; also Insulation: Sealing of Joints.)

INTERIOR PANELS

1. Interior of body shall be lined with panels securely fastened to adjoining parts in an acceptable manner. If ceiling is constructed so as to contain lapped joints, exposed edges shall be beaded, hemmed, flanged or treated to minimize

sharp edges. Fastenings shall minimize vibrations and rumble and be installed to facilitate removal. A cove molding, which may be an extension of body panels, shall be installed covering wall to floor joint beginning at windshield post on left side of bus and extending along walls around corners to service door on right side. Molding shall be securely fastened so that dirt will not readily work under it.

2. Interior paneled area immediately below window line shall be formed in a manner to provide a shoulder molding effect; otherwise, a padded shoulder strip having a minimum width of three (3) inches shall be provided at this location.

REAR BUMPER

Rear bumper shall be of pressed steel channel at least 3/16 inch thick, 8 inch high ribbed face and flanged two (2) inches at top and bottom or otherwise designed to furnish equal flexural strength. It shall be of wraparound design and securely fastened to each chassis rail and braced diagonally from each end of bumper to chassis rail with heavy braces to permit fully loaded bus to be pushed without permanent distortion to bumper, chassis or body. Contour of bumper shall fit contour of body in a manner to prevent hitching to or riding on bumper. An appropriate seal shall be applied between bumper and body panel.

SERVICE DOOR

Service door shall be a double-wall split type or jackknife type located at right front of bus. A double-bearing chromium-plated or epoxy-coated mechanical control shall be mounted within comfortable reach of driver on a firm and substantial support and lock in off-center position. On models with service doors opening outward, there shall be installed an approved safety latch. Control shall have a smooth machined handle and the rod to the door shall also be chromium-plated or epoxy-coated. Doors shall be securely hinged with approved heavy-duty hinges with brass or rust resistant rod adequately fastened to adjoined member. Doors shall have a two (2) inch minimum safety gap sealed with a safety flap of approved quality. Door shall extend to bottom step and be fitted with suitable weatherstrip to restrain water entering step well.

Service door shall have minimum horizontal opening of 24 inches and minimum vertical opening of 68 inches. Immediately above the door opening there shall be secured to body panel a high density foam rubber pad, minimum three (3) inch width, or approved equal safety cushion.

Doors shall be so designed and weatherstrips mounted so that there is no binding or tendency for stripping to dislodge during door operation. Two (2) glassed-in openings shall be provided in each door half with glass of same grade as specified on side windows and mounted in rubber. Bottom of lower glass panel shall not be more than 35 inches from ground when bus is unloaded. Top of upper glass panel shall not be more than six (6) inches from top of door.

EMERGENCY DOOR

1. Emergency door on all conventional and forward control buses shall be located at center of rear of bus and have minimum horizontal opening of 24 inches and vertical opening of 48 inches. Emergency door shall be hinged on right-hand side using hinge(s) with a brass or rust resistant rod. Door stop shall permit door to open at least 150° but shall protect body lights from damage by the opened door. Inside of door header shall be padded with energy absorbing material a minimum of three (3) inches wide.
2. The emergency door shall be so designed to be opened from inside and outside of bus and shall have a fastening device which may be quickly released but designed for protection against accidental release. Control from driver's seat shall not be permitted. Outside control shall consist of nondetachable opening device designed to prevent hitching to but to permit opening when necessary.

Emergency door shall be equipped with slide bar, cam-operated lock, having a minimum stroke of one (1) inch. Emergency door lock shall be equipped with suitable electric plunger type switch connected with buzzers as required by Federal Standards. Switch shall be enclosed in metal case, and wires leading from switch shall be concealed in bus body. Switch shall be so installed that plunger contacts farthest edge of slide bar in such a manner that any movement of slide bar will immediately close circuit switch and activate buzzer.

Door lock shall be equipped with interior handle that extends approximately to center of emergency door. It shall lift up to release lock.

Emergency door controls, labeling and warning device shall meet requirements of F.M.V.S.S. 217.

WINDOWS

1. An adjustable split sash window shall be mounted in side of bus body between each framing post. Safety glass shall be set in an acceptable manner in a sturdy extruded or die formed frame to provide adequate support for glass. Permanent mark showing grade of glass shall be visible and glass shall be a minimum of 1/8 - inch thick.

A minimum clear vertical opening of not less than nine inches shall be provided by lowering top sash. Bottom sash shall be stationary. Movable window shall be controlled by approved lock having finger-touch opener providing for ease of operation and shall be free of injury prone projections. Sash shall operate in plastic channels. Window seals and visors or drip molding shall be installed and unit shall provide ample protection from leakage in hardest rain. (See Grades of Steel.)

2. For ventilation purposes, the driver's window shall be adjustable and shall be equipped with a positive latch which is lockable from the inside of bus.
3. There shall be installed, in rear door, two (2) windows (one (1) upper, one (1) lower) set in rubber in a water-proof manner. Total glass area in emergency door shall be a minimum of 750 square inches. Glass shall be same type as for side windows.

Rear side windows located at each side of emergency door shall be set in rubber in waterproof manner. Glass area shall be large enough to provide desirable vision to rear and shall be of same quality and grade as for side windows.

WINDSHIELD

Front body section in area of windshield shall provide for corner vision and be fitted with curved glass, four-piece flat glass or two-piece flat glass as approved by the Department of Education. Glass shall be laminated safety polished plate with dark tint at top, set in rubber in a waterproof manner and slanted to reduce glare. Glass shall meet current S.A.E. specifications and Federal Motor Vehicle Safety Standards. Light tint may be used in transit buses.

BODY TESTS

Load test of body shall meet the requirements of Federal Motor Vehicle Safety Standard 220.

SEATING

1. Seats shall be mounted forward-facing and provide a minimum of 12.8 inches of seat width per passenger seating position. The aisle shall be 12 inches minimum. This plan of body seating shall determine seating capacity.

Seat spacing shall be the maximum permitted by Federal Motor Vehicle Safety Standard 222. Seat spacing shall provide a minimum of 25 inches of knee room at each seat with a measurement to be made at the center of the reference point. In making this measurement from back of seat cushion to back of seat or barrier in front, upholstery may be placed against padding both forward and rear but padding may not be compressed.

The padding shall be secured to the frame in a non-sag manner. Screws and bolts used in seat back construction shall not be exposed.

2. Seats, seat back cushions, and crash barriers shall be covered with a material having 42-ounce finished weight, 54-inch width, and finished vinyl coating of 1.06 broken twill or other material with equal tensile strength, tear strength, seam strength, adhesion strength, resistance to abrasion, resistance to cold and flex separation. Padding and covering on all seats shall be of material that will not flash or explode upon contact with spark or open fire. When welt is not used, all seams shall be double-sewn.

3. Driver's seat shall be firmly supported and of a design to give driver stability and support of position and shall be centered behind steering wheel. There shall be 16 hourglass type coil springs of 10½-gauge wire interlaced and joined to an 8-gauge border wire or foam as an approved equal. Seat back shall be form-fitting and shall have locking positions of tilt independent of other adjustments. Seat shall also be adjustable fore and aft for a minimum of 4 inches and have a minimum adjustment of 3 inches up and down. Vertical adjustment must be independent of horizontal adjustment. All driver's seat adjustments shall be designed for fingertip control without use of tools. Minimum distance between steering wheel and back rest of driver's seat shall be 11 inches.

Driver's seat shall have a safety belt having tensile strength and metal-to-metal buckle, mounted to a floor bracket extending approximately 9 inches above the floor plate in an approved manner, and meeting S.A.E. Standards. A support(s) for seat belts shall be installed at cushion height or as needed to maintain constant driver-to-seat belt relationship at varying adjustment positions.

UNDERCOATING: INSULATION: SEALING OF JOINTS

1. Entire underside of body including floor members, wheel-housings, and side panels below floor level shall be coated with fire-resistant asphalt base, rubber base, or other undercoating material, applied by spray method to seal, deaden sound, insulate, and prevent oxidation.

2. Thermal insulation of the type that will harbor dampness shall not be used. Overlapping of edge of exterior roof and side panels and also the top edge of rub rails shall be sealed with nonhardening resilient material.

FUEL FILLER OPENING

An opening of adequate size and design shall be provided over fuel servicing unit.

VENTILATION

Body shall be equipped with an effective exhaust type ventilation system, nonclosable type installed in low pressure area of roof, capable of ejecting foul air under all operating conditions. System shall be adequately weatherproof and dustproof.

ELECTRICAL SYSTEM: WIRING

All wiring shall conform to current standards of the Society of Automotive Engineers, be coded by color, and be insulated. All joints shall be soldered or joined by equally effective fasteners. A wiring diagram showing location of wires and code of circuits for buses meeting Florida Standards shall be installed in each body. Wiring shall be in circuits as follows:

1. Clearance and step well lights: Four (4) body corners, upper section—amber front, red rear. Intermediate amber units required on all units over 30 feet. Step well lights shall illuminate the bus entrance and be adequately protected. It shall be activated automatically when door is opened and clearance lights are on.
2. Identification lights: Three (3) amber front, three (3) red rear, grouped in a horizontal row. Lamp centers spaced not less than six (6) or more than twelve (12) inches apart, mounted as close as practical to the vertical centerline (Federal Standards).
3. Tail lamps: Bus shall be equipped with two (2) tail lamps and at least one (1) backup lamp (Federal Standards). Light intensity shall at least equal Class A type turn signal units.

