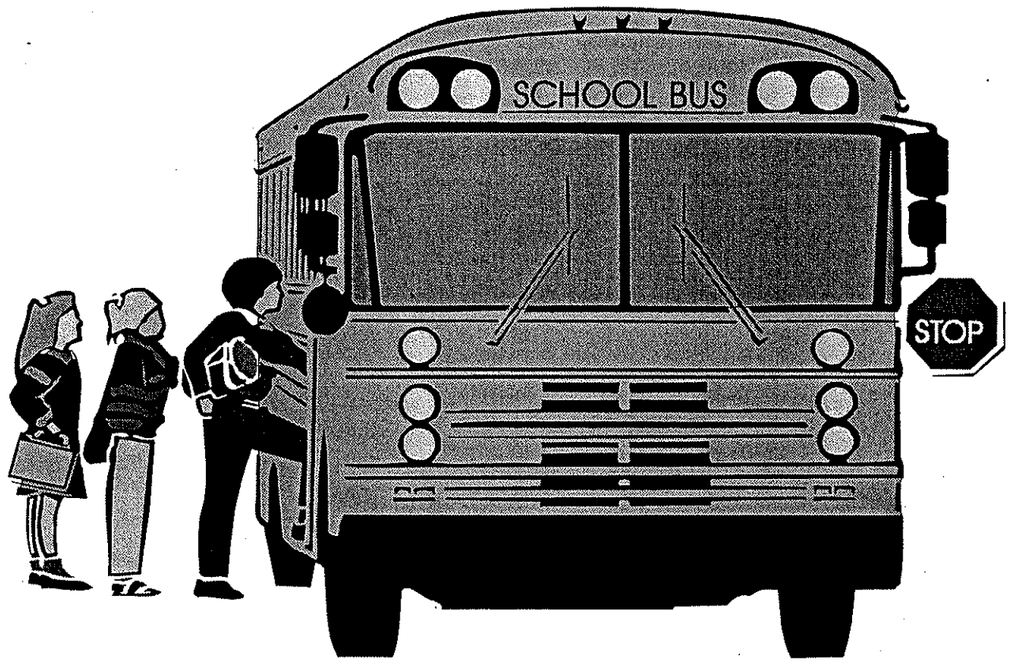
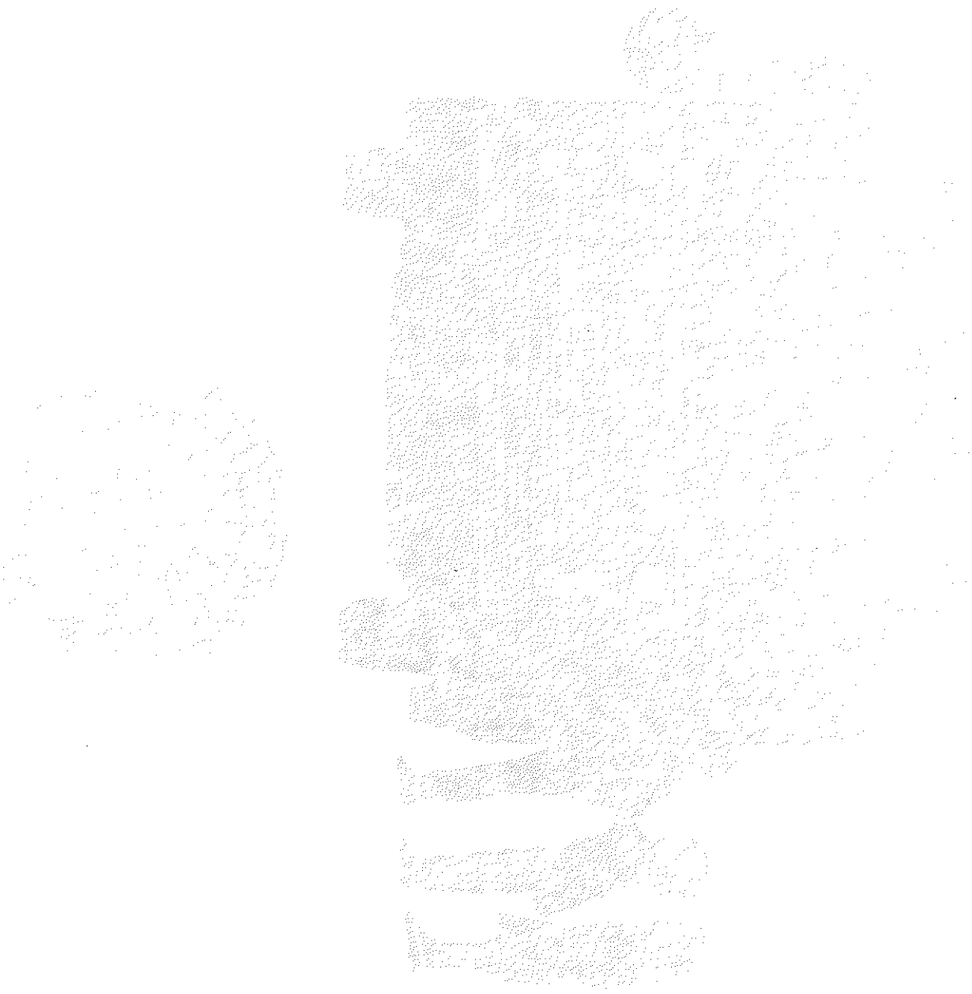
Ohio School Bus
Minimum Construction Standards



EFFECTIVE DATE: JANUARY 1, 1990

FRANKLIN B. WALTER
SUPERINTENDENT OF PUBLIC INSTRUCTION
OHIO DEPARTMENT OF EDUCATION
Equal Employment Opportunity



SCHOOL BUS MINIMUM CONSTRUCTION STANDARDS ADVISORY COMMITTEE

Timothy Stafford
Maintenance Supervisor
Dayton City School District

Ralph W. Shell
Area 1 Coordinator
Ohio Department of Education
Cincinnati, Ohio

Larry Lane
Transportation Supervisor
West Clermont Local School District
(Clermont County)

Stanley C. Frye
Chief Engineer
Transportation Research Center
of Ohio

Harry Waterman (Retired)
Transportation Supervisor
Mentor Exempted Village Schools

David Decsman
Transportation Administrator
Toledo City School District

Robert Butscher
Fleet Supervisor
Cuyahoga Board of MR/DD
(Cuyahoga County)

Douglas Winner
Transportation Director
East Muskingum Local School District
(Muskingum County)

Jim Hirzel
Maintenance Supervisor
Columbus City School District

Edward Schott
Transportation Supervisor
Warren Local School District
(Washington County)

Jim Dixon
Transportation Supervisor
Ridgedale Local School District
(Marion County)

Fred Stephens
Business Manager
Elyria City Schools

George R. Sontag, Jr.
Transportation Supervisor
Milford Exempted Village Schools

Jim Randall
Transportation Supervisor
Springfield City School District

Trooper Scott Harter
Office of Vehicle & Driver Services
Ohio State Highway Patrol

Table of Contents

Foreword

Contained herein are the minimum standards covering the construction and equipping of school buses, as recommended by the School bus Minimum Construction Standards Advisory Committee, adopted by the State Board of Education and filed with the Secretary of State. These standards were adopted with the advice and consent of the director of Department of Highway Safety and shall apply to all school bus chassis and bodies bid on and after January 1, 1990, which are owned and operated by any school district in this state. (Section 4511.76 of the Ohio Revised Code.)

The School Bus Minimum Construction Standards Advisory Committee is comprised of representative superintendents, transportation directors, and other school officials; members of the Ohio State Highway Patrol, representing the director of highway safety; and the staff members of the Pupil Transportation Section and the Ohio Department of Education.

The Ohio Department of Education appreciates the combined efforts of the members of the School Bus Minimum Construction Standards Advisory Committee and experts from the school bus body and chassis manufacturing industry who offered their services in the interest of formulating a standard designed for maximum safety, efficiency, and dependable service.

School officials and others responsible for pupil transportation should familiarize themselves with these standards and make certain that all school buses and equipment purchased after the effective date meet or exceed the same.

TABLE OF CONTENTS

3301-87-01 General provisions.

(A) All school buses bid on or after January 1, 1990 shall conform to the rules in this chapter.

(B) The Ohio school bus minimum standards, revised 1989, that are presented in the rules in this chapter of the Administrative Code, do hereby supersede and take precedence over all similar specifications previously adopted. These rules also cancel all existing "approved equal" certification and all construction approvals or waivers.

(C) Revision of this chapter will be considered annually at a meeting of the school bus minimum standards advisory committee. The assistant director, division of school finance, pupil transportation section, Ohio department of education, shall annually present the necessary revisions to the state board of education for adoption.

(D) Equivalency - Permission to use a device or material as an "equivalent" to that called for in the rule must be requested in writing by the manufacturer or owner. Any item supplied as an equivalent must have prior approval, in writing, from the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(E) Failure to comply with any of the rules in this chapter and the procedures as outlined may result in the suspension of authorization for sale of the chassis and/or body in the state of Ohio until such discrepancy is corrected by the manufacturer or the responsible representative and concurred with by the pupil transportation section, Ohio department of education.

(F) Each manufacturer shall file a statement of compliance within thirty days after the effective date of January 1, 1990. The statement shall certify that all products and components

manufactured for use in school buses sold for use in Ohio, as defined by division (F) of section 4511.01 of the Revised Code, will meet or exceed all rules in this chapter.

(G) The responsibility for compliance with the rules in this chapter rests with the dealers, manufacturers, and purchasers. Failure to comply with this chapter may result in the suspension of the authorization for sale or use of the chassis and/or body in the state of Ohio until such discrepancy is corrected and written approval is issued by the Ohio department of education.

(H) Specifications shall be filed in duplicate by the school bus chassis and/or body manufacturer that will meet or exceed this chapter. Specifications being submitted by the manufacturers shall also include any sales brochures and pertinent literature. Specifications shall be filed when new models are introduced.

(I) Predelivery inspection shall be conducted by both body and chassis manufacturers to assure the bus being delivered is in satisfactory operating order (all components) and meets all federal and Ohio standards. This predelivery inspection shall be according to the specific instructions of the purchaser and to the purchaser's satisfaction.

(J) The bus shall be delivered clean inside and out.

(K) Body and chassis manufacturers shall provide a written document specifying warranty provisions. The effective date of all warranties shall be the date of delivery to the purchaser.

(L) All specifications, literature, charts, and general communications should be sent to: "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, Room 815, 65 South Front Street, Columbus, Ohio 43266-0308."

(M) Predelivery service - chassis manufacturer.

(1) The chassis manufacturer shall provide for a predelivery service at the body plant location after the body is mounted and prior to delivery to the purchaser.

(2) At the time of delivery, the chassis dealer shall provide to the purchaser the following documents:

(a) Line set tickets.

(b) Predelivery service checklist.

(c) Predelivery check-out form by the chassis manufacturer or designated agent.

(d) Warranty book and statement of warranty.

(e) Service manual when requested.

(N) Any changes in design or equipment by school districts after receipt of the school bus must have prior approval in writing from the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(O) New products, buses, and related equipment must be in production one year prior to general use in the state. During the first year of production, new products will be subject to the experimental and field test evaluation procedures. (See rule 3301-87-07 of the Administrative Code.)

The interpretation of "new" will be made by the assistant director, division of school finance, Ohio department of education. "New" generally means any item that has not been used on a school bus before. Example: Six-speed transmission. This type of transmission is not new, but it has been redesigned by one company and never used on a school bus in Ohio. Therefore, it would need to be field tested. Another example is various types of air suspension.

(P) Definitions, school bus.

(1) A "type A school bus" is a conversion or body constructed upon a van-type compact truck or a front-section vehicle, with a gross weight rating of ten thousand pounds or less, designed for carrying more than ten persons.

(2) A "type B school bus" is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.

(3) A "type C school bus" is a body installed upon a flat back cowl chassis with a gross vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. All of the engine is in front of the windshield and the entrance door is behind the front wheels.

(4) A "type D school bus" is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. The engine may be behind the windshield and beside the driver's seat or at the rear axles. The entrance door is ahead of the front wheels.

3301-87-01

Effective:

_____
Certification

_____
Date

Promulgated under R.C. Chapter 119.
Rule authorized by R.C. section: 4511.76
Rule amplifies: R.C. section 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-02 Standards and specifications for school bus chassis with rated seating capacity of twenty-four through eighty-four.

(A) Air cleaner - dry element type air cleaner shall be provided. Air cleaner and element shall meet all appropriate S.A.E. J726 tests per engine application.

(B) Axles or other types of suspension.

(1) The front and rear axles including suspension assemblies, and all frame-to-ground components, shall have a gross axle weight rating at ground at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating. In no case shall capacities be less than those listed below.

(2) All vehicles shall be equipped with appropriate GAWR axles or suspension systems and tires by chassis manufacturer.

(3) Front axle shall be heavy-duty bus type. Oil bath wheel bearings on front axle are optional.