4. License plate lamp: This lamp may be combined with one of tail lamps above.
5. Two combination brake and tail lamps: These shall be a minimum of 7 inches in diameter mounted as high and spaced as far apart laterally as practical, below window line, but not less than three (3) feet measured from center of lamps. Lenses shall meet or exceed the photometric values of Class A turn signals, and be clearly visible throughout 180 degrees. All brake and turn signal lamp housings shall be galvanized or made rust resistant in an approved manner. All lamp sockets must be brass nickel-plated or approved equal and grounded to bus body by wire or strap. Socket springs must be stainless steel or phosphor bronze. Lens retaining screws or fasteners must be stainless steel or brass nickel-plated. They shall meet current S.A.E. requirements and be installed in compliance with Federal Motor Vehicle Safety Standards.
6. Turn signal lamps: On front, turn signal lamps shall be Class A double-face lamp with red lens to rear and amber on front, and furnished by chassis manufacturer (except on Transit). On rear, lens shall be plastic, red in color, seven (7) inches in diameter, Class A, mounted as far apart laterally, as practical on the same horizontal centerline as the brake stop lamps, and be visible throughout 180 degrees. Front turn signal lamps on transit bus body shall be of same type as for rear except amber lens shall be installed.
7. Warning lamps: Minimum lamp requirements shall be dual, mounted side by side on all corners of bus roof. Mounting shall be as high as practical on top and as near outer edge of bus as curvature permits. Lamps shall be securely mounted in a shroud including hood extending out a minimum of 2½ inches. Housings shall be galvanized or made rust resistant in an approved manner. Black background 1¼ inches to three (3) inches wide shall be painted around lights. Lamps shall be par 46, 5.7 inches diameter of sealed beam type, which may be composed of a sealed unit with a plastic lens. Lamps installed on outside shall be red; inner, amber. Lamps shall have aiming pads and meet latest S.A.E. requirements for school bus flashing warning lamps, including five (5) degrees up, ten (10) degrees down, 30 degrees right and 30 degrees left. Lamps shall be clearly visible in bright sunlight for a minimum of 500 feet. A three (3) position switch to actuate lamps, having this sequence: (1) off, (2) amber, (3) red, shall be installed and in combination or in conjunction with the switch to actuate semaphore stop arm. The No. 3 position shall also connect the two (2) double-face lamps with semaphore stop arm which shall be actuated simultaneously with the roof-mounted red flashing warning lights. The control system

shall be designed in a manner that will permit actuation of the red lights by opening the service door as required by Federal Standards. Also, the system of controls shall permit the bus driver to actuate the amber lights and then deactivate the amber lights and activate the red lights and stop arm before service door is opened. It shall be designed to permit the bus driver to open the service door at a railroad crossing without actuating either the amber or red warning lights. This feature may be accomplished by use of a master switch, a recycling switch, an override switch or another approved method. An approved solid state or motor driven flasher unit is required. (See diagram in Appendix.)

8. Interior lights: There shall be installed three or more interior lights, depending upon length of bus. If lights are mounted in ceiling above center aisle, they must be of recessed flush type.
9. Stop arm signal: There shall be installed on left outside of body an approved web-foot design vacuum or air actuated stop signal arm, equipped with two double-face flashing lights for signaling a pupil stop. Light lens shall be red. (For controls, see item 7 of preceding page. For color, see LETTERING AND TRIM, page 36.) Vacuum line shall be copper, steel or nonmetallic materials meeting S.A.E. Standard J844d, and fittings shall be brass. A 1,000 cu. inch vacuum tank shall be installed by body company together with appropriate check valve to actuate this unit. (This tank is in addition to that for actuating vacuum-powered brakes.) Vacuum lines must not be readily accessible to students inside or outside the vehicle and an acceptable method of attaching these lines to the engine manifold for vacuum is required.
10. Reflectors: Two amber reflectors shall be mounted on side of bus near front and two red on rear side panels, two red on rear panels, and two intermediate amber on buses over 30 feet.
11. Emergency door buzzer: Emergency door (and window) buzzer should be connected to accessory side of ignition switch.
12. Heater: There shall be installed a heater of heavy-duty hot water circulating bus type, with minimum of 80,000 BTU rating. Heater shall have a per-hour capacity specified at a temperature differential of 150 degrees between the hot water and ambient air temperature. The heater shall be mounted to left of driver, except on transit type units where it may be mounted in front of bus. A supplemental heater, minimum 40,000 BTU rating may be installed in larger buses. Heater lines on the interior of the bus shall be shielded to prevent scalding of the driver or passengers. The windshield defroster and defogging system shall provide defogging of driver's window and entrance door glasses by utilizing hot air taken off the heater. Defroster shall have separate fan(s).

WINDSHIELD WIPERS AND WASHERS

1. Electrical windshield wipers shall be standard on all buses. (Air is optional on Types "C" and "D" buses.) All wipers by design and installation shall provide desirable vision for drivers. Two heavy-duty motors shall be provided and equipped with blades of sufficient length and heavy-duty arms to clear windshield glass in driver's direct view. All wiper controls shall be located within easy reach from driver's seat and designed to move blades away from driver's direct view when in stop position.
2. Windshield washers shall be electrically operated. The washer reservoir shall be made of hard plastic or other approved material and have a capacity of at least one-half gallon. Flexible plastic bags are not acceptable.

MIRRORS

1. Interior: One rear-view electroplated copper and chrome back safety glass mirror, or approved equal, 6" x 30" having a metal frame and securely mounted and braced on windshield header so as to restrain vibration. Location shall not interfere with forward vision but give driver a clear view of bus interior.
2. Exterior: Two exterior clear-view mirrors shall be provided, one to left and one to right of driver. Area of each mirror shall not be less than 50 square inches overall. Each mirror shall be firmly supported and adjustable to give driver a clear view past left rear and right rear of bus. Mirror backing plate and rim shall be zinc steel properly primed and painted as other bus body parts or be made of non-ferrous material.
3. Cross View: Two 7½-inch convex cross-view mirrors to give driver view of pupils crossing in front of bus shall be provided. Mirrors shall be mounted on the left and right front fenders of Types "A", "B" and "C" buses and the front corners of Type "D" buses. Ball and socket mirror mounting shall have an adjustment for tightening and supports so braced as to restrain vibration.
4. One convex mirror with a minimum of 7½-inch diameter shall be mounted to tripod of right cross-view mirror on Types "A", "B" and "C" buses or to right front corner of bus body on Type "D" buses to give driver view of students at right side of bus.

SUN SHIELD

A plastic adjustable sun shield, minimum 6" x 24", shall be installed and have substantial mounting so that it will remain in position.

WINDSHIELD STEPS AND HANDLES

A step and appropriate grab handle shall be installed on each front corner of body to facilitate cleaning of windshield. The handle shall be stainless steel, chrome-plated or non-ferrous metal and provide for four point mounting and adequate hand hold.

DEFOGGER FAN

Two (2) six (6) inch defogger fans in addition to defrosters operating in conjunction with bus heater shall be installed so that the driver may direct an air stream on left and right windshield glass area. Exception: If the bus body is equipped with a right side mounted defroster fan operated in conjunction with the heater or if ducts are installed at the base of the windshield in a manner that will direct heated air against both the left and right side of the windshield, only one (1) defogger fan is required.

LICENSE HOLDER

Type C Buses,
Recessed on left rear outside of body with suitable method for mounting license tag. *Type A, B, + D Buses, manufacturers standard.*

FIRE EXTINGUISHER

1. A 2½-lb. minimum dry chemical extinguisher with gauge designed to restrain tampering shall be mounted in a place accessible to driver, preferably near service door.
2. Fire extinguisher shall bear label of Underwriters' Laboratories, Inc., showing rating of not less than 2A-10BC.

WARNING DEVICE

Three (3) reflector-type warning devices, meeting the requirements of F.M.V.S.S. 125, shall be mounted in a location accessible to driver in front section of bus and stored in a container.

FIRST-AID KIT

1. Bus shall carry Grade A ~~metal~~ first-aid kit, mounted in such a manner that it can be easily detached and made portable and in an accessible place in driver's compartment.

2. Number of units and contents shall be as follows:

4-inch bandage compress.....	2 pkgs.
2-inch bandage compress.....	1 pkg.
1-inch bandage compress.....	2 pkgs.
40-inch triangular bandage with two safety pins.....	1 pkg.
Eye dressing packet.....	1 pkg.
Wire splint.....	1 pkg.
Tourniquet.....	1 pkg.

FINISH

Prior to application of finish coats to body, hood, and cowl, metal surfaces shall be cleaned of grease, foreign matter, excessive body caulking and sealing materials and treated as needed for proper paint adhesion. Two (2) coats of national school bus chrome, Spec. No. 13432, should be applied for total dry thickness of 2 mils over metal surface. Trim, lettering and bumpers shall be black. (See requirements for metal preparation under Design Specifications and Grade of Steel.)

LETTERING AND TRIM

Letters and trim on three (3) rub rails below belt-line shall be black (except for stop sign). Letters of words SCHOOL BUS on top front and rear section of bus body shall be eight (8) inches high and correspond to Series B, Standard Alphabet. (See National Standards.) (Name of District) DISTRICT SCHOOLS, on each side of bus body at belt-line shall be in four (4) inch minimum letters. Numbers to be furnished by county shall be in four (4) inch minimum height and on each side and on rear of bus body. EMERGENCY DOOR shall be in two (2) inch letters at top or directly above door, visible inside and outside of bus.

Stop signal arm shall be reflectorized red background with white border and the letters STOP shall be in six (6) inch white letters.

BODY MOUNTING

Body shall be assembled in body company's standard production facilities. Bid price shall include mounting body upon chassis furnished by bidder. Body shall be securely attached to each chassis side rail at each main body cross beam. All attaching bolts shall not be less than 7/16 inch in diameter with S.A.E. threads. Nuts shall be secured with lock washers.

EXCEPTIONS FOR TYPE "D" FORWARD CONTROL BODY

1. Radiator filler tube shall be located for ease of servicing outside bus body.
2. Units 71 through 89 capacity shall have battery or batteries mounted in slide-out tray.
3. The distance between barrier at rear of entrance step well and engine cover shall be a minimum of 13 inches.
4. A step, in lieu of stirrup steps, is permitted in or on the front bumper, both sides.
5. Engine cover shall be made of metal or an approved equal and shall provide adequate seal to the bus floor area to keep engine fumes from entering the passenger compartment and shall be insulated to retard transfer of heat and engine noise.

EXCEPTIONS FOR TYPE "D" PUSHER BODY

1. Entrance door shall be forward of right front wheel.
2. Engine compartment shall be constructed so as to permit servicing of engine, having two doors opening at rear and louvered removable panels on each side of engine compartment. Engine compartment must be sealed at top and front to retard heat transfer and prevent engine fumes from entering passenger compartment. Provisions shall be made for easy removal of engine through rear compartment.
3. Mud flaps shall be installed at rear of dual wheels.
4. Engine air intake, meeting chassis manufacturer's approval, shall be installed in approved manner to outside of body.
5. A step, in lieu of stirrup steps, is permitted in or on the front bumper, both sides.
6. Front end construction of body shall be designed to prevent distortion and vibration. Forward outer panel shall be substantial for mounting headlamps and turn signals. Provisions shall be made for servicing steering gear.
7. Emergency exits - Bus body shall have an emergency door located on left side of bus body, hinged in front, supplemented by a rear emergency window over motor, hinged at top. Emergency door and windows shall meet F.M.V.S.S. 217 and 220. Emergency window over engine compartment shall be minimum of 16" x 54".
8. Odometer/Speedometer shall be front-wheel drive.

PART VI

SPECIFICATIONS FOR OPTIONAL EQUIPMENT

TYPES "B", "C" AND "D" BUSES

SPECIFICATIONS FOR OPTIONAL EQUIPMENT
TYPES "B", "C" AND "D" BUSES

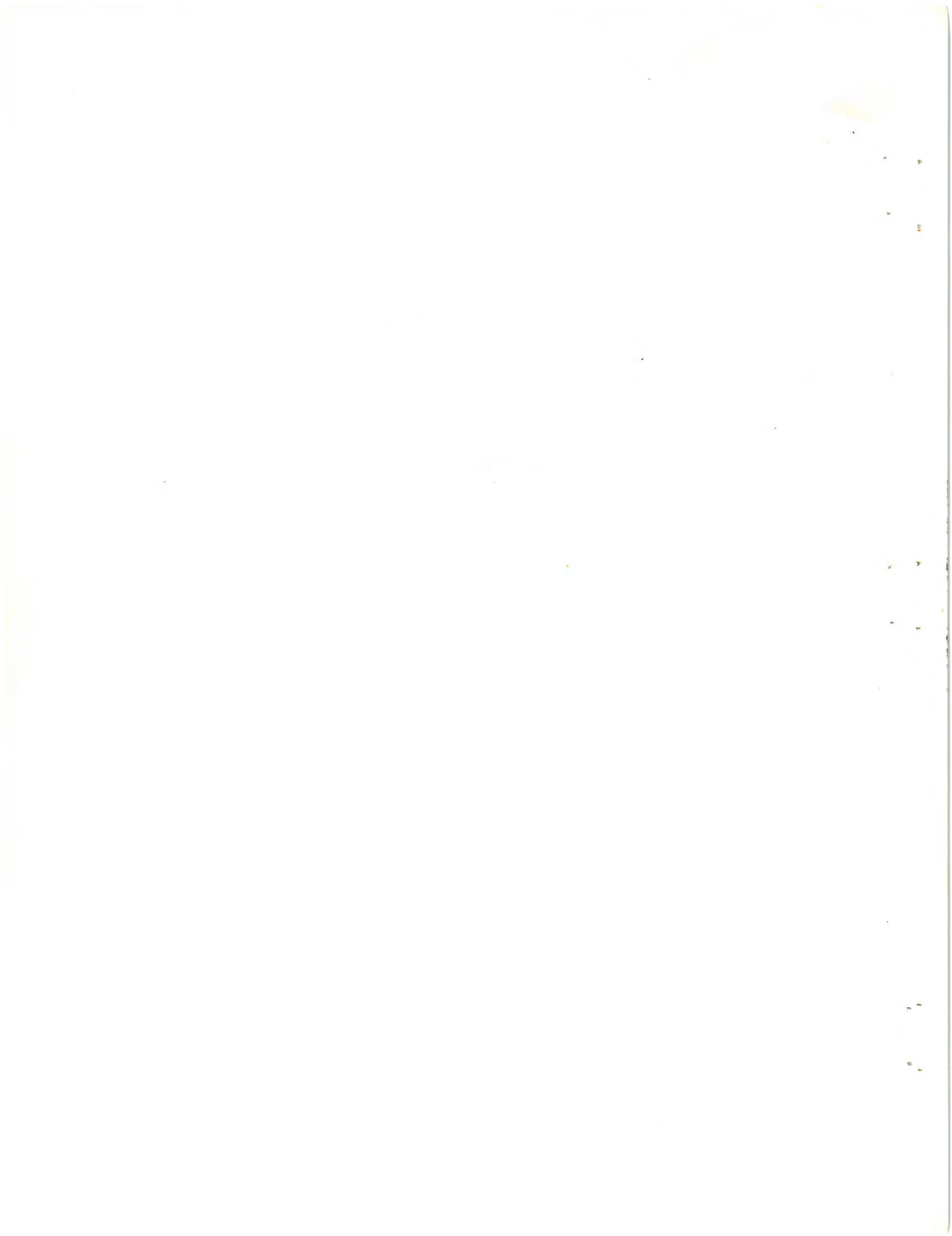
1. Low air pressure warning device, full air brake models: There may be installed a device automatically actuated when the air pressure drops below the limit for safe bus operation. Signal shall be in driver's direct view and remain in this position until a safe operating pressure is reached and remains constant.
2. Book racks (interior) are approved as an optional item only if installed in buses used for extracurricular purposes and main rails are padded to adequately safeguard pupils against injury.
3. A lock with two keys may be installed in the fuel supply service door of the body skirt.
4. Two (2) push-out windows of standard design including device for locking in place, buzzer, and lettering "EMERGENCY EXIT." One mounted on each side of bus body.
5. A vandal box for safe storage of fire extinguisher, first-aid kit, and warning devices may be specified provided it is equipped with a warning buzzer to warn the driver the box is locked if the ignition switch is in the "on" position.
6. A public address system with two speakers inside the bus and one heavy-duty speaker outside the bus with controls to permit the driver to select "inside" or "outside" speakers, mounted in driver's compartment so that all controls are readily accessible to the driver from a normal seated position may be required.
7. A power operated service door is approved provided the unit is equipped with a manually operated override to enable the driver to manually open the door in the event of loss of power.
8. A system of monitoring exterior lights on the front and rear of the bus from the driver's seated position is approved as an option. Such systems shall indicate to the driver whether or not a light is operational. A system that monitors only electrical circuits to determine if current is going to a lamp bulb but does not indicate whether or not the light is burning is not acceptable.
9. An emergency exit known as the "roof hatch type" is an approved option in all buses 65 capacity and larger. Roof hatch, if specified, shall be an exit in addition to the emergency door and not a replacement for the emergency door requirement.

10. The type of governor, known as a combination road speed/engine speed governor is an approved option on all sizes of conventional, forward control, and pusher type buses.
11. A body electrical circuit master switch (kill-switch) that will cut "ON" and "OFF" body circuits by use of a solenoid controlled by the ignition switch.
12. An additional semaphore stop sign, meeting Florida Specifications, may be located on the left rear of the body.
13. Two heavy-duty tow hooks, installed by manufacturer, one on each frame rail at front of bus in an approved manner.
14. A 12 C.F.M. air compressor on conventional models.
15. Aluminum-coated interior side panels or approved equal.
16. Strobe-type lamp mounted in center of rear part of roof.
17. Two-way mobile radio communications system.
18. An approved cold weather start assist for diesel-powered units.
19. A break-away front bumper meeting strength requirements of specified bumper.
20. A temporary frame mount of battery with longer cables for mounting battery in the body skirt of a completed Type "C" bus is an approved option.
21. Optional 10.00 x 20 12-ply tires with appropriate rim size is an approved option on buses 59 and 65 capacity sizes.
22. Automatic slack adjusters are an approved option on air brake models when available.
23. Tinted glass in windows rear of the driver's compartment with a light transmission of 70 percent is an approved option on exceptional child buses.
24. When air conditioning is ordered on 59 and 65 capacity buses, a minimum G.A.W.R. of 17,700 lbs. is required on rear axles.
25. Units ordered with air conditioning require thermal insulation in body, walls and ceilings; plywood floors; and tinted glass.

PART VII

BODY SPECIFICATIONS

EXCEPTIONAL CHILD BUSES



BODY

GENERAL REQUIREMENTS

Bus body structure and equipment shall conform to Florida Specifications approved by the State Board of Education, except for modifications necessary for installation of special equipment listed below; provided that for sizes 47 and 59 capacity the front body section may be approximately 35 inches, or at the option of the builder, a section approximately 9 inches wide may be installed as an addition to the standard 27-inch section as needed to provide specified wheelchair space. Proper bracing shall be added as specified in the body standards.

Any school bus purchased for the transportation of physically handicapped children shall be equipped with a side powered lift. The lift shall be located on right side of the body and in no way attached to the exterior but confined within the perimeter of the standard school bus body.

SPECIAL EQUIPMENT

SPECIAL SERVICE OPENING

1. There shall be an enclosed service opening located on the right side of the bus. If it is located forward of rear wheels it shall be located away from the regular service entrance so any fully opened, forward-mounted door will not obstruct the conventional service entrance. Minimum clear opening shall be 33 inches for lift.
2. Door posts, headers and floor sections around this special opening shall be reinforced to provide strength and support equivalent to adjacent side wall and floor construction of an unaltered model.
3. A drip molding shall be installed above opening so as to effectively spill water from entrance.

SPECIAL SERVICE DOORS

1. A single door may be used for enclosing an opening that is not more than 38 inches wide.
2. Lift openings more than 38 inches wide shall be enclosed by two doors of equal width.

3. All doors must open outwardly.
4. If body opening extends through body skirt, doors shall extend to bottom of body skirt.
5. All doors shall be weather sealed and so constructed that a flange on the forward door overlaps the edge of rear post or door when closed. Design shall provide positive means of holding door, or doors, in open position during lift operation. Friction type catches are not acceptable.
6. When manually operated dual doors are provided, rear door shall have at least a one-point fastening arrangement to header. Forward mounted door shall have a two-point fastening device extending to header and to rear door or platform floor. These locking devices shall afford maximum safety when doors are in the closed position. Doors shall be hinged to body side using a heavy-duty piano-type hinge fitted with brass pin. When single door is used, locking device shall meet requirements for emergency door lock.
7. Door materials, panels, and structural strength shall be equivalent to the conventional service and emergency doors. Color, rub rail extensions, lettering, and other exterior features shall match adjacent sections of the body.
8. Each door shall have glass window set in rubber compatible with and set to the lower line of adjacent sash.
9. Doors shall be equipped with a device that will actuate an audible or visible signal located in the driver's compartment when not securely closed.

POWER LIFT

1. Unit or lift must be of a standard made by a nationally known manufacturer and approved by the Department of Education. Lifting mechanism shall have a minimum capacity of 700 lbs. Lift may be of through-the-floor design or fold-out type that operates outside the bus body on bus bodies less than 31 feet long. Lift on bodies 31 feet or longer shall be through-the-floor type. Power unit shall be an electrohydraulic, self-contained motor pump, dual cylinder, valve and reservoir unit or approved equal. Lifting cylinders shall have honed surfaces. The piston rods shall be ground, polished and

chrome-plated. All hydraulic oil hoses must conform to or be better than S.A.E. Specification 100-R3. Hose fittings and metal hydraulic lines shall be made of material other than galvanized pipe. When the drive motor and hydraulic pump are located inside the bus, they shall be installed in such a manner so as not to interfere with the movement of wheelchairs through the bus aisle. The unit shall be enclosed to prevent transported students from coming in contact with it and shall be readily accessible to service personnel for routine service and for maintenance. When the hydraulic pump and drive motor are installed below the floor level, they shall be enclosed in a box accessible through a door installed in the body skirt.

2. The lift platform shall provide for power operation both fully up and down with a manual operating system as a backup in the event of an electrical or hydraulic failure. When the lift platform is in the fully up position, it shall be locked in position mechanically by means other than a support, or lug, on the door. The lift mechanism shall be equipped with adjustable limit switches and/or bypass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or the ground. The lift travel shall be vertical. A swing arm design that travels in an arc is not acceptable. Fold-out type lift shall provide for power fold-out and fold-up for storage.

NOTE: (A gravity down lift may be purchased by the district upon written request to the Department and approval by the Department.)