MANUFACTURER'S RATED PUPIL CAPACITY	FRONT AXLE OR OTHER FRONT SUSPENSION CAPACITY	REAR AXLE OR OTHER REAR SUSPENSION CAPACITY
TYPE A - 10-16	3,400 LBS. AT GROUND	5,300 LBS. AT GROUND
TYPE B - 16-23	4,000 LBS. AT GROUND	7,900 LBS. AT GROUND
24-32	4,500 LBS. AT GROUND	11,000 LBS. AT GROUND
TYPE C - 16-35	5,000 LBS. AT GROUND	12,000 LBS. AT GROUND
47-35	6,000 LBS. AT GROUND	15,000 LBS. AT GROUND
59	7,000 LBS. AT GROUND	17,000 LBS. AT GROUND
65	9,000 LBS. AT GROUND	18,500 LBS. AT GROUND
71-77	9,000 LBS. AT GROUND	19,000 LBS. AT GROUND
TYPE D - 42 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
48 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
54 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
60 (FC)	7,000 LBS. AT GROUND	17,000 LBS. AT GROUND
66 (FC)	9,000 LBS. AT GROUND	17,000 LBS. AT GROUND
72 (FC)	10,800 LBS. AT GROUND	17,000 LBS. AT GROUND
77 (FC)	13,000 LBS. AT GROUND	19,000 LBS. AT GROUND
83 (FC)	13,000 LBS. AT GROUND	20,000 LBS. AT GROUND
60 (RE)	10,300 LBS. AT GROUND	18,000 LBS. AT GROUND
66 (RE)	10,300 LBS. AT GROUND	18,000 LBS. AT GROUND
72 (RE)	11,000 LBS. AT GROUND	19,000 LBS. AT GROUND
78 (RE)	11,000 LBS. AT GROUND	19,000 LBS. AT GROUND
84 (RE)	13,000 LBS. AT GROUND	23,000 LBS. AT GROUND

(SEE PARAGRAPH (D) OF RULE 3301-87-02 OF THE ADMINISTRATIVE CODE, BRAKES.)

(C) Battery.

(1) Gasoline power: Gasoline - Eight-hundred cold cranking amperes (CCA) or larger.

Diesel power: Diesel - One-thousand-two-hundred-fifty CCA minimum or larger depending on additional amperes draw.

(2) Type A and B buses diesel powered -- Two five-hundred CCA or larger depending on lift requirements if so equipped. If gasoline powered -- type A and B buses shall use manufacturer's standard.

(3) One-piece nonspliced battery cables shall be provided by the chassis manufacturer.

(a) All cables shall conform to S.A.E. standard J541 with respect to electrical resistance.

(b) All cable assemblies shall conform to "American Trucking Association-Truck Maintenance Council (ATA-TMC)" RP105.

(c) Chassis fifty-three-passenger school bus and above, with diesel engine, shall have copper wire circuit to and from starter.

(4) Batteries for types B, C, and D school buses shall be mounted in the body skirt by the body manufacturer. In this case the chassis manufacturer shall temporarily mount the battery on the chassis frame, with proper cables of appropriate length for mounting, etc., which shall conform to the "SBMI Design Objectives Booklet," January 1985 edition. Exception: Type D bus rear engine may have batteries mounted in engine compartment.

(D) Brakes - all braking systems shall comply with DOT standards ("Federal Motor Vehicle Safety Standard [FMVSS]") 105 or 121.

(1) Types of brake systems - chassis rated from twenty-four to sixty capacity shall be equipped with four-wheel power-assisted hydraulic brakes. Chassis rated from sixty-five-passenger conventional, or transit-type chassis with capacity of fifty-four-passenger school bus or greater, shall be equipped with air brakes. Option - hydraulic four-wheel disc or Ford disc front, drum rear hydraulic brakes.

(2) Air brakes - all air brake systems shall be S-cam type and shall be equipped with necessary limiting valve(s) to ensure the proper amount of air pressure to the front axle to permit efficient stopping.

(a) Service brakes - every bus, under all conditions of load, shall be equipped with service brakes of standard make designed to bring the vehicle to a safe stop in such a manner that will not interfere in any way with steering or control of the vehicle and shall be provided in accordance with FMVSS 121.

(i) Compressors - on buses using air brakes for service, emergency and parking brakes, the compressor shall be gear- or belt-driven with a twelve-cubic-foot displacement at a speed of one thousand two hundred fifty revolutions per minute.

(ii) Reservoir requirement - air brake system shall have at least two reservoirs, or one reservoir with dual chambers with a total capacity which is equal to or greater than twelve times the total volume of all brake actuators at full travel.

(iii) Air brake reservoir function

(a) Check valve - brake system reservoirs shall be equipped with a check valve or equivalent device that will prevent depletion of stored air

in the event of a leak or failure of components or connections. The check valve shall be mounted in such a manner as to provide easy access for maintenance.

(b) Safety valve - buses equipped with compressed air brakes shall require a safety valve installed in the first reservoir, designed to release air pressure in excess of one hundred fifty pounds per square inch.

(c) Drain cock - buses equipped with compressed air brakes shall be equipped with a drain cock to drain from the lowest point of the dry reservoir.

(d) All school buses equipped with air brakes shall have "Bendix Westinghouse Model No. AD 4, No. AD 9" or "Cyclo-Gard Models 1701140, 1701300" or equivalent air dryer.

(iv) Tubing and hose - brake tubing and hose shall conform to the "Society of Automotive Engineers Standards" and be equivalent to automotive engineering practice of the transit industry. These transmission lines and connections in the brake system shall be installed so as to accommodate all normal motions of the vehicle without damage or chafing. (S.A.E. J1402, FMVSS 106) See table below.

(v) A relay valve or quick release valve shall be installed in the rear application line.

(vi) Gauge and warning devices for brake systems - vehicles using air shall be equipped with an illuminated gauge, accurate to within ten per cent of the actual reservoir pressure. The vehicle shall be equipped with an audible warning device which will give a continuous warning to the driver when the air pressure in the system available for braking is sixty pounds per square inch or less.

(b) Stoplight switches - electric or mechanical pneumatic stoplight switches shall be installed by the chassis manufacturers to operate in the air lines to complete an electric circuit to the stoplight when a brake application of six pounds per square inch or more is made. Stoplight indication should always occur whenever brakes are being applied.

(c) Emergency stopping system, air or vacuum.

(i) All school buses shall be equipped with an emergency stopping system.

(ii) Brake system(s) shall perform emergency stopping function and be so designed and constructed that a single failure anywhere in the brake system, excepting mechanical parts of wheel brake assemblies, brake pedal or attachments to brake valve or master cylinder which performs service brake function, will not leave vehicle without operative brakes capable of stopping vehicle, when loaded up to and including manufacturer's GVWR (gross vehicle weight rating).

(iii) (a) Control requirements of air brake emergency stopping system.

(b) Control of emergency stopping system shall be designed and constructed to conform with the following:

(i) The control valve(s) shall be visible to the driver and shall be mounted on the steering column or on the dash panel within twelve inches to the right of the steering column. (Exception - transit-type buses may be mounted on dash panel within twelve inches to the left of the steering column.)

(ii) The emergency spring brakes shall start to apply when the air pressure in all reservoirs has been reduced to approximately sixty pounds per square inch.

(iii) The emergency spring brake shall be so constructed as to permit release by means of a manual release bolt.

(3) Hydraulic brakes - all hydraulic brake systems shall comply with FMVSS 105.

(a) Buses using a hydraulic-assist booster in the operation of the brake system shall be equipped with warning signals readily audible and visible to the driver. The warning signals shall be wired directly to the battery and sound continuously in the event of a loss of fluid flow from the primary source, or loss of electrical source powering the backup systems Exception: type A buses are not required to have an audible warning system.

(b) Buses equipped with hydraulic brake-assist booster systems shall also be equipped with a source of hydraulic pressure automatically initiated upon

loss of power from primary source and operating independently of the primary power source.

(c) Vacuum-assisted brakes are permitted.

(4) Parking brakes - parking brake system may be a parking brake on the drive shaft and/or emergency stopping system using the rear wheel brakes and shall be designed and constructed to meet the following requirements:

(a) Parking brake shall hold vehicle stationary or limit traction of braked wheels on twenty per cent grade under any condition of legal loading.

(b) When applied, parking brake shall remain in applied position with capability set forth as above, despite exhaustion of source of energy used for application or leakage of any kind.

(5) Brake pedal - surface of brake application shall be covered with a rubber pad or a nonskid surface.

(6) All brake lining material shall be asbestos-free and meet the following minimums for sixty-five-passenger and larger capacity type C school buses.

	Axle	Brake Lining
Front	9,000 lbs.	15" x 4"
Rear	18,500 lbs.	16 1/2" x 7"

(E) Bumper - front.

(1) Front bumper on all conventional-type buses shall be furnished by the chassis manufacturer.

(2) Front bumper on all transit buses shall be furnished by the body manufacturer.

(3) Front bumper shall be at least three-sixteenths of an inch pressed steel, channel one-piece construction, and a minimum of eight inches in width after forming.

(4) Front bumper shall be contoured to offer maximum protection of fender lines without permitting snagging or hooking.

(5) Front bumper shall be attached to the frame and extend forward of grille, head lamps, fender or hood sections to provide maximum protection.

(6) Front bumper shall be of sufficient strength to permit pushing of vehicle of equal weight without permanent distortion to bumper, chassis or body.

(7) Exception: type A bus front bumper is to be manufacturer's standard bumper.

(F) Clutch - chassis using manual transmission shall be equipped with a clutch torque capacity which shall not be less than ten per cent greater than or equal to the maximum net engine torque output.

(G) Color - chassis.

(1) Bumper shall be painted black.

(2) Cowl and fenders shall be painted national school bus yellow.

(3) Hood shall be painted nonreflective national school bus yellow. Exception: type A and D buses.

(4) Frame shall be painted black.

(5) Grille shall be painted national school bus yellow. (Exception: grilles can be chrome or anodized aluminum finish.)

(6) Wheels, spokes and rims shall be painted black. (Exception: rims that are natural iron gray [unpainted] need not be painted black.)

(H) Cooling system.

(1) The cooling system fan shall be heavy-duty reinforced type. The fan, alternator, and water pump, If belt driven, shall be driven by dual belts and shall be equipped with matched pulleys and matched belts. A single multiple-grooved, serpentine belt of equivalent or greater horsepower capacity may be used. Exception: type A bus.

(2) The cooling system radiator shall be of sufficient capacity to cool the motor at all speeds in all gears. Thermostatic controls shall be high temperature type.

(3) On all chassis requiring hoses or extensions to fill radiators, the hose or extension shall be so designed to permit adding of coolant without trapping air.

(4) Permanent ethylene-glycol base antifreeze shall be provided by chassis manufacturer to protect the cooling system to minus twenty degrees Fahrenheit when tested at normal engine temperature.

(5) When a chassis is equipped with an automatic transmission, said chassis shall have a heavy-duty cooling system with increased capacity in the radiator, fan, and other necessary components, to provide for the additional cooling required by the automatic transmission.

(6) Chassis shall be equipped with a coolant recovery system or a deairation system.

(I) Drive shaft - each drive shaft shall be equipped with adequate protective metal guard or guards to prevent whipping through floor or dropping to ground if broken.

(J) Electrical system.

(1) Alternator.

(a) School buses of rated capacity of thirty-five passengers or larger shall be provided with a minimum of one-hundred-thirty-ampere alternator with a matched regulator. Transit buses with a rated capacity of seventy-one, seventy-seven, and eighty-three passengers shall be equipped with a one-hundred-thirty-ampere alternator. One-hundred-thirty-ampere alternator output must be approximately sixty amperes at engine idle (fourteen-hundred to sixteen-hundred-rotor RPM).

(b) All school buses of twenty-four through thirty-four capacity shall be provided with a minimum of eighty-ampere alternator. School buses with twenty-four through thirty-four capacity equipped with a lift shall be provided with a one-hundred-thirty-ampere alternator. Twelve through twenty-three capacity school buses equipped with a lift shall have dual batteries with an eighty-ampere alternator. Each battery shall be CCA-625 minimum. School buses of ten through twenty-three capacity shall be provided with a minimum of seventy-ampere alternator. Exception: dual batteries are not required on type A buses.

(c) Alternator shall be driven by dual belts with matched pulleys and matched belts. A single multiple-grooved serpentine belt

of equivalent or greater horsepower capacity may be used. Exception: type A dual belt drive is not required.

(2) Battery. (See paragraph (C) of this rule.)

(3) Lamps and signals. (See paragraph (S) of this rule.)

(4) Voltage regulators. Regulator shall be full transistor matching capacity type.

(5) Wiring. (See paragraph (FF) of this rule.)

(6) Power terminal. Chassis manufacturer shall provide an adequate electric power source terminal for bus body power connection. This terminal shall be connected by number eight wire or larger wire of adequate gauge running from the power supply. The terminal shall be of the single-post type, a minimum of one-fourth-inch stud and located on the fire wall above the toeboard on the left-hand side.

(7) All buses shall be equipped with a voltmeter with graduated scale to sixteen volts.

(K) Exhaust system.

(1) Exhaust pipe, muffler, and tailpipe shall be outside bus body and attached to chassis.

(2) Muffler shall be heavy-duty truck type of aluminized or stainless steel or ceramic coated to offer maximum resistance to corrosion or oxidation.

(3) Tailpipe shall be constructed of seamless or electrically welded tubing of sixteen-gauge steel or equivalent, and shall extend at least five inches beyond chassis frame with sufficient length to reach the bumper but not to extend beyond rear bumper. Short sections of flexible pipe for gas and diesel engines are permitted. Exceptions: where frame

extends to the rear bumper, five-inch extension is not required. Type A AND B buses tailpipes shall be manufacturer's standard.

(4) Diameter of tailpipe shall not be reduced after it leaves the muffler.

(5) The rear end of tailpipe must be located at least twenty inches to the right or left of the centerline of the chassis. Option: left-side exit is permitted for gas and diesel-powered buses. Tailpipe must be at least three inches and not more than eighteen inches in front of the rear wheel and bent downward at a forty-five-degree angle six inches from the end of the pipe. Type A and B buses shall be manufacturer's standard.