3. Lift platform shall conform to door and floor opening and be a minimum of 30-inch usable width. All edges of platform shall be designed to restrain wheelchairs and operator's feet from becoming entangled during raising and lowering process. Platform ends of through-the-floor type lifts shall be fitted with full-width shields which extend above floor when lift platform is in lowered position.
4. Platform floor surface is to be covered with smooth-surfaced rubber, 1/8-inch minimum thickness, RCA or approved equal, except fold-out type lift may have platform made of expanded metal. Edges of through-the-floor platform and adjacent floor shall be properly finished and all seams covered with molding as required for bus floor. Flexible seals designed to keep dirt, water and fumes out, when in a locked position, shall be installed along platform edges.

5. Lifts installed in buses of 71 capacity body shell or larger shall be through-the-floor type and adjacent under-floor areas, three sides, shall be closed off with properly designed shields when platform is in lowered position.
6. Through-the-floor type lift shall have a self-adjusting, non-skid metal ramp of a width to minimize incline to lift platform and of sufficient strength to support the front wheels of a wheelchair with student. Control over lowering and placement of ramp shall be convenient to attendant when standing on platform.
7. Positioning of power lift unit shall be controlled by push-button type switch mounted within bus and adjacent to lift, convenient to attendant when standing upon lift platform and when the lift is in any position. An actuating switch shall be installed in the circuit so that the lift mechanism will not operate when the lift platform doors are closed.
8. With the exception of floor molding, no metal screws are to be used in fabrication of platform assembly.
9. A circuit breaker is required in the main electrical feed line to protect the lift from a power overload.

MODESTY PANELS, STANCHIONS AND CHAIN

1. Units with through-the-floor lift shall have heavy-duty padded panels extending above floor level on both fore and aft sides of the special service opening to prevent students from falling in the lift opening when the lift is lowered. The width of the panels shall be equal to the depth of floor opening. A covered chain shall be fastened to rear panel with hook and eye for attachment to forward panel.
2. Fold-out type lift shall have padded panel to protect students from being thrown forward against lift in raised and stored position.
3. There shall be a padded barrier approximately 8 inches in front of the forward edge of the seat cushion of all passenger seats that do not have another seat approximately 27 inches in front of them.

FASTENING DEVICES FOR WHEELCHAIRS

An approved adjustable locking device to hold each wheelchair in place shall be provided. When wheelchairs are in their locked position, they may not be in a position that would block the movement of an aide up or down the aisle of the bus.

PASSENGER RESTRAINING DEVICES

1. Seat frames shall be equipped with rings or other devices, three per seat, to which restraining devices may be attached.
2. When restrainers are specified, each seat shall be equipped with two individual sets.

AISLE

The aisle leading from the wheelchair position to the emergency door shall be wide enough to allow a wheelchair to be moved between the two rows of seats in the event an emergency evacuation of the bus is necessary. The minimum required aisle width is 30 inches for buses with outside width of more than 90 inches and 28 inches for buses with outside width of 90 inches or less. Thirty-nine inch seats are acceptable forward of the wheelchair positions.

SPECIAL LIGHT

A light shall be placed inside the bus, over the special service door, and shall be operated from door area.

REGULAR SERVICE DOOR ENTRANCE

1. Stainless grab rails shall be provided on each side of this entrance and shall be placed in such a manner as to afford easy accessibility to small children entering or leaving the bus.
2. When in open position, service doors shall not obscure any portion of grab rails.
3. On buses of 35 capacity shell or larger, there shall be three (3) step risers of equal height in the entranceway, placing the first landing approximately 12 inches above ground level, and otherwise meeting all requirements listed for regular type school bus.

SEATING AND WHEELCHAIR FLOOR PLAN

Appendix D shows the standard floor plan of passenger seats and wheelchair positions for buses of 47, 59 and 65 capacity body shell. Optional floor plans are permissible only if forward seat is protected by a padded barrier meeting the requirements of F.M.V.S.S. 222.

PART VIII

SPECIFICATIONS FOR TYPE "A" SCHOOL BUSES

SCHOOL BUS SPECIFICATIONS FOR TYPE "A" SCHOOL BUSES

The design and construction of the bus shall provide for the safety and comfort of transported students and for economical transportation. Manufacturers and dealers offering Type "A" school buses for sale in Florida for the purpose of transporting public school students shall certify in writing to the Commissioner of Education that any school bus sold in Florida will meet all applicable Federal Motor Vehicle Safety Standards effective on the date the vehicle is manufactured and all Florida Department of Education school bus specifications effective at the time the bid prices were established.

The National Minimum Standards for School Buses, 1980 Revised Edition, is applicable for items not specified in this document; storage compartment for snow chains and tools excepted. Any purchase of school buses under this specification shall include the right to inspection of the product during and after manufacture by any district or state agency making purchases or the Department of Education.

MINIMUM EQUIPMENT REQUIRED

1. Construction shall be of prime commercial quality steel or material with strength equivalent to steel and be built to chassis manufacturer's specifications and shall have added features and equipment as specified.
2. The chassis shall be of American design and manufacture, and body shall be built to chassis manufacturer's specifications.
3. The completed bus (body and chassis) shall be of sufficient strength to meet all requirements of F.M.V.S.S. 220 for school bus roll over protection.
4. Height Floor-Ceiling shall be minimum 60 inches.
5. Floor design shall provide adequate and firm support for seat legs and shall have minimum one-half inch exterior grade plywood securely attached to floor.

6. The interior roof and wall panels shall be lined and free of sharp projections likely to cause injury to pupils.
7. Window glass, except windshield, shall be safety glass AS-2 or better grade.
8. Emergency door shall have at least one window to give driver a view of area behind bus through inside rear view mirror. The emergency door window(s) shall be nonopening type.
9. There shall be a minimum of four split sash school bus type windows on each side of bus.
10. Deluxe fresh air type heater and defroster is required.
11. Bumpers shall be channel design, minimum 6 inches full width, front and rear.
12. School bus type seats, forward facing, shall be provided and installed to provide a minimum of 12-inch aisle. Seat frames and seat backs above cushion level shall be padded with energy absorbing material to meet requirements of F.M.V.S.S. 222. (See page 30 for covering requirements.)
13. Painting:
 - A. Body outside shall be painted School Bus Chrome Yellow.
 - B. Guard rails shall be either painted black or have black profile stripe. Lettering shall be black. (See Lettering.)
14. Headlights, brake lights, back-up lights and turn signals shall meet requirements of F.M.V.S.S. 108.
15. Windshield wipers and washer shall be electric powered and meet Federal Standards.
16. Entire underside of body and front fenders shall be undercoated with fire-resistant undercoating material applied by spray method.
17. Shock absorbers, front and rear, shall be adequate for axle size.
18. Dual horn minimum of 120 decibels is required.
19. Exhaust muffler shall be corrosive resistant and exhaust shall exit behind rear wheels.
20. Wiring shall meet S.A.E. requirements.

21. Mirrors, interior and right and left outside, shall be a minimum of 50 square inches.
22. Manufacturer's standard hubcaps are acceptable.
23. Differential ratio shall be compatible with engine and transmission used.
24. Brakes shall be power assisted self-adjusting, dual hydraulic.
25. Transmission shall be 3-speed automatic.
26. Minimum 60 amp. alternator is required.
27. Battery shall be 12 volt, minimum 455 cold cranking amps. at 0°F, and shall be mounted under the hood in a manner to provide easy access for servicing.
28. Oil filters shall be replaceable element type.
29. Vacuum connection in engine manifold for stop sign attachment is required.
30. Fuel tank shall have a minimum 30-gallon capacity.
31. Power steering is required.
32. Wheelbase shall be minimum 123 inches.
33. Tires shall be 8.75 x 16.5 10-ply rating or approved equal.
34. Gross Axle Weight Rating:
 - A. Front, minimum 3,200 lbs.
 - B. Rear, minimum 5,000 lbs.
35. There shall be installed on the left side of body an approved web-foot design vacuum or electric actuated stop signal arm equipped with two flashing lights, red lights front and rear, for giving notice bus is making a pupil stop. Supply line shall be routed through a 1,000 cubic inch tank. Installation shall include appropriate check valve between the tank and vacuum source. The tank for activation of stop sign shall be separate for brake installation. The sign shall be painted red with white border and the word "STOP" in 6-inch white letters. (See page 33 for vacuum line requirements.)
36. Warning Lamps: Minimum lamp requirements shall be dual, mounted side by side on all corners of bus roof. Mounting

shall be as high as practical on top and as near outer edge of bus as curvature permits. Lamps shall be securely mounted having a hood extending out a minimum of 2½ inches. Housings shall be galvanized or made rust resistant in an approved manner. Lamps shall be par 46, 5.7" diameter of sealed beam type, which may be composed of a sealed unit with a plastic lens. Lamps installed on outside shall be red; inner, amber. Lamps shall be clearly visible in bright sunlight for a minimum of 500 feet.

A three (3) position switch to actuate the lamps, having this sequence: (1) off, (2) amber, and (3) red, shall be installed and in combination or in conjunction with the switch or valve to actuate the semaphore stop arm which shall be actuated simultaneously with the roof mounted red flashing warning lights. The circuits shall also be connected to a second switch actuated by the door control which, when the door is opened, deactivates the amber circuit and actuates the red (Federal Standards).

The circuits and controls shall be designed to permit the bus driver to open the service door at a railroad crossing without actuating either the amber or red lights. This feature may be accomplished by use of a master switch, a recycling switch, an override switch or another approved method.

Solid state or motor driven flasher units are required.

37. Lettering:

- A. (Name of District) DISTRICT SCHOOLS, each side minimum 4-inch letters.
- B. "EMERGENCY DOOR", 2-inch black letters inside and outside at or near top of emergency door.
- C. Bus Number (to be furnished by purchaser) front, rear and each side of bus—minimum 4 inches.
- D. "SCHOOL BUS", 8-inch letters front and rear roof cap.

38. Service Door Control: The right front door across the vehicle from the driver's position shall be secured by an over center locking type device controlled by the driver. School bus service door control and rod shall be chromium-plated or epoxy-coated.

39. The emergency door shall be located at rear of vehicle with door control both inside and outside of vehicle. The door shall be equipped with an audible signal mounted so as to warn the driver if the door control is released while the ignition switch is in the "ON" position. Signal shall meet requirements of F.M.V.S.S. 217.