(6) Exhaust system on gas-powered chassis shall be insulated from fuel tank and fuel tank connections by securely attached metal shield at any point where it is twelve inches or less from the fuel tank or fuel tank connections. Exception: fuel tank shield not required on diesel-powered buses.

(L) Fenders - front.

(1) Total spread of outer edges of front fenders measured at fender line shall exceed total spread of front tires when front wheels are in straight-ahead position.

(2) Front fenders shall be braced and free from any body attachment. Trailing edge of front fender shall extend to bottom of front body section. Fender extensions are acceptable.

(3) Chassis sheet metal shall not extend beyond rear face of cowl.

(4) Color. (See paragraph (G) of this rule.)

(M) Frame.

(1) Frame shall be designed to correspond with or exceed standard practice performance criteria for trucks of same general load specifications used for severe service.

(2) Frame side members shall be one-piece construction with the following exceptions:

(a) Extension of these members shall be designed, furnished, and guaranteed by chassis or body manufacturer. Installation shall be guaranteed by the company installing extension. Extension of frame lengths shall not be for the purpose of extending wheel base.

(b) No holes shall be permitted in the chassis rails except those drilled at the chassis plant or authorized by the chassis manufacturer.

(c) Welding to chassis rails is permitted and must be guaranteed by the company making the modifications.

(N) Fuel tank - all fuel tank specifications shall conform with FMVSS 301.

(1) Fuel tank shall have a minimum capacity of sixty gallons with a fifty-five-gallon actual draw on all school buses forty-seven-passenger and above. It shall be filled and vented outside of the body. Construction will prevent the spillage or drainage of fuel on any part of the exhaust system. Type B buses fuel tank shall be thirty gallons with twenty-five-gallon actual draw; otherwise, shall meet requirements of type C and D buses. Exception: type A bus - fuel tank shall be manufacturer's standard.

(2) Fuel filter with replaceable element shall be installed between fuel tank and injector pump. A flexible connection which is gasoline- and

oil-proof shall be provided at engine end of fuel line.

(3) A water separator shall be installed between fuel tank and all diesel engine fuel and/or fuel injector pumps.

(4) Drain plug of at least one-fourth-inch pipe tread shall be located in center of bottom of tank. Exception: type A school bus.

(5) Fuel tank installation shall be in accordance with "SBMI Design Objectives Booklet," January 1985 edition.

(O) Governor - engine speed governor shall be installed on all school buses. Settings shall comply with manufacturer's maximum recommended governed speed and set by the chassis manufacturers. Exception: type A school bus.

(P) Heating system - engine design shall provide inlet and outlet holes in accessible locations for attachment of school bus heating system water lines.

(Q) Horn(s).

(1) School bus shall be equipped with dual horns of standard make, each horn capable of producing complex sound in band of audio frequencies from two hundred fifty to two thousand Hz and having total sound level of eighty-two to one hundred two dBa within these frequency limits when measured at fifty feet from the vehicle.

(2) Sound level measurements shall be made with meter that complies with "American Standard Association, Inc." Measurement shall be made with meter set to flat response.

(3) All school buses shall be equipped with audible electrical warning device,

automatically actuated when the bus is in reverse gear. Device shall be ECCO model 630, one hundred seven decibels or equivalent, meeting S.A.E.-J9946. Device shall be mounted behind rear axle, between frame rails, and shall emit intermittent sound. Device to be provided and installed by body manufacturer.

(R) Instruments and instrument panel.

(1) Chassis shall be equipped with the following instruments and gauges. (Lights in lieu of gauges are not acceptable.)

(a) Speedometer.

(b) Odometer which will give accrued mileage including tenths of miles.

(c) A voltmeter with a graduated scale of sixteen volts. Voltmeter shall show the battery voltage. It shall be off when the engine is off.

(d) Electrical or mechanical oil pressure gauge. Warning light unacceptable.

(e) Electrical water temperature gauge. Warning light unacceptable.

(f) Fuel gauge.

(g) Upper beam headlamp indicator light.

(h) Left and right turn signal indicator.

(i) All chassis with air brake system shall be equipped with a visible gauge and audible low-pressure indicator to warn driver if air pressure in air brake system falls below sixty pounds per square inch.

(j) All chassis with vacuum brake system shall be equipped with a visible low-pressure indicator and lighted graduated

gauge. The gauge shall be accurate within ten per cent of actual reservoir pressure, which will indicate to the driver the vacuum, in inches of mercury, available for operation of brakes. Exception: type A and B buses, manufacturer's standard warning light acceptable.

(k) A pusher, transit type D chassis, shall be equipped with an electric tachometer.

(2) All instruments shall be easily accessible for maintenance and repair.

(3) The above instruments and gauges shall be mounted on instrument panel in such a manner that each is clearly visible to driver in a seated position. The visibility of the instruments must comply with FMVSS 101.

(4) All instrument faces shall be illuminated.

(5) The chassis manufacturer shall provide and cover instrument panel with plastic covering or equivalent in order to provide protection from precipitation from time of manufacture until body is mounted.

(S) Lamps and signals - chassis.

(1) All lamps and their installation shall conform to current FMVSS 108.

(2) Chassis shall be equipped with sealed beam head lamps; beams to be controlled by a foot-operated dimmer switch. Exception: type A and B buses, manufacturer's standard dimmer switch acceptable.

(3) A self-cancelling turn signal shall be installed by the chassis manufacturer as an integral part of the steering column assembly and shall have circuit wires of sufficient length for the connection of the bus turn signals by the school bus body manufacturers.

(a) Turn signal systems shall be independent units and the chassis manufacturer shall provide a four-way hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as vehicular traffic hazard warning.

(b) The chassis manufacturer shall install a left and right turn signal direction indicator on the instrument panel plainly visible to the driver.

(c) Front turn signals shall be supplied by the chassis manufacturer in compliance with requirements of FMVSS 108. Placement shall be in an area most visible to other motorists.

(T) Oil filter - oil filter of replaceable element or cartridge type shall be provided and shall be connected by flexible high-pressure type hose with wire braid reinforcement that will withstand pressure and heat if it is not of built-in or engine-mounted design. Hose must meet FMVSS 106 and S.A.E. J1402. Diesel oil filter, manufacturer's standard capacity. See the following table.

HOSE I.D. (INCHES)	.19	.25	.31	.41	.50	.62	.88	1.12	1.38
HOSE O.D. (INCHES)	.52	.58	.68	.77	.92	1.08	1.23	1.50	1.75
MAXIMUM OPERATING PRESSURE (PSI)	2000	1500	1500	1250	1250	750	400	300	250
MINIMUM BURST PRESSURE (PSI)	8000	6000	6000	5000	5000	3000	1600	1250	1000

(U) Openings - all openings made by the chassis manufacturer in the floor board and firewall shall be sealed by the chassis manufacturer to prevent

gases from entering driver's compartment. Boots for the accelerator pedal, gearshift, and emergency brake, when required, shall be supplied by the chassis manufacturer.

(V) Power train.

(1) Under GVWR-loaded condition, the engine, transmission and other drive line components shall be capable of maintaining a speed of fifty-five miles per hour on a road grade of one per cent when the engine is operating at ninety per cent of the engine manufacturer's recommended maximum or governed revolutions per minute.

(2) Gasoline engine - chassis equipped with gasoline engines shall meet or exceed the cubic-inch displacement as shown in the following table. All gasoline engines shall be fuel-injected.

24	C*	passenger chassis	350 cubic inch
36	C*	passenger chassis	350 cubic inch
48	C*	passenger chassis	350 cubic inch
54	C*	passenger chassis	350 cubic inch
60	C*	passenger chassis	350 cubic inch
66	C*	passenger chassis	366 cubic inch
72	C*	passenger chassis	366 cubic inch

*C = type C school bus

Option - diesel engine type A, B, or C bus.

(3) All type D school buses (transit) must be diesel-powered.

(4) Diesel - chassis equipped with a diesel engine shall have one hundred sixty minimum horsepower and shall be equipped with sound abatement package which reduces the noise by nine decibels at the driver's ear. Engine components shall include:

(a) Dual belts on water pump and alternator. A single, multiple-grooved, serpentine belt of equivalent or greater horsepower capacity may be used.

(b) Coolant recovery system with overflow escape hose exiting engine compartment.

(c) Engine heater, minimum seven hundred fifty watts.

(d) Diesel oil filter shall be manufacturer's standard capacity.

(e) Primary fuel filter and water separator located between tank and engine transfer pump.

(f) All engines shall be equipped with an automatic engine cooling fan. Shutters are optional, but when used must be coordinated to cycle with automatic fan.

(g) All type C and D school buses shall be equipped with positive locking hand throttle. Air throttle is permitted as equivalent.

(W) Shock absorbers - heavy-duty double-acting shock absorbers compatible with the manufacturer's rated axle capacity shall be installed on the front and rear of the school bus chassis.

(X) Springs.

(1) Suspension assemblies as specified shall maintain control stability of school bus under all loading conditions.

(2) Springs or suspension assemblies shall be designed to carry their proportioned share of gross vehicle weight in accordance with the weight distribution as stated in paragraph (EE) of this rule (weight distribution).

(3) If leaf-type front springs are used, stationary eyes shall be protected by full wrapper leaf in addition to main leaf.

(4) If leaf-type rear springs are used, they shall be of progressive type. Wrapper leaves on rear springs are permissible.

(5) Air suspension systems are an approved option.

(Y) Steering gear assembly.

(1) All school bus chassis in all passenger capacities shall be equipped with heavy-duty, truck-type integral power steering. Power steering components shall be compatible with the GVWR for each capacity as shown in chassis manufacturer's literature.

(2) Steering mechanism shall provide for easy adjustment for lost motion.

(3) Steering gear assembly shall be so constructed and guaranteed by chassis manufacturer to provide maximum safety and steering performance of school bus under all conditions of load and speed.

(4) No changes shall be made in the steering mechanism unless approved by chassis manufacturer.

(5) There shall be a clearance of at least two inches between steering wheel and any other surface or control.

(6) Chassis manufacturers shall provide and cover steering wheel and column with a temporary plastic covering or equivalent in order to

provide protection from precipitation from the time of manufacture until body is mounted.

(Z) Tires, rims and wheels.

(1) All tires provided by chassis manufacturer shall meet performance standards for the current year of manufacture.

(2) All tire sizes and construction standards shall conform with current federal requirements.

(3) All rim sizes and construction standards shall conform with current federal requirements.

(4) Chassis manufacturer and/or authorized dealer shall balance all wheels and make necessary alignments prior to delivery.

(5) Dual rear tires (wheels) shall be provided on all vehicles. Exception: type A bus.

(6) All tires on a given vehicle shall be of same size, construction and capacity.

(7) See the following table for the type C conventional bus tire sizes.

CONVENTIONAL BUS TIRE SIZES

All School Buses Shall Be Equipped With Tubeless Radial Tires Of Proper Size And Load Range For Chassis GVWR Ratings And Body Combinations.
DISC OR SPOKE WHEELS MAY BE USED

	29-35	53	53	59	65	71
BIAS PLY EQUIVALENT FOR REFERENCE	825X20 E	825X20 E	825X20 E	900X20 E	900X20 F	900X20
MINIMUM STANDARD, TUBELESS RADIAL SIZES ->	9R22.5 E	9R22.5 E	9R22.5 E	10R22.5 E	10R22.5 F	10R22.5 G
	235/80R22.5 G	235/80R22.5 G	235/80R22.5 G	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G
	245/75R22.5 G	245/75R22.5 G	245/75R22.5 G	265/75R22.5 G	265/75R22.5 G	265/80R22.5 G
	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT
	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES
OPTIONAL TIRES	10R22.5 E	10R22.5 E	10R22.5 E	10R22.5 E	11R22.5 G	11R22.5 G
	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G	295/75R22.5 G	295/75R22.5 G
	265/75R22.5 G	265/75R22.5 G	265/75R22.5 G	265/75R22.5 G	275/80R22.5 G	275/80R22.5 G
	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT

Type A - radial tires of proper size and ply rating for the GVWR of the bus
Type B - 16 - 23 8 X K19.5, 8 PLY on 6.0 rims
Type D - 53 - 71 capacity 10 X 22.5, 77 - 84 capacity 11 X 22.5

(AA) Tow hooks - optional.

(BB) Transmission.

(1) Manufacturer shall furnish best available automatic transmission compatible with power plant, unless local school district authorities request a manual-type transmission.

(2) When a manual-type transmission is specified, it shall come with full synchromesh in all forward speeds except first and reverse gears pursuant to the following chassis capacities:

(a) Twenty-three-rated capacity through fifty-three-rated capacity - minimum of four forward speeds and one reverse speed.

(b) Fifty-nine-rated capacity through eighty-four-rated capacity - five forward speeds and one reverse speed. (Option - six-speed manual transmission.)

(c) All transmissions shall be equipped with a backup light switch. This switch is to be activated when the gearshift lever is in the reverse position.

(3) Torque rating of the transmission shall exceed torque output of engine by at least five per cent.

(CC) Undercoating - chassis manufacturer shall coat undersides of front fenders with rustproofing compound which meets or exceeds federal specifications TT-C-520B. Exception: fiberglas fenders.

(DD) Vehicle identification number plate location.

(1) Conventional school bus chassis serial number identification plate (vehicle identification number) shall be securely mounted on the dash panel or the firewall area of the engine compartment by the chassis manufacturer.