40. The floor covering of underseat area, driver's compartment, and aisle between the passenger seats shall be covered with fire resistant rubber or approved equal, applied to a leveled floor surface.
41. The vehicle shall be equipped with two 8-inch convex mirrors mounted on left and right corner below windshield base to give driver view of pupils crossing in front of bus.
42. Fire Extinguisher:
- A. A 2½-lb. minimum dry chemical extinguisher with gauge and designed to restrain tampering shall be mounted in a place accessible to driver, preferably near service door.
 - B. Fire extinguisher shall bear label of Underwriters' Laboratories, Inc., showing rating of not less than 2A-10BC.
43. The vehicle shall be equipped with warning devices meeting F.M.V.S.S. 125.
44. First-Aid Kit:
- A. Bus shall carry Grade A metal first-aid kit, mounted in such a manner that it can be easily detached and made portable and in an accessible place in driver's compartment.
 - B. Number of units and contents shall be as follows:

4-inch bandage compress.....	2 pkgs.
2-inch bandage compress.....	1 pkg.
1-inch bandage compress.....	2 pkgs.
40-inch triangular bandage with two safety pins.....	1 pkg.
Eye dressing packet.....	1 pkg.
Wire splint.....	1 pkg.
Tourniquet.....	1 pkg.
45. Guard rails shall be applied on each side of bus. Upper guard rail shall be located at seat cushion level and extend from front edge of front door to rear corner of bus, installed in sections to permit operation of service door. Lower guard rail shall be located at floor level and shall cover the same longitudinal area as upper guard rail, except wheelhousings. Guard rails shall be a minimum of 4 inches wide, shall be of 16 gauge steel formed to provide maximum strength and shall be fastened with bolts, rivets or huck bolts at each body member transversed and to outside body skin minimum of two fasteners per foot of guard rail. Upper edge of guard rails shall be sealed to

prevent water from entering behind rails and lower edge shall be vented minimum once each two feet.

46. The drive shaft shall be protected by a metal guard to prevent it from dropping to the ground if broken.
47. The driver's seat shall be equipped with belt meeting Federal Standards for seat belts.
48. Passenger seats shall meet requirements of F.M.V.S.S. 222 for crash protection of passengers.

PART IX

OPTIONAL EQUIPMENT SPECIFICATIONS

TYPE "A" BUSES

MINIMUM REQUIREMENTS FOR OPTIONAL EQUIPMENT - TYPE "A" BUSES

1. Optional larger engine shall have a minimum of 350 cubic inches of piston displacement.
2. Air conditioning shall have adequate ducts for uniform distribution of cold air in passenger compartment.
3. A.M. or F.M. radio shall have two speakers, one flush mounted in passenger compartment and one in driver's compartment.
4. Power Lift for Exceptional Child Bus:
 - A. Unit or lift must be of a standard make by a nationally known manufacturer and approved by the Department of Education. Lifting mechanism shall have two cylinders and a minimum capacity of 700 lbs. Power unit shall be an electrohydraulic, self-contained motor pump, valve and reservoir unit or approved equal. Lifting cylinders shall have honed surfaces. The piston rods shall be ground, polished and chrome-plated. All hydraulic oil hoses must conform to or be better than S.A.E. Specification 100-R3. Hose fittings and hydraulic metal lines shall be made of material other than galvanized pipe. When the drive motor and hydraulic pump are located inside the bus, they shall be installed in such a manner as not to interfere with the movement of wheelchairs. The unit shall be enclosed to prevent transported students from coming in contact with it and shall be readily accessible to service personnel for routine service and for maintenance.

NOTE: (A gravity down lift may be purchased by the district upon written request to the Department and approval by the Department.)

- B. When the hydraulic pump and drive motor are installed below the floor level, they shall be enclosed in a box accessible through a door installed in the body skirt. The lift platform shall provide for power operation both fully up and down with a manual operating system as a backup in the event of an electrical or hydraulic failure. When the lift platform is in the fully up position, it shall be locked in position mechanically. The lift mechanism shall be equipped with adjustable limit switches and/or bypass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or the ground. The lift travel shall be vertical. A swing arm design that travels in an arc is not acceptable. *Fold-out type lifts shall provide for power fold-out and fold-up for storage.

- C. All edges of platform shall be designed to restrain wheelchairs and operator's feet from becoming entangled during raising and lowering process.
- D. Platform floor surface is to be covered with smooth-surfaced rubber, 1/8-inch minimum thickness, RCA or approved equal, except when platform is made of expanded metal.
- E. Positioning of power lift shall be controlled by push-button type switch mounted within bus and adjacent to lift, convenient to attendant when standing upon lift platform and when the lift is in any position. An actuating switch shall be installed in the circuit so that the lift mechanism will not operate when the lift platform doors are closed. A circuit breaker in the main feed line is required to protect the lift from a power overload.
- F. Wheelchair locks shall be sufficient in strength to retain the wheelchair in a stable position under all types of driving and road conditions without causing damage to the wheelchair. When the wheelchairs are in their locked position, the position shall not be located where movement of a bus aide up or down the aisle is blocked.
- G. Lift platform door or doors shall have glass window set in rubber compatible with and set to lower line of adjacent sash.

Because of the wide variation in type, size, construction and design of lift gates and wheelchair locking position, the Department of Education reserves the right to inspect any lift gate bus offered for sale to Florida district school boards and to reject any unit found to be unsafe, inadequate or not suitable for use in transportation of physically handicapped students.

- H. Spare tire and wheel of appropriate size shall be offered as an option.
- I. A vehicle of the Type "A" school bus design with a seating capacity or 19 or 20 students shall meet all the requirements, state and federal, of a Type "A" school bus.
- J. Two-way mobile radio communication systems are an approved option.

APPENDIX A

ACCEPTANCE CHECK FOR NEW SCHOOL BUSES

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ACCEPTANCE CHECK FOR NEW SCHOOL BUSES

(Form provided by Department of Education as a service to District school authorities.)

COUNTY: _____ BUS NO.: _____ DATE: ____/____/____

Chassis: Make _____ Model _____ Year _____ Serial # _____

Body: Make _____ Model _____ Year _____ Serial # _____

Check each item if acceptable, otherwise indicate comment below.

CHASSIS (FOR 17 THROUGH 90 CAPACITY SIZE BODY)

1. Directional signal switch: Self-canceling type. _____
2. Power steering: Integral type. _____
3. Transmission: Synchromesh all gears except first and reverse (automatic excepted). _____
4. Gauges required: (a) Speedometer; (b) Odometer; (c) Oil pressure; (d) Coolant; (e) Fuel; (f) Air pressure or vacuum, where air or vacuum brakes are used (National Standards); and (g) Voltmeter or Ampmeter. _____
5. Signals, visual and audible, to indicate: (a) low air pressure (air brake models); (b) low vacuum pressure (hydraulic brake models with vacuum assist). _____
6. Hand brake or spring applied parking brake. _____
7. Engine size. (See specifications.) _____
8. Oil bath or dry element type air cleaner. _____
9. Oil filter: One quart full flow type required. _____
10. Governor (shall permit mfg. maximum recommended r.p.m.). _____
11. Battery: Conventional - 12V, 455 cold cranking amps. at 0°F rating, located under hood; Type "D" (71 through 90) - 12V, 455 cold cranking amps. at 0°F, in slide-out tray; Dual 12V with 455 cold cranking amps. at 0°F required for diesel powered units. _____
12. Horns: Dual, 120 decibels. _____
13. Headlights: Must meet SAE and National Standards. _____
14. Alternator: Dual belt drive*; 100 amp. minimum rating; 50 amp. minimum output at idle with a maximum r.p.m. ratio to engine of 2.5:1; sealed ball or roller bearings on drive and slip ring ends and ammeter meeting National Standards. _____
15. Voltage regulator: Solid state components except field cutout relay, readily accessible. _____

- 16. Air compressor for air brakes: 7 c.f.m. on Type "C"; 12 c.f.m. on Type "D".
- 17. Shock absorbers: Front and rear, double acting.
- 18. Fuel tank: 30 gallon capacity minimum on 29-47 capacity buses; 60 gallon minimum on 59-89 capacity.
- 19. Springs. (See specifications.)
- 20. Drive shaft guards and shields.
- 21. Tire and rim size. (See specifications.)
- 22. Air tanks for air brake models: 1,600 cubic inch minimum.
- 23. Reserve tank: 1,000 cubic inch for hydraulic brakes.
- 24. Wiring harness: 100 amp.
- 25. Split type brakes meeting National Standards. Power assist on hydraulic models.
- 26. Quick release valves front and rear (air brake models).
- 27. Air brake actuators: If self-adjusting on one axle they shall be self-adjusting on both axles.
- 28. Air dryer on air brake models.

BODY

- 1. Check heater hose for nearness to exhaust manifold, or sharp bends and shielded inside bus.
- 2. Cowl-to-body contact area properly sealed.
- 3. Windshield steps including grab handle, right and left sides.
- 4. Paint and body condition (note workmanship and possible damage).
- 5. All exterior panels and top of rub rails sealed.
- 6. Undercoated underside.
- 7. Vacuum tank 1,000 cubic inch for body accessories (in addition to vacuum brake tank).
- 8. Guard rail locations: (a) bottom of outer body skirt; (b) floor line; (c) seat line (extends to emergency door); and (d) window line (or equivalent). (See specifications.)
- 9. Rear bumper: Minimum 3/16 inch thick, 8 inch high ribbed face, 2 inch flanges.
- 10. Emergency door—upper and lower glass also equipped with buzzer.
- 11. Warning lamps: Dual roof-mounted all corners front and rear, black background, 2½ inch minimum hood length; 5.7 inch minimum approved sealed beam unit.
- 12. Clearance lights: Four (4) on units under 30 feet, six (6) on longer units.
- 13. Turn signal lamps.
- 14. Brake stop lamps: Two (2), seven (7) inch diameter minimum.