(2) Transit type D school bus identification plate shall be mounted on the dash or an acceptable area in the driver's area. Engine compartment mounting is not acceptable.

(EE) Weight distribution.

(1) Conventional - weight distribution of fully loaded school bus on level surface shall be such that not more than seventy-five per cent of gross vehicle weight is on rear tires and not more than thirty-five per cent is on front tires.

(2) Transit type D - with engine inside front of body. If entrance door is ahead of front wheels, not more than seventy-five per cent of gross vehicle weight shall be on rear tires, nor more than fifty per cent on front tires. If entrance door is behind front wheels, not more than seventy-five per cent of gross vehicle weight shall be on rear tires, nor more than forty per cent on front tires. With engine in rear, not more than seventy-five per cent of gross vehicle weight shall be on the rear tires, nor more than forty per cent on front tires.

(FF) Wiring.

(1) All wiring shall conform to current standards of the "Society of Automotive Engineers."

(2) Tail light and stop light electrical connections shall be supplied by the chassis manufacturer through the main electrical terminal block, to be connected by the school bus body manufacturer.

3301-87-02

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7-1-88

3301-87-03 School bus body standard - twenty-four- through eighty-four-rated seating capacity.

(A) Aisle.

(1) Minimum clearance between seats shall be twelve inches at seat level and fourteen inches at top of seats.

(2) On type D transit forward control (engine front) buses, the aisle shall not be less than twelve inches, measured at floor level, between engine cover and any other object. Hold-down fastening devices used on engine cover shall be designed to prevent hooking or catching on shoes or clothing.

(B) Battery.

(1) Battery and all battery cable shall be provided by the chassis manufacturer.

(2) Body manufacturer shall provide a drawer-type pull-out tray on all buses with capacities of thirty or greater to facilitate servicing or removal of battery(ies). The battery(ies) shall be enclosed by a compartment constructed of mill-applied zinc steel provided with drain ports, hold-down carrier mounted as to avoid blocking filler ports, and locking device to prevent accidental opening. Drawer assembly shall be covered with acid-resistant paint. Rustproofing shall be provided and applied to battery box. Battery tray shall be equipped with a positive locking device to keep tray from sliding completely out to prevent battery from being dropped. Exception: type D rear engine buses - battery may be located in engine compartment.

(C) Bumper, rear.

(1) Rear bumper shall be one piece, heavy-duty type, or pressed steel channel, at least three-sixteenths inch of thickness and a minimum of eight inches in width (high) after forming.

(2) Rear bumper shall be wrapped around back corners of bus and extend forward at least twelve inches, measured from rear-most point of body at floor line. Rear bumper shall also protect rear corners of body by extending beyond the body exterior side panels. The bend of the rear bumper at the rear body corners shall be sufficient to allow the entire contour of the forward end of the rear bumper to extend no more than one inch beyond the body line of the exterior side panels.

(3) Bumper shall be fastened to chassis frame side rails in such a manner as to develop full strength of bumper section from rear or side impact. Bracing materials shall have an impact ratio comparable to that of bumper material and shall be fastened at the ends and radii of the bumper, attached to the side of the frame only and not to the body at any point.

(4) Rear bumper shall extend beyond rear-most part of body surface at least one inch, measured at floor line.

(5) No spaces, projections, or cutouts that will permit a handhold shall be permitted.

(6) Two rear tow hooks shall be installed, with the hooks and their mountings of sufficient strength to tow the vehicle at the vehicle's curb weight.

(7) Front ends of the bumper shall be enclosed by end caps or other protective metal or shall have the ends rounded or tucked in and shall be free from sharp edges or projections likely to cause injury or snagging.

(8) A rubber or metal strip shall be installed to close any opening exceeding one-fourth inch between rear bumper and body metal.

(9) Type A school bus shall have chassis manufacturer's standard rear bumper.

(D) Capacity (rated) seating spacing shall conform to and be in full compliance with FMVSS 222 - school bus passenger seating and crash protection. See the following table.

Row of Seats	Rated Capacity 3-3 Plan; Rump Width of 13 Inches	Rated Capacity 3-2 Plan; Rump Width of 15 Inches
4	23 conventional	19 conventional
6	35 conventional	29 conventional
7	42 forward control	35 forward control
8	47 conventional	39 conventional
8	48 forward control	40 forward control
9	53 conventional	44 conventional
9	54 forward control	45 forward control
10	59 conventional	49 conventional
10	60 forward control	50 forward control
11	65 conventional	54 conventional
11	66 forward control	55 forward control
11	66 rear engine	55 rear engine
12	71 conventional	59 conventional
12	72 forward control	60 forward control
12	72 rear engine	60 rear engine
13	78 forward control	65 forward control
13	78 rear engine	65 rear engine
14	84 forward control	70 forward control
14	84 rear engine	70 rear engine

(E) Color - body exterior and interior.

(1) Body exterior.

(a) All exterior metal shall be painted national school bus yellow with exception of those areas listed below. All components (as listed) not painted yellow shall be painted black enamel.

(b) Components to be painted black:

(i) Lettering and numbering.

(ii) Bumpers.

(iii) Floor level rub rail.

(iv) Seat level rub rail.

(v) Background area and hoods for warning light system.

(2) All interior panels, walls, and roof surfaces shall be painted by the body manufacturer.

(3) Use of Imron or equivalent special paint is permitted.

(F) Construction - body.

(1) All school bus body construction components shall be of prime commercial quality mill-applied zinc-coated steel. The zinc plating shall be one hundred twenty grams/meter two minimum coating weight (G60) applied by either hot dipping or electroplating or equivalent. All such construction materials shall be fire-resistant. (Zinc-coated items shall include structural members, inside and outside panels, floor panels, joints, floor sills, and step wells; excluded are door handles, grab handles, interior decorative parts, other interior plated parts, and components heavier than twelve-gauge.)

(2) All metal surfaces that will be painted shall be (in addition to above requirements) chemically cleaned, etched, zinc-phosphate-coated, and zinc-chromate or epoxy-primed or conditioned by equivalent process.

(3) In providing for the requirements in paragraphs (F)(1) and (F)(2) of this rule, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges, punched or drilled hold areas in sheet metal, closed or box sections, unvented or undrained areas, and surfaces subject to abrasion during vehicle operation.

(4) Upon final assembly of the school bus body and after mounting body upon chassis, the total unit strength of the school bus shall meet or exceed all strength criteria as established by FMVSS 220 and 221.

(5) Body construction shall provide a reasonably dustproof and watertight unit.

(6) When water leaks or dust leaks, due to workmanship at point of manufacture, occur during the first year of use, these leaks shall be repaired entirely at the expense of the school bus body manufacturer as a part of the regular warranty.

(7) Floor.

(a) The floor shall be not less than fourteen-gauge mill-applied zinc-coated steel sheet. The zinc plating shall be one hundred twenty grams/meter two minimum coating weight (G60) applied by either hot dipping or electroplating or equivalent.

(b) There shall be a main floor cross member of at least ten-gauge steel or equivalent placed at each side post extending the full width of the floor plate and permanently attached.

(c) There shall be a minimum of two intermediate floor cross members of at least sixteen-gauge steel equally between the main floor cross members and permanently attached.

(8) Longitudinal strainers - all longitudinal side strainers and members shall be a minimum of sixteen-gauge steel.

(a) There shall be one longitudinal side strainer (or impact rail) mounted at belt line (window sill level) and

extending at least from the front main vertical post (excluding the front door entrance) to the last main vertical post on each side of body. This member shall be attached at each vertical post.

(b) There shall be one longitudinal side strainer mounted at the side window header level and extended completely around the school bus body. This member shall be attached at each vertical post.

(c) Additional longitudinal side strainers are permissible if they form an integral part of the school bus body construction and meet all fastening requirements.

(d) Side strainers used in basic construction at floor level and extending above floor line may be utilized as mounting base at wall line for rail-mounted seats.

(9) Rub rails.

(a) Body manufacturers shall install one rub rail at approximately seat level (except for opening for emergency door). This rail shall extend from the main vertical post behind the entrance door to the forwardmost vertical post on the left side of the body.

(b) A second rub rail shall be installed at approximately the floor line and cover the same longitudinal area as the seat level rail (except at wheel housings) and shall extend to the radii of right and left rear corners. A third rub rail installed on the lower edge of the body skirt is optional. If used, it shall be painted black.

(c) All rub rails shall be attached at each body post and all other upright structural members.

(d) All rub rails shall be four inches or more in width (after formed) and shall be a minimum of sixteen-gauge steel, corrugated or ribbed pattern.

(e) All rub rails shall be mounted outside body panels.

(f) External longitudinal members are permissible in addition to all previously specified members if they form an integral part of the body construction and meet the fastening requirements.

(10) Roof strainers - two or more roof strainers or longitudinal members shall be provided to connect, to reinforce flattest portion of roof skin, and to space roof bows. These strainers may be installed between roof bows or applied externally. They shall extend from the windshield header and are to function as continuous longitudinal roof members. At all points of contact between strainers or longitudinal members and other structural material, attachment shall be made by means of welding, riveting, or bolting.

(11) Rear corner reinforcements - rear corner construction of the bus body between the floor and window sill and between the emergency door posts and last vertical side posts shall consist of at least three structural members which will provide impact and penetration resistance equal to or greater than that provided by frame members in the sides of the body. Such structural members shall be securely attached at each end.

(12) Ceiling panel construction - if the ceiling is so constructed to contain lap joints, the forward panel shall be lapped by the rear

panel and the exposed edges shall be beaded, hemmed or flanged or otherwise treated to minimize sharp edges.

(13) All body components shall be designed and constructed so as to avoid the entrapment of moisture.

(G) Defroster.

(1) A defroster system shall be installed of sufficient capacity to keep windshield area, left front side window to rear of the driver's vision, and service door glass area free of condensation or ice under all possible combinations of pupil load and climatic conditions.

(2) Defroster system shall be capable of providing at least sixty per cent fresh air.

(3) Two adjustable six-inch auxiliary defroster fans shielded with small mesh metal or polypropylene guards shall be installed. Exception: type A school buses, one fan required.

(a) Fans shall be mounted to complement the defroster system used by the manufacturer.

(b) Auxiliary defroster fans shall be controlled individually by two speed switches located in the electrical control panel.

(H) Doors.

(1) Service doors.

(a) Service door shall be power or manually operated, under control of the driver, so designed as to afford easy release, and to prevent accidental opening. When manual lever is used, no parts shall come

together so as to shear or crush fingers.

(b) Manual door control mechanism shall be heavy-duty bearing type, adjustable for wear, noncorrosive, anodized steel, or equivalent.

(c) Service door shall be located on right side of bus opposite the driver and within the driver's direct view.

(d) Service door shall have minimum horizontal opening of twenty-four inches and minimum vertical opening of sixty-eight inches.

(e) Service door shall be split or folding type. Split-type door includes any sectional door which divides and opens outward.

(f) All door glass shall comply with current FMVSS 205. Glass in service door shall provide maximum area of visibility for operation of bus.

(g) All edges of service door shall be sealed by flexible rubber or equivalent material to prevent air from entering door entrance when closed.

(h) There shall be no safety rail or hand-holds mounted on the service door.

(i) There shall be a head bumper pad installed on the inside at the top of the entrance door. This pad shall be approximately four inches in width and extend across the entire top of the entrance door opening.

(j) Service door shall have suitable access for easy lubrication.

(k) Type A school bus may be equipped with a sedan-type door.

(2) Emergency doors.

(a) Emergency door shall meet FMVSS 217 and be designed to be opened from inside and outside of bus and shall be equipped with a fastening device which may be quickly released but is designed to offer protection against accidental release.

(b) Emergency door shall be equipped with slide bar-, cam- or gear-operated latch. Slide bar shall have minimum stroke of one inch. Emergency door latch shall be equipped with suitable electric plunger-type switch connected with buzzer located in driver's compartment. Switch shall be enclosed in metal case, and wires leading from switch shall be concealed in school bus body. Switch shall be so installed that plunger contacts farthest edge of slide bar in such manner that any movement of slide bar will immediately close circuit on switch and activate buzzer. A separate interior handle shall be provided to pull the door shut from the inside.

(c) Exterior door handle shall be of permanent hitch-proof design and mounted with enough clearance to permit opening without touching door surface.

(d) All emergency door openings shall be completely weather-stripped.

(e) Operation instructions for opening the door shall be lettered or decaled on the inside of the emergency door.

(f) There shall be no step-type mechanism in the use of the emergency door.

(g) No seat or chassis or body component shall be installed in the aisleway leading to the emergency door. Exception: does not apply to type D bus.

(h) Emergency door shall bear words "EMERGENCY DOOR" both inside and outside in letters at least two inches high. Words shall be placed directly above the emergency door or on the upper portion of the door.

(i) Rear emergency door.

(i) On all buses, except rear-engine transits, an emergency door shall be located in the rear of the school bus body and centered with respect to the body.

(ii) Emergency door shall have a minimum horizontal opening of twenty-four inches and a minimum vertical opening of forty-eight inches measured from floor level.

(iii) Rear emergency door shall be hinged on right side and shall open outside.

(iv) The rear emergency door shall contain upper and lower glass panels which comply with FMVSS 205.

(v) Glass in emergency door shall provide maximum area of visibility for safe operation of school bus.

(vi) There shall be a head bumper pad installed over the emergency door on the inside of the school bus body. This pad shall be at least the width of the door opening. Padding shall be of the same material as the padding used over the service door exit.

(j) Side emergency door.

(i) On all rear-engine transit school buses, a side emergency door shall be located in the rear half of the left side of the bus body. The door shall be hinged on the front side.

(ii) The glass inside emergency door shall be one piece and compatible with the design of the side windows and shall contain glass which meets FMVSS 205.

(3) Emergency side window exits.

(a) All type A, B, C and D school buses shall be equipped with side window emergency exits.

(b) School buses with a rated capacity of less than fifty-three shall have one emergency swingout window on each side of the body.

(c) School buses with a rated capacity of fifty-three or greater shall have two emergency swingout windows on each side of the body.

(d) The emergency window shall meet FMVSS 205. Glass shall be tempered unless specified laminated by the purchaser.

(e) Emergency window shall bear words "EMERGENCY EXIT" in letters at least two inches high both inside and outside the window. Words shall be placed no more than three inches directly above window.

(f) Emergency window shall be equipped with a buzzer. When not fully latched, it shall actuate a signal audible to the driver. Buzzer shall be in the driver's compartment.

(4) Emergency windows type D rear-engine buses.

(a) An emergency window shall be installed above the engine compartment and shall be no smaller than sixteen inches in height and fifty-four inches in width.

(b) The emergency window shall meet FMVSS 205. Glass shall be tempered unless specified laminated by the purchaser.

(c) Windows shall be hinged from top and provided with a device to ensure against accidental closing during an emergency.

(d) Emergency window in rear shall be equipped with latch on the inside, and also be equipped with a handle of hitchproof design which will permit opening from the outside.

(e) Emergency window shall bear words "EMERGENCY EXIT" in letters at least two inches high both inside and outside the window. Words shall be placed no more than three inches directly above window.

(f) Emergency window shall be equipped with a buzzer. When not fully latched, it shall actuate a signal audible to the driver. Buzzer shall be in the driver's compartment.

(I) Emergency equipment - shall be mounted in the driver's compartment area in an accessible

location. Quick access to all emergency equipment shall be provided.

(1) Fire extinguisher - bus shall be equipped with at least one dry-chemical type fire extinguisher of at least five-pound capacity, twenty B.C. rating, mounted in a quick release type bracket and easily accessible from the driver's compartment. The extinguisher is to be equipped with a dial-type, graduated gauge, which indicates loss of pressure. Fire extinguisher shall be of the type that permits the dry-chemical case to be refilled by ordinary procedures. Fire extinguisher shall be equipped with metal head.

(2) First-aid kits shall be dustproof, plainly labeled and mounted in a location easily accessible to the driver. Minimum units for the school bus shall be as follows: a sixteen-unit kit shall be used on forty-two-passenger and smaller buses, and twenty-four-unit kits for forty-eight-passenger and larger buses.

(3) Contents of sixteen-unit first-aid kit:

2 units - 1" adhesive compress
2 units - 2" bandage compress
1 unit - 3" bandage compress
1 unit - 4" bandage compress
1 unit - 3" x 3" plain gauze pads
1 unit - 4" gauze roller bandage
2 units - plain absorbent gauze - 1/2 square yard
2 units - plain absorbent gauze - 24" x 72"
3 units - triangular bandages
1 unit - scissors, tweezers

(4) Contents of twenty-four-unit first-aid kit:

3 units - 1" adhesive compress
3 units - 2" bandage compress
2 units - 3" bandage compress

1 unit - 4" bandage compress
1 unit - 3" x 3" plain gauze pads
2 units - 4" gauze roller bandage
4 units - plain absorbent gauze - 1/2 square yard
3 units - plain absorbent gauze - 24" x 72"
4 units - triangular bandages
1 unit - scissors, tweezers

(5) Reflectors - three triangle reflectors with weighted stands shall be properly encased for easy storage. Six fusee, thirty-minute type, shall be encased with the triangle reflectors. The triangle reflections shall meet FMVSS 125. The reflectors and fuses shall be encased together in a heavy duty container. The lockable metal bracket shall be provided to hold these items. The bracket shall be mounted within easy access of the driver.

(6) Wrecking bar - one twenty-four-inch wrecking bar shall be required.

(J) Floor covering.

(1) All floor covering shall be permanently bonded to the floor and must not crack or lose its adhesive power when vehicle is subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and recommended by the manufacturer of the floor covering material.

(2) Underseat areas shall have a smooth fire-resistant floor covering having a minimum overall thickness of one-eighth inch. The entire joint between the floor covering and the wall of the school bus body shall be covered with a curved, fitted, rustfree metal molding or preformed interior panel.

(3) Driver's compartment floor area shall be of the same quality material as the underseat

floor covering. It shall be permanently bonded to the floor. Floor mat is not acceptable.

(4) Center aisle covering shall be fire-resistant rubber, nonskid, wear-resistant and ribbed. Minimum thickness shall be one-hundred-eighty-seven-thousandths inch measured from the top of the ribs.

(5) The transmission inspection plate:

(a) Shall be installed for easy access and servicing of the clutch and transmission installed above the regular floor covering when possible; and

(b) Shall not be undercoated.

(6) Brake, gear shift, and accelerator boots supplied by the chassis manufacturer shall be installed by the school bus body manufacturer.

(7) Metal molding or stripping.

(a) Metal stripping or molding shall cover all floor-covering joints between the ribbed center aisle and smooth underseat floor covering.

(b) Cove molding is required at the junction of the floor covering and side wall. Molding may be formed to the side wall panel or separate cove base.

(c) Molding around the wheelwell and floor covering shall be provided to seal floor covering with the wheelwell.

(8) Accelerator boot will be used around the accelerator rod passing through the toe board or floor board to prevent fumes or dust from entering the driver's compartment.

(9) Entrance step treads, including the edge at floor level, shall be of the same quality as

the aisle material and shall be formed with a minimum turndown lip of three-fourths inch. Step treads shall have an integral white, yellow, or orange nosing of one and one-half inch or more or use diagonal stripes. Treads shall be permanently bonded to the metal steps and sealed to prevent water from getting underneath the step tread.

(10) A fuel access plate shall be installed for easy access to fuel gauge mechanism and shall be installed above the regular floor covering when possible. The access plate shall not be undercoated. Panel shall be identical to floor material in thickness and coating and shall be sealed to prevent any leakage or moisture. Interior shall not be undercoated. exception: type A AND B school buses.

(K) Fuel opening - the fuel fill opening in the body skirt shall be equipped with a hinged cover held closed by a spring or other conveniently operated device. The mechanism that holds this cover closed shall be sufficient to keep it closed under severe operating conditions. The fuel fill opening shall be large enough to permit the entire pump nozzle to pass through the opening and reach the fill neck of the fuel tank. Exception: type A and B school buses.

(L) Heaters.

(1) All school buses shall be equipped with two or more hot water heaters capable of maintaining inside temperature of fifty degrees Fahrenheit with one hundred fifty degrees Fahrenheit of water being delivered to the system at a rate of six gallons per minute using an ambient temperature of zero degrees to ten degrees Fahrenheit.

(2) Conventional-type buses shall be equipped with a right and left front heater with an integrated defroster system of a capacity to provide heat for the front part of the bus,

driver's compartment, to keep the windshield area, service door glass, driver's left glass area and stepwell clear of moisture, ice and snow.

(3) Type D transit-type buses shall be equipped with front heater(s) with integrated defroster system of sufficient capacity to provide heat for the front part of the bus and the driver's compartment, to keep windshield area, driver's left glass area, service door glass area and stepwell clear of moisture, ice and snow.

(4) Hot water heaters shall bear the name plate rating in accordance with the standard code for testing and rating automotive bus hot water heater and ventilating equipment.

(5) A third heater is required on all sixty- and larger capacity buses and is to be mounted to the rear of the rear wheelwell.

(6) Two-speed switches shall operate all heater fans independently.

(7) All hot water lines shall be a minimum of one inch inside diameter and shall be enclosed.

(8) Heater cores and fans shall be completely encased, but designed to permit servicing heating assembly by removing all or part of case.

(9) Heater hose installation in the engine compartment shall include two brass shut-off valves able to shut-off coolant completely when necessary.

(a) One shut-off valve shall be mounted between the water pump outlet and heater hose connection.

(b) One shut-off valve shall be mounted between the motor block and the return heater hose connection.

(10) The body manufacturer shall add the required amount of permanent ethylene-glycol base anti-freeze after heaters have been connected to protect cooling system of the school bus to minus twenty degrees Fahrenheit tested at normal engine temperature.

(11) There shall be a heater water-flow regulating valve installed for convenient operation when the driver is in a normal seated position.

(M) Identification - body shall bear the following words:

(1) "SCHOOL BUS" in black letters at least eight inches high on both front and rear of body. Lettering shall be placed as high as possible without impairment of visibility.

(2) "STOP" on the rear of the school bus in letters approximately ten inches high on the door or the center of the school bus.

(3) "STATE LAW" on the rear in letters at least five inches high below "STOP" on the door or the center of the school bus.

(4) Name of the school district shall appear on both sides of the vehicle at the belt line and be at least five inches high.

(5) County of the school district shall appear on both sides of the vehicle in five-inch letters with the school district name unless the city or exempted village appears as a part of the district name. City or exempted village districts that are not geographical locations must also list the name of the county.

(6) Ownership of the vehicle shall appear on the entrance door side in two-inch high letters.

(7) District-assigned school bus numbers shall be

five inches high and shall be located as follows:

(a) Bus number shall be located on body of the bus above the entrance door.

(b) Bus number shall be on the rear of the bus in the area of the right side of the taillight.

(c) Bus number shall be on the left side of the bus in the vicinity of the driver's window.

(d) Bus number shall be on the front of the bus in the area designated by the buyer.

(N) Inside heights - inside body height shall be nominal, seventy-two inches or more measured metal-to-metal at any point on longitudinal center line from front vertical bow to rear vertical bow.

(O) Insulation.

(1) Bus body shall be fully insulated in the roof and all body panels to deaden sound, reduce vibrations and heat transfers. Insulation one-inch minimum thickness in addition to the usual sprayed-on material shall be a fiber-glass or equal and fire-resistant material.

(2) A plywood floor shall be applied on top of the steel floor. Floor covering shall be applied on top of the plywood. Plywood shall be five-eights of an inch thick five-ply CD exterior grade. Plywood shall extend to firewall and under the driver's seat. Plywood shall be sanded and vacuumed before covering is applied. Waterproof sealing material shall be applied to seams in the sections of plywood floor. Plywood shall be four feet by eight feet sections, pieced only as necessary. Drawings shall be provided which show how the plywood is to be installed.

Clarification - waterproof sealing applied on top of the plywood to hold the floor covering is considered as one method of sealing the seams in the plywood floor. This method is acceptable.

(P) Interior.

(1) Interior of the school bus shall be free of all projections.

(2) All school buses shall require inner linings on ceiling and walls and shall include sound abatement package in the driver area.

(Q) Lamps and signals - all lamps herein listed and their installation shall conform to current standards and recommendations of the "Society of Automotive Engineers" and meet FMVSS 108.

(1) Construction of components.

(a) All lamps, reflectors and their installation shall conform to federal motor vehicle safety standards where applicable, S.A.E. J887, and national minimum school bus standards where not covered by federal standards or additional requirements stated herein.

(b) Directional signal, stop light, tail-light, marker light, clearance light, identification light, backup light and reflector lenses shall be of acrylic plastic. Alternately flashing red and amber signal lamps shall be sealed beam of acrylic plastic lens construction. Body-mounted stop lamps, directional signals and red signal lamps shall be visible throughout one hundred eighty degrees.

(c) All exterior lamp sockets shall be zinc-plated or chromated steel, or other suitable noncorrosive materials such as plastic or stainless steel.

(d) Alternately flashing red signal lamps, body-mounted directional signals and stop lamps shall be grounded by attaching a ground wire or strap from the lamp socket or negative side of the bulb to the school bus body or ground wire included in the wiring.

(e) Wiring shall conform to current S.A.E. standards. A body load disconnect solenoid of one-hundred ampere continuous duty shall be supplied and installed so that when the ignition switch is in the off position all body electrical circuits will be inoperative except the directional signals, hazard warning, stop light, backup light, marker, clearance, identification, and head lamp circuits.

(2) Additional requirements.

(a) The service doorstep well light shall be wired with the marker light circuit and activated by a switch controlled by the service door. On type C bus the light shall be a minimum of ten candlepower. (Weldon No. 3-8025-1400 stepwell light or equivalent.)

(b) Interior dome lights shall be provided and activated whenever the rear emergency door is opened, or when activated by independent switch or switches. Dome lights shall be equipped with plastic or shatterproof lens.

(c) Combination stop and tail lamps: each bus shall be equipped with two combination stop and tail lamps. These shall have double filament lamp bulbs. These shall be connected to the brake-operated stop lamp circuit.

(d) Each bus shall be equipped with two combination stop and tail lamps with a diameter of not less than seven inches with plain red lens, emitting red light plainly visible from a distance of five hundred feet to the rear. These lamps shall be as high as practicable but below the window line and spaced as far apart laterally as practicable, but not less than three feet. Measurements shall be taken from lamp centers. The stop lights are to be activated by the brake switch.

(i) These lamps are to use double-contact bulbs.

(ii) These lamps are to have a red lenses approximately seven inches in diameter.

(iii) Grounding instructions: the socket of these stop lamps shall be grounded separately, either by use of a wire with one end permanently affixed to the socket and the other end affixed to the lamp base or bus body metal or by the use of a lamp socket flange grounded to the bus body metal by a screw or bolt.

(e) Directional signals.