15. Reflectors: Body sides and rear. Sides, 4 amber and 2 red; Rear, 2 red. _____
16. Tail lamps: Four required, one of which must illuminate license plate & two in combination w/brake lights. _____
17. Stop arm: Approved web-foot design, two (2) flashing lights. _____
18. Entrance steps: 3/16 inch ribbed rubber covering; leading edge contrasting color. _____
19. Entrance grab rail shall be stainless steel. _____
20. Door-control and rod: Chromium-plated or epoxy-coated, smooth finish on handle. _____
21. Mirrors: 6 inch by 30 inch interior, two (2) 50 square inch exterior and 3 convex. _____
22. Sun shield: 6 inch by 24 inch minimum. _____
23. Defogger fan: Two, 6-inch, directed at windshield. (See specifications.) _____
24. Fire extinguisher: 2½-pound dry chemical, emergency warning devices, grade A first-aid kit. _____
25. Windshield wipers and control: Controls in easy reach of driver; park position blades out of line or sight. _____
26. Warning system indicator lights (red and amber). _____
27. Heater shall be 80,000 BTU fresh air type with separate defroster system. _____
28. Windshield: Laminated plate, shaded, and having dark tint at top, corner vision. _____
29. All other glass: Safety sheet minimum 1/8-inch thick. _____
30. Windows: Split sash with 9-inch opening required. _____
31. Floor covering: (a) Driver's compartment, under seats and wheelhousing, covered with approved 1/8 inch linoleum or rubber; _____
 (b) Aisle and landing covered with 3/16 inch RCA ribbed rubber or equal; _____
 (c) Molding (non-ferrous metal) required on all joints; _____
 (d) Cove molding or equivalent required at floor along inner walls. _____
32. Driver's seat: Adjust fore and aft, up and down, and adjustable back rest; seat belt with support at seat. _____
33. Seat frames shall have fully padded back rest. _____
34. Dome lights: Recessed flush type if over aisle. _____
35. Lettering: "(Name of District) DISTRICT SCHOOLS" near belt line; "SCHOOL BUS" front and rear; Bus Numbers; "EMERGENCY DOOR" inside and out. _____
36. Padding inside of service and emergency door headers. _____

REMARKS: _____

Signed: _____

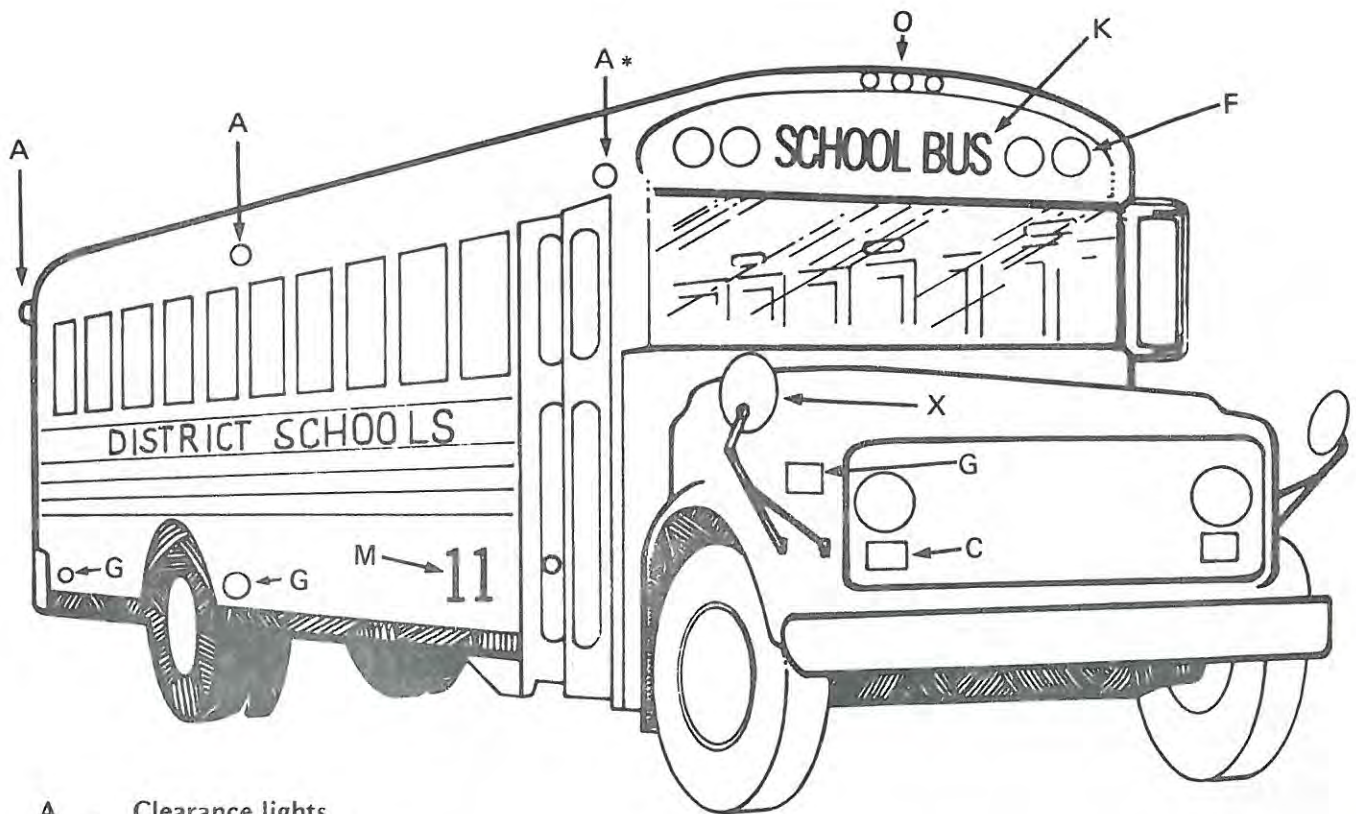
Date: _____

*Single belt drive acceptable if combined belt wrap of drive pulley and driven pulley equals 360 degrees. 80 amp. minimum on 22-33 capacity.

NOTE: This check sheet pertains to different size chassis, therefore, current State specifications should be referred to for information on gross vehicle weights, wheelbases, axle ratings, springs, tire size, clutch diameter, brake lining area and gear ratios.

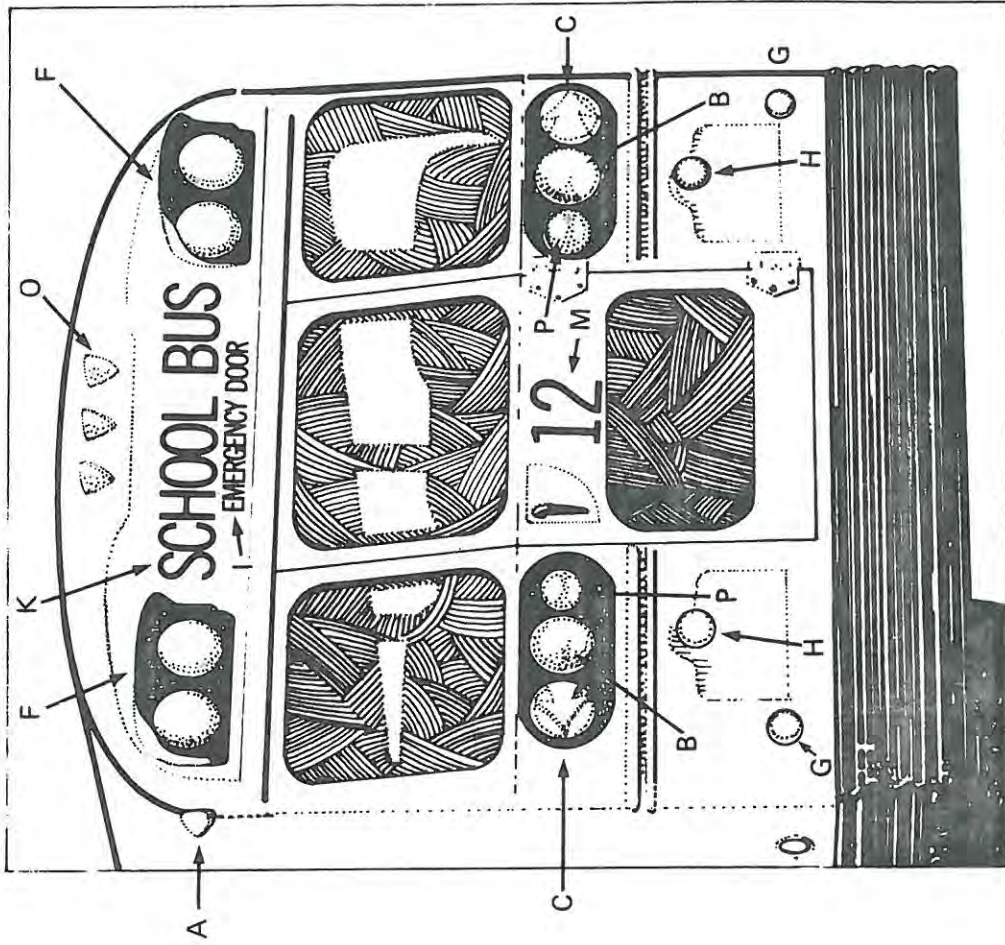
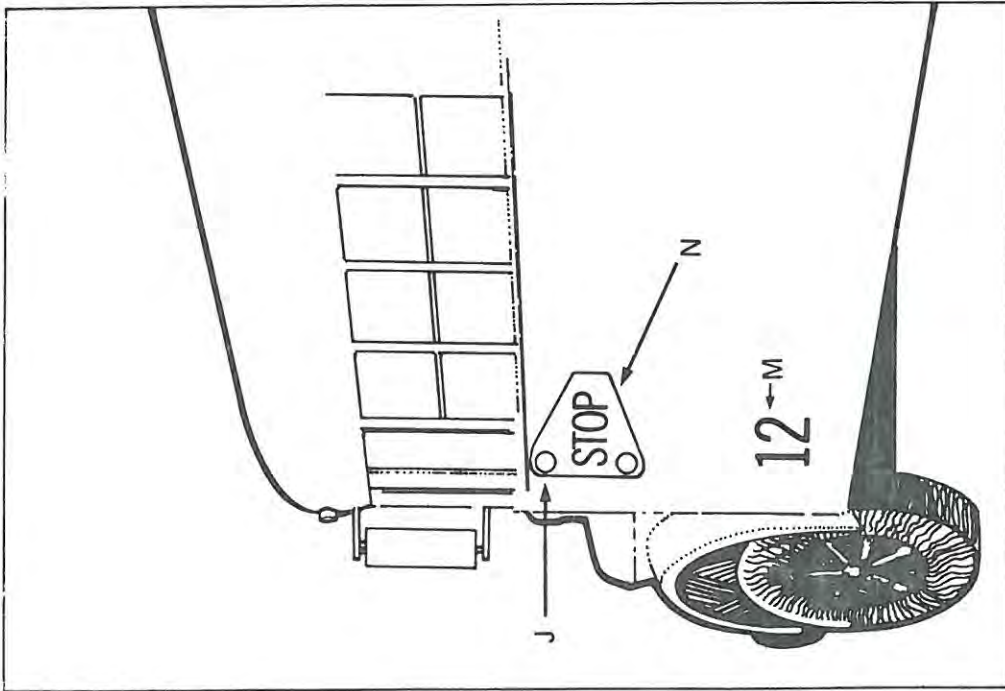
APPENDIX B

OUTLINE OF MINIMUM LETTERING AND
LIGHTING REQUIREMENTS FOR BOTH
CONVENTIONAL AND TRANSIT BODIES



- A ... Clearance lights
- B... Two Stop Brake Lamps
- C... Directional Signals
- D... Stepwell Light
- E... Adequate Interior Lights
- F... Warning Lights-dual (side by side)
- G... Reflectors
- H Two Tail Lamps. (One lamp Must Illuminate license plate)
- I ... EMERGENCY DOOR - 2" letters inside and outside at top or directly above door.
- J ... Double face flashing red lights connected to roof mounted flashing red lights
- K. SCHOOL BUS - front and rear, 8" letters, Series B Standard Alphabet (see National Standards)
- L ... NAME OF DISTRICT SCHOOLS - each side, belt line, 4" minimum letters
- M ... NUMBER-To Be Furnished by County 4" numbers on each side and rear.
- N Vacuum or air actuated semaphore stop arm, red background, 6" white letters, connected with copper or steel tubing, web-foot design.
- O Identification Lamps
- P. Back Up Lights
- X. Walk Mirror
- (*) Required on Units Over 30' Long