(i) Front, side, and rear directional signals shall be wired to operate properly with the front directional signals supplied by the chassis manufacturer on all conventional-type school buses. Transit-type school buses shall have front, side, and rear directional signals installed by the school bus body manufacturer.

(ii) School bus body manufacturer shall install required signal lamps to the

directional signal control switch so all directional signal lamps shall be operative. The directional signal system shall be installed on an integral part of the hazard warning signal switch activated by an independent switch furnished by the chassis manufacturer.

(iii) Color of lenses shall be amber. All front and rear directional signals installed by the body manufacturer shall be at least seven inches in diameter. Side directional signals shall be armor protected.

(f) Warning lamp control switches - a warning control switch shall be provided to operate the warning signals. The warning control shall include one manual switch, one master switch, one door control switch which will close the warning light circuit when the door is open, and an indicator lamp to show when the master switch has been activated.

(g) Two backup lights are required and shall be mounted on or below the belt line on the school bus body. Backup lights shall conform with FMVSS 108. These lamps shall have a white lenses at least seven inches minimum in diameter and shall be thirty-two candle power.

(3) School bus alternately flashing warning signal lamp.

(a) Each school bus body shall be equipped with a system of four red signal lamps and four amber signal lamps. Both red and amber lamps shall be installed in accordance with S.A.E. J887.

(i) Each amber signal lamp shall be located near each red signal lamp, 25 at the same level but closer to the vertical centerline of the bus; and

(ii) The system shall be wired so that the amber signal lamps are activated only by a manual switch, and if activated, are automatically deactivated when the bus entrance door is opened.

(b) These lamps shall flash at a designed rate from sixty to one hundred twenty cycles per minute.

(c) Operation of warning lights and stop arm system.

(i) With the entrance door closed, activate manual start switch. The amber pilot light and amber warning lights flash.

(ii) When the entrance door handle is moved toward the open position, the amber pilot and amber warning lights go off and red pilot and red warning lights flash. Stop arm is automatically extended and lights on the stop arm flash.

(iii) Close entrance door. All lights go out and the stop arm retracts automatically. The entrance door switch that activates the red lights in the eight-light system shall be located in a position or shall be protected by a cover or guard that will prevent the likelihood of this switch being activated or deactivated by pupils boarding or leaving the bus.

(iv) With master switch closed, open the entrance door. Red lights flash and the stop arm extends.

(v) With the entrance door open, depress the manual push button. The red pilot and red warning lights flash. The stop arm is automatically extended and the lights on the stop arm flash.

(vi) Both the amber pilot light and the red pilot lenses shall be approximately one-half inch in diameter. These pilot lights shall be installed in a position clearly visible to the driver.

(vii) An emergency system for extending the stop arm and flashing the red Warning lights on the bus body and the stop arm shall be installed on each bus body.

(A) An emergency override switch shall be installed in the bus body electrical accessory panel in an area isolated from the other switches. This switch shall be installed with a standard switch identification decal with the Words "WARNING LIGHTS" or "EMERGENCY WARNING LIGHTS."

(B) This system shall operate the red flashing lights, extend the stop arm, and Pperate the red pilot light.

(d) Installation requirements.

(i) Each flashing signal lamp shall be mounted with its axis substantially parallel to longitudinal axis of vehicle.

(ii) Front and rear alternately flashing signal lamps shall be spaced as far apart laterally as practicable.

(iii) Alternately flashing signal lamps shall be mounted at the front above the windshield and at the rear so that the lower edge of the lens is not lower than the top line of the side window.

(iv) Vertical and lateral vision of the front and rear alternately flashing warning lights shall not be obstructed by any part of the body of the lamphouse insofar as standard bus body construction will permit.

(v) A square or rectangular area around the lens of each alternately flashing signal light and extending outward approximately three inches shall be painted black. In installations where there is no flat vertical portion of the body immediately surrounding the entire lens of the lamp, a square or rectangular band of black, approximately three inches wide, immediately below and to both sides of the lens, shall be painted on the body or roof area against which Signal light is seen from a distance of five hundred feet along the axis of the vehicle.

(4) School bus body lamps and reflectors - all lamps and reflectors shall comply with FMVSS 108 - clearance lamps.

(a) Body shall be equipped with a red armored clearance lamp at each of the rear corners and an amber armored clearance lamp at each of the front corners. These lamps shall be mounted at the highest and widest position on these corners.

(b) Body shall be equipped with an amber armored intermediate or mid-body marker or clearance light on both sides. These lamps shall be mounted in accordance with FMVSS 108.

(c) Armored clearance lamps shall conform to S.A.E. code PC. Lamps shall be equal to Weldon no. 5050 with armor. Bulbs in these lamps shall be a minimum of five-thousand-hour bulbs with a four-candle power illumination.

(d) These clearance lamps shall be connected to the chassis headlight circuit and shall be activated by the chassis headlight switch.

(R) Mirrors.

(1) Interior clear-view mirror shall be at least six by thirty inches overall. Mirror shall be metal-backed and framed and shall be of safety glass. It shall have rounded corners and protected edges. Exception: type A buses - the mirror may be six by sixteen inches.

(2) Two heated adjustable driver exterior side-view mirror systems shall be provided, one on the left and one on the right of the driver. The brackets used for the mirror systems shall minimize mirror vibration and give the driver an unobstructed view of all exterior mirrors through the portion of the windshield cleared by the windshield wipers. Exception: type A, B and D buses -- mirrors may be mounted to give the driver the best possible view through the side windows if necessary.

The exterior side view mirror systems shall meet all federal standards including FMVSS 111, and shall provide a field of view from behind the entrance door to the rear-most part of the school bus. The mirror system shall also make the area from the top of the side windows to the ground clearly visible to the school bus driver. Any object or twelve-inch traffic cone located within six inches of the rear dual wheels shall be visible and clearly identifiable to the seated school bus driver on either side of the bus.

(3) Each type B and C school bus will be equipped with a fender and/or forward mounted system of heated convex mirrors that will provide the seated driver with indirect observation of the front bumper and the area in front of the front bumper of the bus not under direct observation of the seated driver. Mirror system shall include a clear view around the front wheels and shall include the area from the front bumper back to the entrance door on the right and from the front bumper to the driver's window on the left side of the bus.

(4) Two convex mirrors measuring not less than seven and one-half inches in diameter shall be mounted on all transit type D school buses. One will be mounted on each front corner of the bus in such a manner that the seated driver may observe all areas in front of the bus where direct observation is not possible.

(5) Two convex mirrors measuring not less than seven and one-half inches in diameter shall be mounted on all transit type D school buses, one on each front corner, in such a manner that the seated driver may observe the areas along each side of the bus from the front corner to the rearmost part of the bus.

(S) Mounting, body on chassis.

(1) Insulating material shall be placed between all main cross-sill and intermediate members. Insulating material shall be at least one-fourth inch thick and shall be attached to chassis frame or body members so that the body will not move under severe operating conditions.

(2) Chassis frame shall extend to rear edge of rear body cross member.

(3) Bus body shall be attached to chassis frame in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

(4) Body front shall be attached and sealed to the chassis cowl in such a manner as to prevent entry of moisture.

(T) Mud flaps - all buses shall be equipped with two front fender mud flaps and two rear mud flaps.

(U) Openings - all openings created in mounting of bus body to chassis shall be sealed by body manufacturer to prevent entrance of gases, dust or moisture into passenger and driver compartments.

(V) Overall length - overall length of a school bus shall not exceed forty feet.

(W) Overall width - overall width of the school bus shall not exceed ninety-six inches.

(X) Seat belt and upper torso restraint system for driver.

(1) A locking retractor-type seat belt for driver shall be provided. Belts shall be equipped with protective boots of sufficient quality and strength to keep it retracted and off the floor and within easy reach of the driver. Belt shall be adjustable on one side only and keep the driver from sliding sideways under the belt.

(2) Belt and emergency locking retractor upper torso restraint shall be installed in compliance with current federal and S.A.E. standards.

(3) An emergency locking retractor upper torso restraint shall be provided and work in unison with the seat belt.

(Y) Driver's seat.

(1) Minimum distance between steering wheel and back rest of driver's seat shall be eleven inches. Driver's seat shall have vertical adjustment of not less than four inches and horizontal adjustment of not less than four inches. Exception: type A and B school bus.

(2) All sewing on cushions and backs shall be single-stitched, with a minimum of number twelve four-ply glaze finish thread of the best grade or its approved equal. Seams in cushions and seat backs shall be forty-two-ounce or equivalent material strength as upholstery.

(Z) Passenger seats.

(1) All seating and restraining barrier design and construction must meet the provisions of FMVSS 222 (school bus seating and crash protection). All seat back barriers must be a minimum of twenty-eight inches in height, as measured from the intersection of the forward surface of the seat back and the undepressed surface of the seat cushion. The top surface of the barriers shall be the same height as the top surfaces of the seat backs.

(2) All seats shall have a minimum depth of fifteen inches.

(3) All seats shall be forward-facing.

(4) Rear-engine transit-type D school buses shall be equipped with one jump seat. Such seat will be located only immediately adjacent to side emergency exit(s) and shall conform to all applicable federal standards.

(5) Seats shall be mounted so as to provide a minimum of thirty-six-inch headroom for sitting position above the top of undepressed cushion line of all seats. Measurement shall be made vertically not more than seven inches from side wall at cushion height and at fore-and-aft center of cushion.

(6) Seat construction.

(a) Backs of all seats shall be the same width at the top and same height from floor, also slanting at the same angle with the floor.

(b) Seat, seat back cushion and crash barrier shall be covered with flame-barrier fire-retardant seating material. Such material must pass the "Boston Brown Bag" test. Flame-barrier fire-retardant seating material shall meet the following criteria:

(i) The flames will not spread to seat back in front of the fire.

(ii) The flames on the rear seat will self-extinguish.

(iii) The flame barrier seating material will successfully prevent the underlying padding material from being exposed to the flames.

(c) Padding - all seat backs and rails shall be covered with energy-absorbing material as required by FMVSS 222.

(d) A passenger seat cushion retention system shall be employed to prevent the passenger seat cushion from disengaging from the seat frame in the event of an accident. Each seat cushion retention system shall be capable of withstanding a vertical static load equal to a minimum of five times the weight of the cushion. The system shall also be capable of withstanding a forward or rearward static load equal to twenty times the weight of the cushion.

(e) Type A school bus. A barrier/padded guard panel shall be placed forward of all seats not having another passenger seat in front of it.

(AA) Steps - service door.

(1) The first step of the service door shall be not less than twelve inches and not more than sixteen inches from the ground.

(2) Service door entrance shall be equipped with three steps. Risers in each case shall be approximately equal. Exception: type A and B buses.

(3) Steps shall be enclosed to prevent accumulation of ice and snow.

(4) Steps shall not protrude beyond side body line.

(5) Grab handles of maximum length but not less than ten inches long shall be installed on both sides of the interior step well area. These handles shall be stainless-steel clad. Both grab handles must be securely fastened. Exception: grab handles not required on type A school buses. On type B school buses, grab handles may be mounted on jackknife door.

(6) Surface of steps shall be of nonskid material.

(a) Steps shall be covered with first-quality step-covering material which shall have nonskid characteristics and be of ribbed or corrugated design. Step covering shall have a turned-down nosing of a contrasting color of either white, yellow, or bright orange.

(b) Step covering shall be securely fastened to the steps in a manner that will minimize tripping. This requires that the heads of mounting screws or bolts be below the top surface of the step tread.

(BB) Access steps.

(1) Steps shall be installed on each side of the school bus to allow access to windshield for cleaning. Exception: access steps not required on type A school buses.

(2) Grab handles shall be securely mounted in a suitable position. Exception: grab handles not required on type A school buses.

(CC) Sun visor.

(1) The school bus shall be equipped with at least one interior adjustable transparent sun visor, folding type, which is a minimum of six by thirty inches in size. Exception: type A school bus.

(2) A right sun visor which is at least six by sixteen inches in size is permitted. Exception: type A school bus.

(DD) Rustproofing - entire underside of bus body including floor section, emergency and entrance doors, cross member, below floor-line side panels, cowl area, metal fenders or fenders with metal liners shall be coated with commercial-grade

asbestos-free rustproofing compound for which compound manufacturer has issued notarized certification of compliance to bus body builder that compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of federal specification TT-C-520B using modified field test procedures for following requirements:

(1) Salt spray-resistance pass test modified to five per cent salt and one thousand hours.

(2) Pass abrasion-resistance.

(3) Pass fire-resistance.

(4) Rustproofing compound shall be applied with suitable airless or conventional spray equipment to a thickness recommended by the product manufacturer and shall show no evidence of voids in cured film.

(5) Any openings drilled for rustproofing operations shall be plugged except in cases where a solvent system is used.

(EE) Ventilation - body shall be equipped with a suitable controlled ventilating system of sufficient capacity to maintain a satisfactory ratio of outside-to-inside air under operating conditions without opening of windows except in extremely warm weather.

(FF) Wheel housings.

(1) Wheel house shall be attached to floor components in such a manner to prevent water, dust or fumes from entering the bus body.

(2) Wheel house openings shall allow for easy tire removal and service.

(3) Inside height of wheel housing above floor line shall not exceed ten inches.

(4) Wheel housing shall provide clearance for dual wheels as established by the "National Association of Chain Manufacturers."

(GG) Windshield and windows.

(1) All glass in windshield windows and driver's windows shall be approved safety glass with A.S.A. "one" rating or better, as specified by the "American Standards Association."

(2) Glass in windshield shall be heat-absorbent, laminated plate. Windshield shall be large enough to permit the driver to see the roadway clearly, installed to reduce glare, and be installed between front corner posts that are designed and placed to provide maximum visibility for the driver.

(3) Window at the left of the driver shall be A.S.A. "one" or better and capable of opening, equipped with a lock-type closure.

(4) Windshield shall have horizontal gradient band starting slightly above line of driver's vision and gradually decreasing in light transmission to twenty per cent or less at the top of the windshield. Windshield may be fully tinted in lieu of above.

(5) Glass in all side windows and doors shall be of A.S.A. "two" or better grade, as specified in the "American Standard Code Z26.1." All A.S.A. "two" glass shall be tempered unless specified laminated by the purchaser.

(6) Each side window shall be double sash and provide unobstructed emergency opening at least nine inches high and twenty-two inches wide obtained by lowering the upper sash.

(7) Individual windows shall not have a vertical opening greater than twelve inches. Stops shall be installed where needed to obtain this dimension.

(8) All exposed edges of glass shall be banded.

(HH) Windshield wipers.

(1) Bus body to be equipped with two heavy-duty parallelogram-type windshield wipers. Parallelogram-type windshield wipers are required after January 1, 1991. Until then, conventional-type wipers are permitted. Exception: type A and B school bus.

(2) Each windshield wiper to be operated by a separate electric motor. Exception: type A school bus.

(3) Each windshield wiper motor to be operated by a separate electric switch properly identified. Exception: type A school buses.

(4) Switches shall provide for two-speed operation.

(5) The windshield wiper motor or motors shall have sufficient power and the wiper arms and blades shall be of sufficient length to provide the largest cleaning area possible.

(6) Wiper blades shall be a minimum of sixteen inches in length. These blade holders shall be the type that require only the replacement of the rubber blade.

(7) The left-side windshield wiper shall be so positioned that the approximate center of the wiped area will be directly in front of the driver in a normal seated position. The right-side windshield wiper shall be so positioned that the wiped area will provide the driver with maximum vision to the right in a normal seated position.

(II) Windshield washers (electric).

(1) The school bus body shall be equipped with an electrically operated windshield washer by which a stream of washing fluid is directed to both sides of the windshield in the approximate center of the wiped area.

(2) The windshield washer fluid reservoir shall have a minimum capacity of two quarts in a rigid plastic container. It shall be mounted in a position readily accessible for refilling.

(3) This washer shall be operated by a separate switch properly identified. This switch shall be easily reached by the driver in a normal seated position.

(JJ) Wiring.

(1) All wiring shall conform to current S.A.E. standards. All wires shall be coded and numbered as required by the "National School Bus Minimum Standards" book. Wiring diagrams must be made available to school districts upon request.

(2) Circuits.

(a) There shall be no less than eight regular circuits, as follows:

(i) Head, tail, stop (brake), and instrument panel lamps.

(ii) Clearance lamps - step well.

(iii) Dome.

(iv) Starter motor.

(v) Ignition and emergency door signal.

(vi) Turn signal lamps.

(vii) Alternately flashing red and amber signal lamps

(viii) Horn.

(b) Any of the above combination circuits may be subdivided into additional independent circuits.

(c) Whenever heaters and defrosters are used, at least one additional circuit shall be installed.

(d) Whenever possible, all other electrical functions, such as sanders and electric-type windshield wipers, shall be provided with independent and properly protected circuits.

(e) Each body circuit shall be color-coded and a diagram of the circuits shall be attached to the body in a readily accessible location.

(3) A separate fuse or circuit breaker shall be provided for each circuit except starter motor and ignition circuits.

(4) All wires within body shall be insulated and protected by a covering which will protect them from external damage and minimize dangers from short circuits. Whenever wires pass through body members, additional protection in form of appropriate type of insert shall be provided.

(5) Wires not enclosed within body shell shall be fastened securely at intervals of not more than twenty-four inches. All joints shall be soldered or joined by equally effective connectors.

(KK) Stop arm sign-specifications.

(1) All school buses shall be equipped with an octagonal "stop" sign. The background shall be a minimum of eighteen inches in height and eighteen inches in width and shall be reflective material red in color with white lettering. The sign shall be so mounted as to not interfere with the driver's vision to the rear when the sign is extended. The standard octagonal sign shall contain two flashing red lamps which are visible from both sides of the extended sign. Strobe lights are optional and should be used only as warranted.

(2) The word "stop" shall be reflective white letters. The signal shall be manual, vacuum, electric or air-power-controlled and so constructed as to lock in extended and closed position. The signal shall be approved by the assistant director, pupil transportation section, division of school finance, Ohio department of education.

(3) The stop arm shall operate when the service door is opened and when the red flashing warning lights come on during the warning light cycle.

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-04 School bus body and chassis with a manufacturer's rated seating capacity of sixteen through thirty-six passengers.

(A) School buses of this rated capacity shall meet all requirements of rules 3301-87-01 to 3301-87-03 of the Administrative Code with the following modifications.

(B) Chassis.

(1) Axle.

Seating Rows	Base Capacity	Wheel Base Inches	Front Axles GVWR Pounds	Rear Axles GVWR Pounds
4	16-20	125	3,400	6,000
4	16-24	125	4,000	6,000
4-5	22-30	133	4,000	8,000
5-6	26-36	157	4,000	10,000

(2) Brakes.

(a) Service brakes shall be hydraulic power-assisted.

(b) Disc-type brakes are permitted.

(c) Parking brake - manual - manufacturer's standard.

(3) Bumpers - front, chassis manufacturer's standard, painted black.

(4) Electrical system (see paragraph (J) of rule 3301-87-02 of the Administrative Code.)

(5) Engine - not less than three hundred cubic inches.

(6) Exhaust system - manufacturer's standard.

(7) Fenders - manufacturer's standard, painted national school bus yellow.

(8) Fuel tank - manufacturer's standard.

(9) Governor.

(a) All school buses rated below thirty-six-passenger capacity may be equipped with a road and engine speed governor. Such governor shall be set at fifty-five miles per hour maximum.

(b) Road and engine speed control shall be equal to or exceed the performance of model RSC2-5 manufactured by "Sturdy Controls Division, 1839 Carolina Beach Road, Wilmington, North Carolina 28401."

(c) Road speed control may be installed and set prior to delivery of vehicle to purchaser.

(10) Transmission.

(a) Manual - three speeds forward, one reverse.

(b) Automatic (optional) - three speeds forward, one reverse.

(C) School bus body.

(1) Heaters - two required, one front and one rear.

(2) Interior height - minimum sixty inches.

(3) Windshield washer - fluid capacity, two quarts minimum in a rigid plastic container.

(4) Windshield wipers - wiper blade length shall be the maximum possible for the windshield.

(D) All seats shall provide each passenger with not less than thirteen inches of rump room.

3301-87-04

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-05 School bus body and chassis with manufacturer's rated seating capacity of ten through fifteen passengers.

(A) School buses of this rated capacity shall meet all requirements of rules 3301-87-01 to 3301-87-04 of the Administrative Code with the following exceptions.

(B) Chassis.

(1) Axles - GVWR.

(a) Front - three thousand one hundred GVWR.

(b) Rear - five thousand three hundred GVWR.

(2) Alternator - see paragraph (J) of rule 3301-87-02 of the Administrative Code.

(3) Battery - see paragraph (C) of rule 3301-87-02 of the Administrative Code.

(4) Brakes - manufacturer's standard, disc brakes permitted.

(5) Fuel tank - manufacturer's standard.

(6) Governor - road and engine speed governor required and to be set not to exceed fifty-five miles per hour.

(7) Instruments - manufacturer's standard.

(8) Tow hooks - not required.

(9) Fiberglas panels permitted on type A buses between sedan entrance door and chassis window post and other areas with written permission from assistant director, division of school finance, pupil transportation section, Ohio department of education.

(C) Body.

(1) Heaters - two heaters required. Second heater to be installed near the rear of the bus.

(2) Inside height - sixty inches minimum.

(3) Turn signals - manufacturer's standard.

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule amplifies: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-06 School buses used to transport handicapped pupils.

(A) General requirements.

(1) School buses designed for transporting children with special transportation needs shall comply with rules 3301-87-01 to 3301-87-05 of the Administrative Code when applicable.

(2) School buses designed for transporting children with special transportation needs shall comply with school bus "Federal Motor Vehicle Safety Standards" as applicable to their GVWR category.

(3) Any school bus that is used for the transportation of children who are confined to a wheelchair and/or other restraining devices which prohibit use of the regular service entrance shall be equipped with a power lift.

(4) Lift shall be located on the right side of the body, in no way attached to the exterior sides of the bus, but confined within the perimeter of the school bus body when not extended.

(B) Aisles - all aisles leading to the emergency door(s) from the wheelchair area shall be of sufficient width (minimum of thirty inches) to permit passage of maximum size wheelchair.

(C) Fastening devices.

(1) Wheelchair securement devices shall be provided and attached to the floor or walls or both to enable securement of wheelchairs in the vehicle. The devices must be of the type that require human intervention to unlatch or disengage. The fastening device shall meet random static testing forces equal to six thousand plus pounds each on the rear

assembly, two thousand plus pounds each on the front assembly, and six thousand plus pounds each on the floor attachment assembly. There shall be tightening clamps on both front and both rear assemblies. All components must be dynamically tested at thirty miles per hour, twenty G force conditions with an impact sled at a recognized test facility on both a standard wheelchair and a battery-powered electric chair.

(2) Additional fastening devices may be needed to restrain the student due to the many different chair configurations.

(D) Glazing - windows may be tinted. Such tinting shall meet the applicable state laws.

(E) Heaters - an additional heater(s) may be installed in the rear portion of the bus behind the wheelwells. Auxiliary fuel-fired heaters are permitted. (See approved options in paragraph (F) of rule 3301-87-10 of the Administrative Code.)

(F) Identification - buses with wheelchair lifts used for transporting physically handicapped children may display universal handicap symbols located on the front and rear of the vehicle below the windowline. Such emblems shall be white on blue, shall not exceed twelve inches in size, and may be reflective.

(G) Occupant restraint - wheelchair.

(1) A system of positive occupant restraint shall be provided that secures the occupant.

(2) The lap belt shall be attached to the vehicle or to the wheelchair securement fastening devices.

(3) The upper torso restraint may be provided and attached to the vehicle and/or the wheelchair securement fastening devices.

(4) The lap belt and upper torso restraint must be installed pursuant to FMVSS 209 and 210.

(H) Power lift.

(1) Lifting mechanism shall be able to lift minimum payload of eight hundred pounds. A clear opening and platform to accommodate a thirty-inch-wide wheelchair shall be provided.

(2) 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 in the door.

(3) Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside of the bus. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.

(4) Power lifts shall be so equipped that they may be manually raised in the event of power failure of the power lift mechanism.

(5) Lift travel shall allow the lift platform to rest securely on the ground.

(6) All edges of the platform shall be designed to restrain wheelchair and operator's feet from being entangled during the raising and lowering process.

(7) Platform shall be fitted on both sides and rear with full-width shields which extend above the floor line of the lift platform.

(8) A restraining device shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground level.

(9) A self-adjusting skid-resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device explained in paragraph (H)(8) of this rule. The lift platform must be skid-resistant.

(10) A circuit breaker shall be installed between power source and lift motor if electrical power is used.

(11) The lift mechanism shall be equipped with adjustable limit switches and/or by-pass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or down position. If the lift is not powered down, mechanism shall be designed to cause a slow descent of platform to ground level. Rapid descent of lift is not acceptable.

(12) An actuating switch shall be installed in the circuit to prevent the lift mechanism from operating when doors are closed.

(13) Lift structure must have adequate padding and barriers for passenger protection.

(I) Regular service entrance.

(1) In type C and D buses there shall be three step risers, of approximately equal height, in the entrance well.

(2) An additional fold-out step may be provided which will provide for the step level to be no more than six inches to ground level.

(J) Restraining devices - seat frames may be equipped with attachments and/or devices to which belts, restraining harnesses, and/or other devices may be attached.

(K) Seating arrangements - flexibility in seat spacing to accommodate special devices shall be permitted due to the constant changing of passenger requirements.

(L) Special light - lights shall be placed inside the bus to sufficiently illuminate lift area and shall be activated when the door is opened.

(M) Special service entrance.

(1) Bus bodies may have a special service entrance constructed in the body to accommodate a wheelchair lift for the loading and unloading of passengers.

(2) The opening to accommodate the special service entrance shall be at any convenient point on the right (curb side) of the bus.

(3) The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.

(4) The opening, with doors open, shall be of sufficient width and depth to allow the passage of wheelchairs. The minimum clear opening shall be thirty inches in width.

(5) A drip molding shall be installed above the opening to effectively divert water from the entrance.

(6) Entrance shall be of sufficient width and depth to accommodate various mechanical lifts and related accessories as well as the lifting platform.

(7) Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for service doors.

(8) A head bumper pad shall be installed above the lift door and/or on the lift frame.

(N) Special service entrance doors.

(1) A single door may be used if the width of the door opening does not exceed forty-three inches.

(2) Two doors shall be used if any single door opening would have to exceed forty-three inches.

(3) All doors shall open outwardly.

(4) All doors shall have positive fastening devices, T or clip type, to hold doors in the open position and door bumpers to prevent door-to-body contact.

(5) All doors shall be weather-sealed, and on buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.

(6) If optional power doors are installed, the design shall permit release of the doors for opening and closing by the attendant from the platform inside the bus.