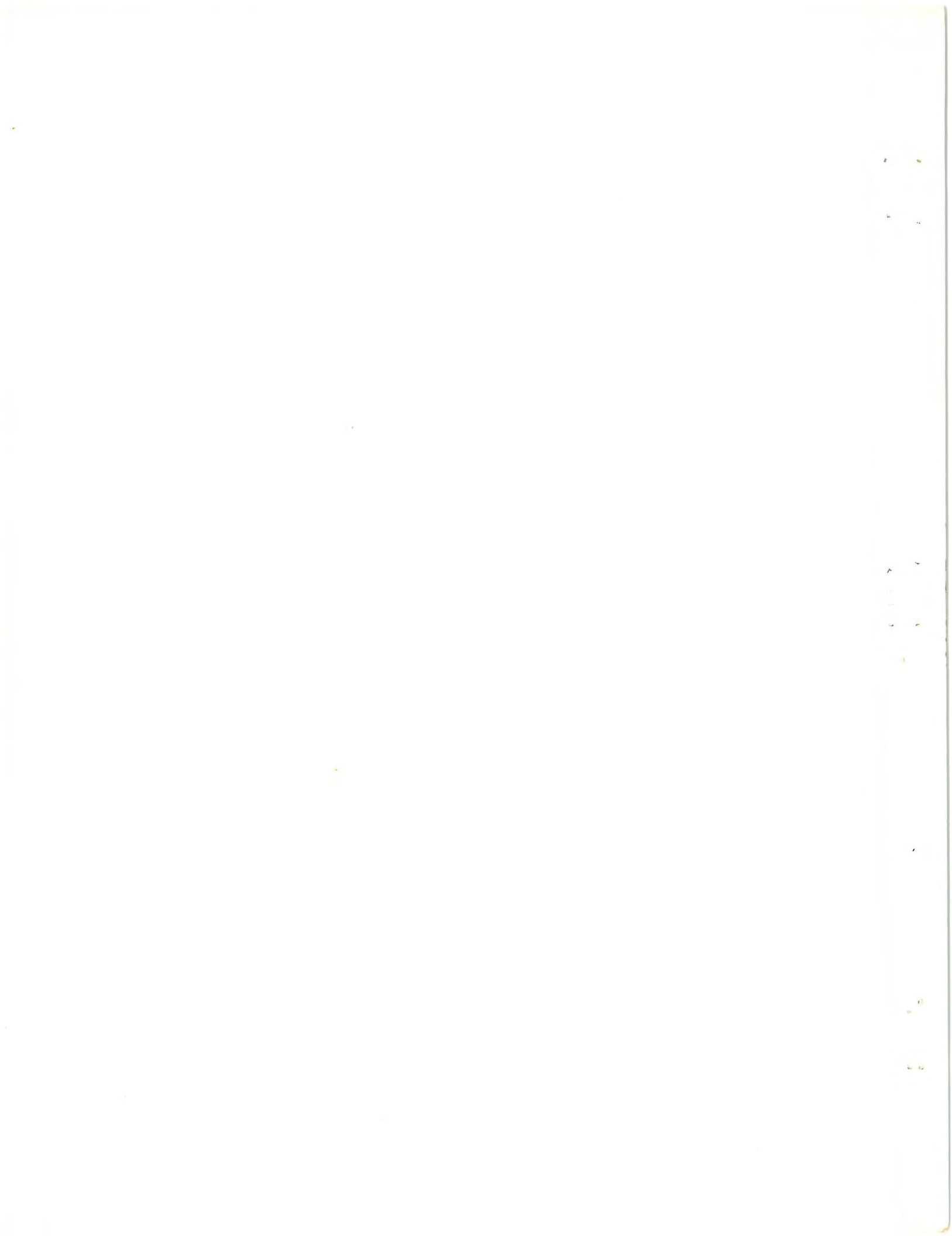
MINIMUM LETTERING AND LIGHTING REQUIREMENTS



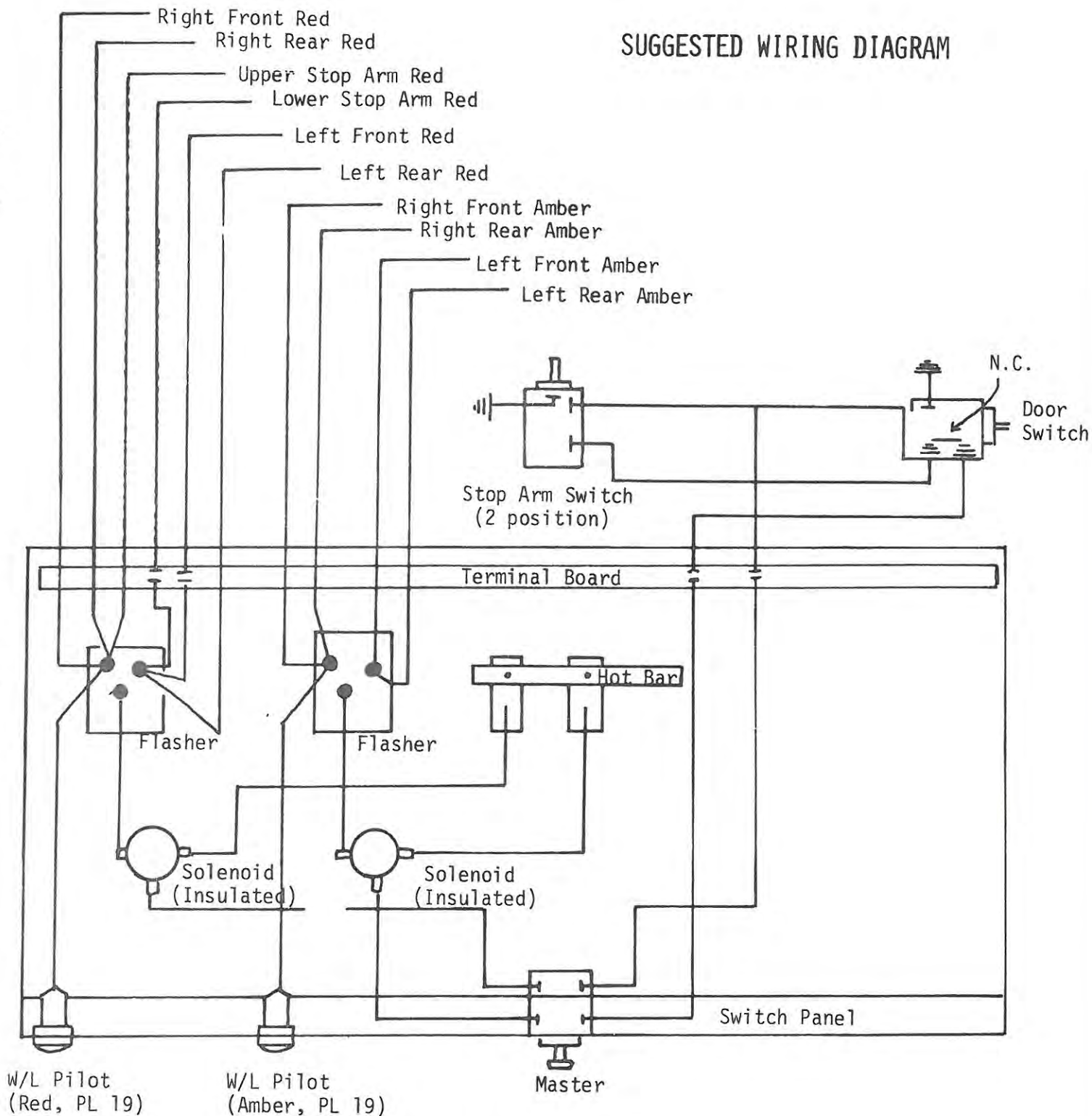
- A... Clearance lights
- B... Two Stop Brake Lamps
- C... Directional Signals
- D... Stepwell Light
- E... Adequate Interior Lights
- F... Warning Lights-dual (side by side)
- G... Reflectors
- H... Two Tail Lamps. (One lamp Must Illuminate license plate)
- I... EMERGENCY DOOR - 2" letters inside and outside at top or directly above door.
- J... Double face flashing red lights connected to roof mounted flashing red lights
- K... SCHOOL BUS - front and rear, 8" letters, Series B Standard Alphabet (see National Standards)
- L... EMERGENCY DOOR - each side, belt line, 4" minimum letters
- M... NUMBER-To Be Furnished by County 4" numbers on each side and rear.
- N... Vacuum or air actuated semaphore stop arm, red background, 6" white letters, connected with copper or steel tubing, web-foot design.
- O... Identification Lamps Back Up Lights

APPENDIX C

SUGGESTED WIRING DIAGRAM



SUGGESTED WIRING DIAGRAM



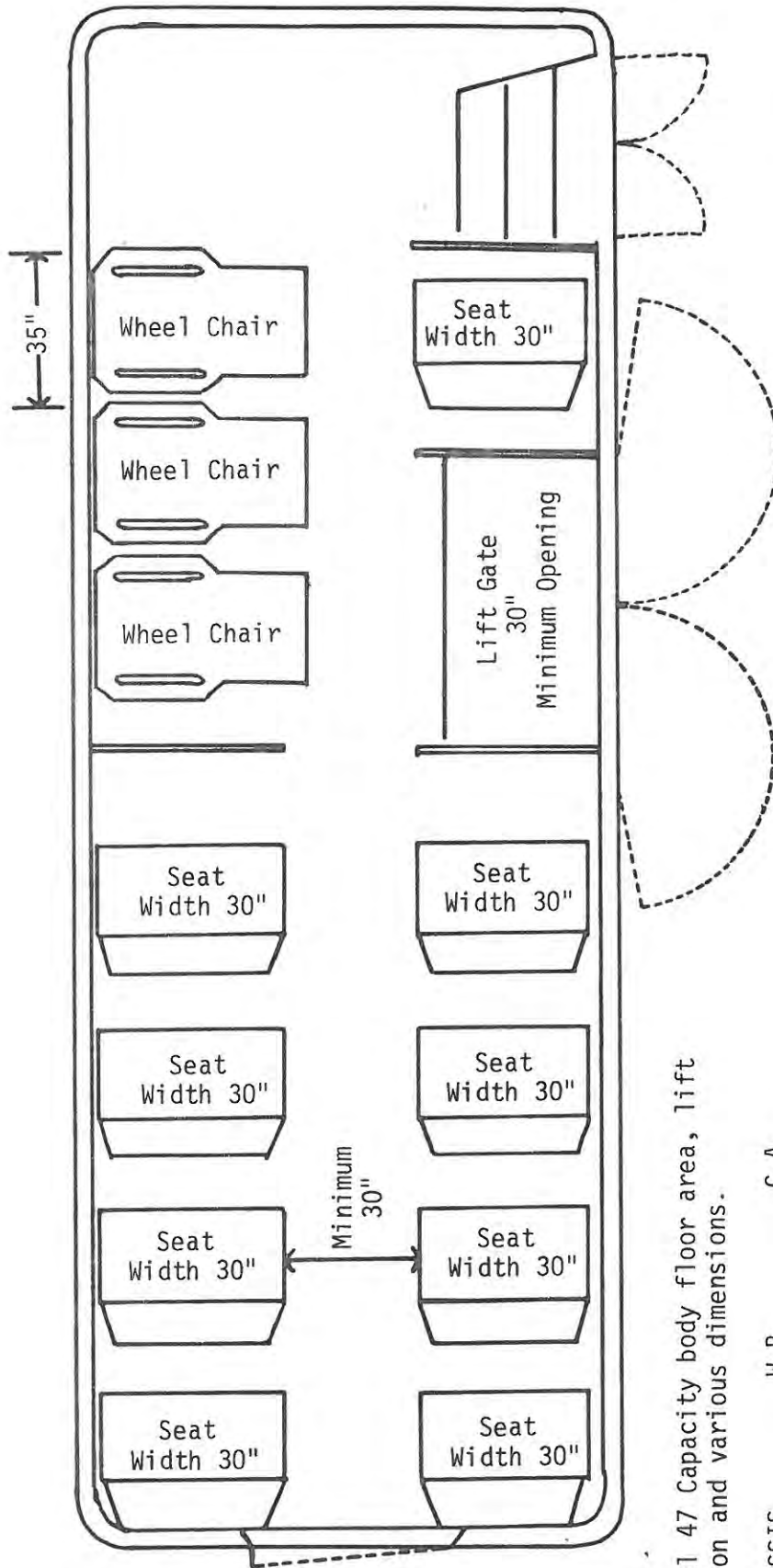
NOTES: Equivalent Switches and Controls Accepted.

1. All wiring is 14 GA,
2. Flashers - Solid state or motor driven
3. Solenoids - Cole-Hersee no. 24107, Insulated
4. Door Switch - Cole-Hersee No. 90039
5. Two Position Stop Arm Switch - Specialty Mfg. Co. No. 668X
6. N.C. indicates these two terminals electrically connected with switch in unopened position. Connection is broken when switch is operated.
7. Master Switch - Cole-Hersee No. 50047-01

APPENDIX D

SEATING AND WHEELCHAIR FLOOR PLAN

STANDARD SEAT PLAN, EXCEPTIONAL CHILD BUS
 ADAPTED TO 47 CAPACITY BODY SHELL
 (APPROXIMATE 35" FRONT BODY SEC. APPROVED)

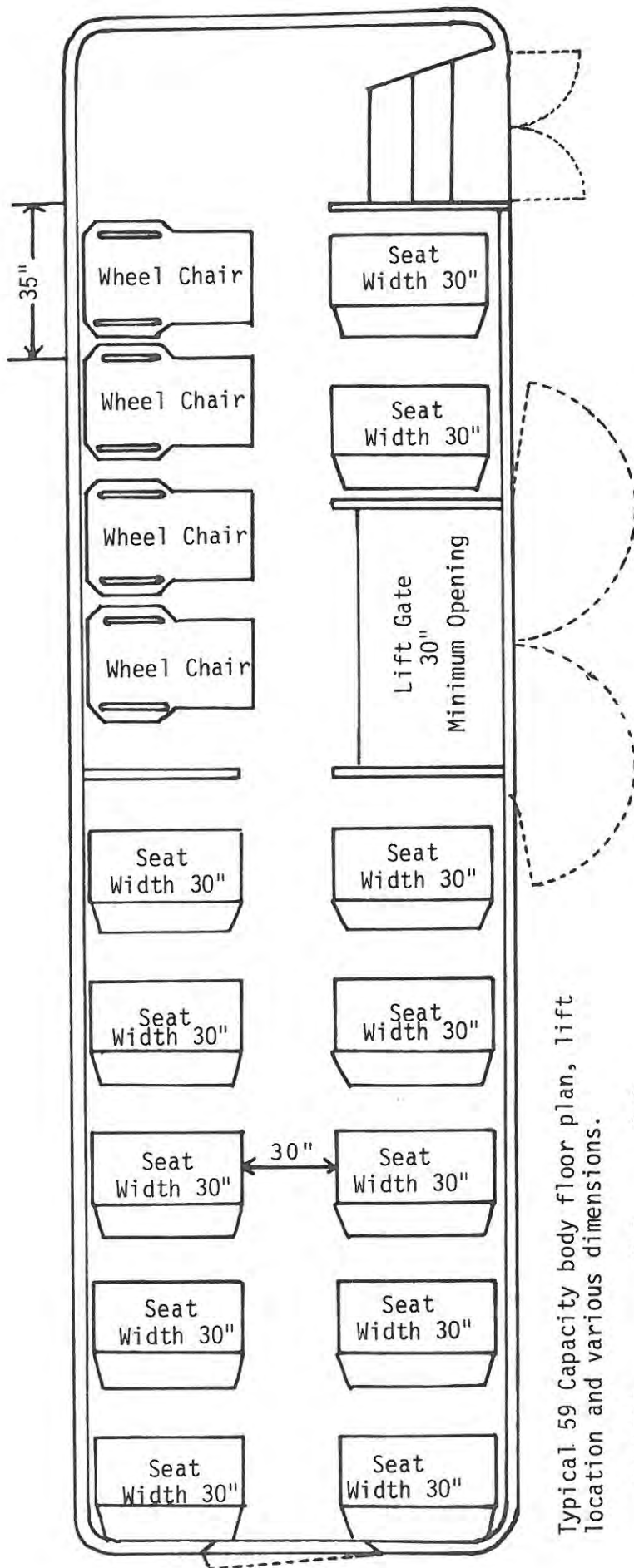


Typical 47 Capacity body floor area, lift location and various dimensions.

CHASSIS	W.B.	C.A.
Chevrolet	189.0	165.5
Dodge	197.0	168.0
Ford	198.5	168.2
G.M.C.	189.5	165.5
IHC	187.0	162.0

See bid sheet for requested variations in seating plans. Rings or clips for fastening passenger restraints are required at ends and center of each seat. Seat width may vary from 30" to 33" to provide minimum 30" aisle width. Dimensions given on the drawings are approximate. See specifications for permissible tolerances.

STANDARD SEAT PLAN, EXCEPTIONAL CHILD BUS
 ADAPTED TO 59 CAPACITY BODY SHELL
 (APPROXIMATE 35" FRONT BODY SEC. APPROVED)

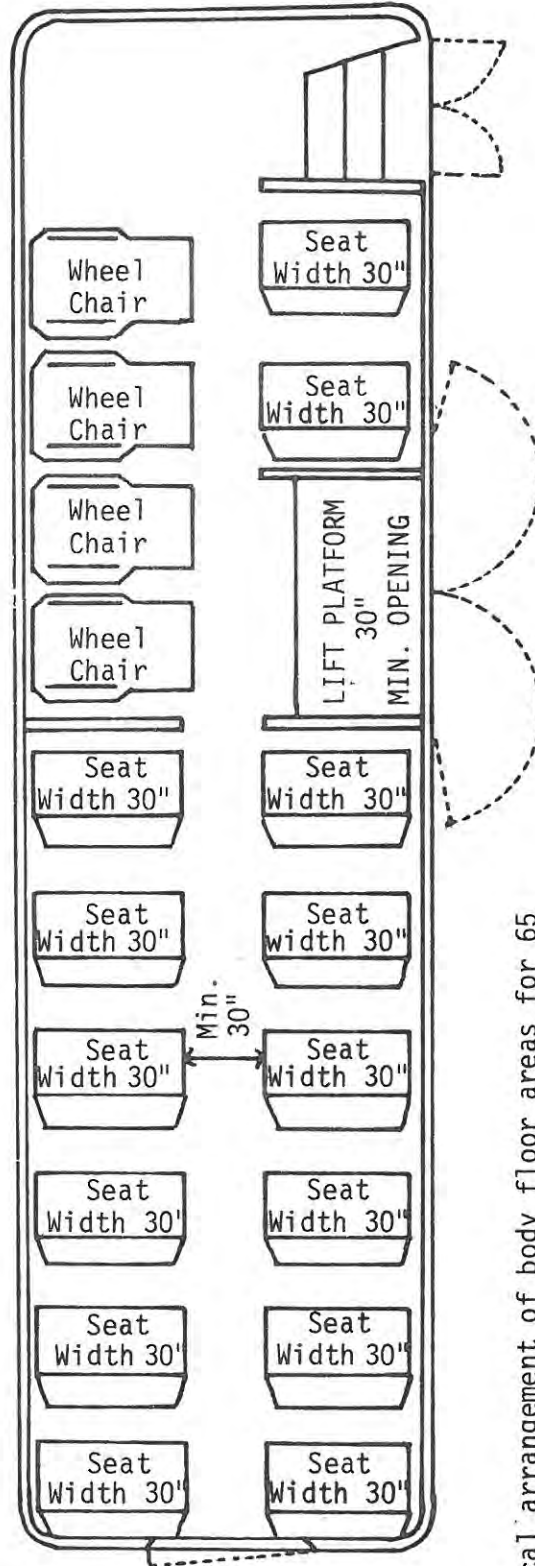


Typical 59 Capacity body floor plan, lift location and various dimensions.

CHASSIS	C.A.	
	W.B.	C.A.
Chevrolet	235.5	211.5
Dodge	240.0	211.0
Ford	242.5	212.2
GMC	235.5	211.5
IHC	236.0	211.0

See bid sheet for requested variations in seating plans. Rings or clips for fastening passenger restraints are required at ends and center of each seat. Seat width may vary from 30" to 33" to provide minimum 30" aisle width. Dimensions given in the drawings are approximate. See specifications for permissible tolerances.

STANDARD SEAT PLAN - EXCEPTIONAL CHILD BUS
ADAPTED TO 65 CAPACITY BODY SHELL



Typical arrangement of body floor areas for 65 passenger conventional bus showing lift location and other dimensions.

CHASSIS	W.B.	C.A.
Chevrolet	253.9	230.2
Dodge	258.0	229.0
Ford	260.5	230.2
GMC	254.0	230.0
IHC	254.0	229.0

See bid sheet for requested variations in seating plans. Rings or clips for fastening passenger restraints are required at ends and center of each seat. Seat width may vary from 30" to 33" as necessary to provide minimum 30" aisle width. Dimensions given on the drawings are approximate. See specifications for permissible tolerances.