(7) When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward mounted door shall be to the header, one to the floor line of the body, and the other shall be into the rear door. These locking devices shall afford maximum safety when the doors are in the closed position. The door and hinge mechanism shall be of a

strength that will provide for the same type of use as that of a standard entrance door.

(8) 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.

(9) Each door shall have windows set in rubber, compatible within one inch of the lower line of adjacent sash.

(10) Doors shall be equipped with a device that will actuate a green flashing visible signal located in the driver's compartment when doors are not securely closed and ignition is in "on" position.

(0) Other.

(1) Battery box and fuel tank may be relocated to provide equal weight distribution to compensate for power lift weight.

(2) All school buses which transport handicapped pupils shall be equipped with two-way radios, and roof ventilator emergency escape exit(s). Fifty-two capacity or less buses shall have one roof exit located in the middle of the school bus. Buses fifty-three or greater capacity shall have two roof exits. (See paragraph (T) of rule 3301-87-10 of the Administrative Code for specifications on the roof ventilator emergency exits.)

(3) Electric-powered wheelchairs, or other carrying devices, transported on school buses shall be equipped with sealed lead acid batteries or batteries containing dry- or gel-type electrolyte. Batteries shall be effectively secured to the carrying device.

3301-87-06

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-07 **Policy for evaluation of new equipment for school buses.**

(A) Experimental phase - during this initial phase, a product will be used and tested by a few school districts (from three to ten) to determine the potential of the item. Between one and ten of the items should be used per school district. Final criteria and sites will be determined by the assistant director, division of school finance, pupil transportation section, Ohio department of education. During this period the manufacturer will be expected to maintain, adjust, and modify the product at no cost to the school district. The ownership of the product, except bus, remains with the manufacturer. It cannot be purchased by the school districts of Ohio, nor can the manufacturers make reduced price offers during the experimental phase.

(B) Field test phase - during this phase the product will be used and tested on a larger scale (twenty to forty school districts, and from twenty to one hundred items).

The product would be made available to the school district for sixty days at no cost during which time it would either be purchased or returned to the vendor. If purchased during this phase, the product would remain experimental until added to the list of approved options in the "Ohio School Bus Minimum Construction Standards."

The department of education would reserve the right to abort the test of a product if it were determined to jeopardize the safety of any pupil.

(C) Consideration for options list - upon successful completion of the field test phase, the product would be considered for addition to the approved options list. (See rules 3301-87-08 to 3301-87-10 of the Administrative Code.)

3301-87-07

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective date: 7/1/88

3301-87-08 Approved chassis options.

(A) Air brake automatic slack adjusters.

(B) Black hood - flat black paint on top of conventional bus hood of type C bus.

(C) Disc-type wheels, two or five handholds.

(D) Drain valve control inside driver compartment.

(E) Drive wheel sanders.

(F) Engine heater, one thousand watts.

(G) Engine meter.

(H) Oil-lubricated wheel bearings.

(I) Road and engine speed control shall be equal to or exceed the performance of model RSC2-5 manufactured by "Sturdy Controls Division, 1839 Carolina Beach Road, Wilmington, NC 28401."

(J) Rubber suspension for rear axle shall be equal to or exceed the suspension manufactured by "Mor/Ryd Inc., P.O. Box 579, Elkhart, IN 46515-0579."

(K) Spare tire and rim.

(L) Tachograph.

(M) Tachometer.

(N) Under hood light, twenty candlepower, activated by switch in driver area.

3301-87-08

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-09 Approved body options.

(A) Body panels - bright metal interior body panels and exterior aluminum side panels which meet FMVSS 221 joint strength requirements.

(B) Air door - power-operated service door.

(C) Horn - air horn.

(D) Lights.

(1) Fog lamps.

(2) Lamp monitoring system.

(3) Single white strobe light, minimum of ten joules with double flash, seventy-two FPM rating.

(4) Back-up type lights along body skirts to be activated when door is opened.

(5) Heavy-duty double marker and clearance lights.

(E) Locks - entrance service door lock is permitted. Rear emergency door lock is permitted only if the bus engine will not start when the door is locked.

(F) Mirrors - stainless steel mounting brackets for fender-mounted mirrors, type B and C buses.

(G) Padded interior side rails.

(H) Public address systems.

(I) Radios - FM radio, two-way, and twenty-five watts.

(J) Rubber fender extensions.

(K) Seats - six- or eight-way adjustable driver seats.

(L) Signs - lighted school bus signs.

(M) Stop arm equipped with two red flashing strobe lights is permitted. Lights shall be six to ten joules with a regulated switch to control intensity.

(N) Sound abatement package - overall length of bus.

(O) Student crossing gate.

(P) Storage compartments (outside).

(Q) Ventilator - powered.

(R) Windows. Thermal pane windows. Window frame shall not protrude into passenger compartment.

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-10) **Additional approved options.**

(A) Air conditioning - air conditioning is permitted on school buses for the handicapped. Units cannot protrude into the head impact zone of any passenger seat.

(B) Air suspension - air suspension systems are permitted. Such systems shall equal the axle weight rating required for the rear suspension capacity of the vehicle.

(C) Automatic lubrication system - pressurized automatic lubrication systems are permitted. Such systems shall apply lubrication to specific components at a predetermined mileage interval.

(D) Automatic radiator shutters - automatic radiator shutters are permitted on diesel or gasoline engines.

(E) Automatic tire chains - power-operated automatic tire chains are permitted, but must be controlled from the driver compartment.

(F) Auxiliary heaters - auxiliary fuel-fired heaters are permitted. These auxiliary heaters should be specified to use the same fuel as the engine is designed to use. These heaters can be either direct hot air systems or connected to the engine's coolant system. When connected to the engine, the heaters can be used to preheat the engine for starting, or to preheat and add supplementary heat to the bus's heating system. These heaters must be installed pursuant to manufacturers' recommendations so as not to exhaust in a manner which will endanger passengers. The heater should not need to be adjusted if fuel is being changed from "Diesel-1" to "Diesel-2" or a blend, and should be equipped with low voltage protection. These heaters must have all applicable federal and "Society of Automotive Engineer" tests. These test results must be filed with the "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, 65 South

including FMVSS 301

Front Street, Room 815, Columbus, Ohio 43266-0308." Such standards shall include S.A.E.-J1024, 49 C.F.R. 571 - standard 301 TE-12 impact testing.

(G) Diesel engine starting systems - diesel engine starting systems are permitted.

(H) Disc brakes - disc brakes installed by the chassis manufacturers are permissible. (See air and hydraulic brakes in paragraph (D) of rule 3301-87-02 of the Administrative Code.)

(I) Dual tire air pressure equalizers - a system whereby the tire pressure in each set of rear dual wheels on a school bus can be equalized is permitted.

(J) Electronic sensors - electronic sensors for detecting persons or object(s) in blind spots are permissible. Such sensor devices must have an audible alarm inside and outside of the bus. They shall be automatic with the initiation of the red warning lights and cover the area known as the "danger zone." Approved training program for students and bus drivers must be provided.

These units must meet all federal and occupational safety and health administration tests. The test results must be filed with the "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, 65 South Front Street, Room 815, Columbus, Ohio 43266-0308." The tests shall include GM-4298P, PF-5996, PF-7273, PF-7648, or their equivalent.

(K) Engine monitors - engine monitoring systems are permitted. These systems may warn the driver, by use of a light or audible signal, that the engine is in need of attention. Such systems may not automatically shut off the engine.

(L) Exhaust - left side exit exhaust pipe is permitted. Such pipe must exit at least three inches and not more than eighteen inches in front of the rear wheels and shall bend downward at a forty-five-degree angle, six inches from the end of the pipe. Left-side exhaust pipe is permitted on gasoline- or diesel-powered school buses. Right-side exhaust systems are not permitted.

(M) Fiberglas replacement body parts - fiberglas replacement fenders and cowl pieces are permitted.

(N) Fire extinguisher - a halon gas fire extinguisher is permissible. The rating shall be at least five pounds in capacity with a twenty B.C. rating. The halon-type fire extinguisher may be mounted for regular use or as an engine compartment fire suppressant system, in which instance the hose must have a special fitting which will direct the halon into the engine compartment. Halon units must be refillable; have a quick release bracket; and have a dial indicating the amount of pressure.

(O) Interior observation mirror - one interior observation mirror mounted at the rear of the school bus above the emergency door is permissible. This mirror must be made of shatterproof high-stress plexiglas. The edges of irror must be protected with heavy vinyl oating. This mirror shall be approximately ighteen by twenty-four inches and shall have dual-mounting brackets.

(P) Paint - Imron or equivalent special paint is permitted.

(Q) Ramps.

When a power lift system is not adequate or an extra emergency system is desired to load and unload students for type A, B, and C buses, a ramp device may be installed.

(1) If a ramp is used, it shall be of sufficient strength and rigidity to support the special device, occupant, and attendant(s). It shall be equipped with a protective flange on each longitudinal side to keep special device on the ramp.

(2) Floor of ramp shall be of nonskid construction.

(3) Ramp shall be of weight and design, and equipped with handle(s), to permit one person to put ramp in place and return it to its storage place. Ramp storage must protect ramp from dirt and weather.

(R) Reflective markings - reflective markings which set a school bus apart and make it more visible in the dark are permitted. The design for the over-markings must be approved by the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(S) Remote-controlled mirrors - remote-controlled mirrors which are adjusted by a power source that permits the mirror to swivel from right to left are permitted. These mirrors must be controlled from the driver compartment and may include the day/night option.

(T) Roof ventilators - roof ventilators are permissible. Such ventilators shall be adjustable and of sufficient capacity to provide adequate fresh air under operating conditions without the opening of windows, except in extremely warm weather. This ventilator shall have multi-positions and shall be static-type with exhaust ventilation that cannot be reclosed. The ventilator shall have a release handle or handles permitting operation as an emergency exit which can be opened from inside or outside the school bus. A buzzer shall sound when the ventilator is opened in the escape position. These ventilators/ emergency exits are required on buses for the handicapped, "Transpec Safety Vents" or equivalent.

(U) Safety lugs - the use of safety lugs and clamps are permitted on wheels that use multipiece rims. Lugs must be rimlock or equivalent.

(V) School bus crossing control arms - school bus crossing control arms shall be designed to work in conjunction with the opening of the service door.

(W) Spray-suppressant skirting - a system for suppressing flying spray on a wet surface is permitted. Such a system shall consist of filament-type plastic which is installed around the front fender wells. Rear installation shall include a full width filament-type plastic skirt.

(X) Standard transmissions - six-speed transmissions are permitted.

(Y) Stop arms equipped with strobe lights - a stop arm with two red flashing strobe lights is permitted.

(Z) Tinted side windows - tinted windows are permitted on school buses for the handicapped. Such tinting shall meet the applicable state laws.

(AA) Vehicle use monitors - the use of various types of monitoring devices to record vehicle movement, speed, RPM, and other measurements are permitted.

(BB) Vinyl lettering - vinyl stick-on lettering is permitted in lieu of painted-on letters, either on original equipment or as replacement letters.

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective date: 7/1/88

APPENDIX A

Applicable Federal Motor Vehicle Safety Standards as They Apply to School Bus Construction:

No.	Title
101	Control Location, Identification, and Illumination.
101-80	(effective 9-1-80)
102	Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect.
103	Windshield Defrosting and Defogging Systems.
104	Windshield Wiping and Washing Systems.
105-75	Hydraulic Brake Systems.
106-74	Brake Hoses.
107	Reflecting Surfaces.
108	Lamps, Reflective Devices, and Associated Equipment.
111	Rearview Mirrors.
112	Headlamp Concealment Devices.
113	Hood Latch System.
115	Vehicle Identification Number (effective 9-1-79/80).
116	Motor Vehicle Brake Fluids.
119	New Pneumatic tires for Vehicles Other Than Passenger Cars.
120	Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars.
121	Air Brake Systems.
124	Accelerator Control Systems.
125	Warning Devices.
127	Speedometers & Odometers (effective 9-1-79/80).
205	Glazing Materials.
207	Seating System.
208	Occupant Crash Protection.
209	Seat Belt Assemblies.
210	Seat Belt Assembly Anchorages.
212-76	Windshield Mounting.
213	Child Seating Systems.

217	Bus Window Retention and Release.
217-76	
219	Windshield Zone Intrusion.
220	School Bus Rollover Protection.
221	School Bus Body Joint Strength.
222	School Bus Passenger Seating and Crash Protection.
301-75	Fuel System Integrity.
302	Flammability of Interior Materials.

APPENDIX B

Highway Safety Program Standard No. 17

Pupil Transportation Safety

(A) Scope. This standard establishes minimum requirements for a state highway safety program for pupil transportation safety; including the identification, operation, and maintenance of school buses; training of personnel; and administration.

(B) Purpose. The purpose of this standard is to reduce, to the greatest extent possible, the danger of death or injury to schoolchildren while they are being transported to and from school.

(C) Definitions. "Type I school vehicle" means any motor vehicle with motive power, except a trailer, used to carry more than sixteen (16) pupils to and from school. This definition includes vehicles that are at any time used to carry schoolchildren and school personnel exclusively, and does not include vehicles that only carry schoolchildren along with other passengers as part of the operations of a common carrier.

"Type II school vehicle" means any motor vehicle used to carry sixteen or less pupils to or from school. This does not include private motor vehicles used to carry member of owner's household.

(D) Requirements. Each state, in cooperation with its school districts and its political subdivisions, shall have a comprehensive pupil transportation safety program to assure that school vehicles are operated and maintained so as to achieve the highest possible level of safety.

(1) administration.

(A) There shall be a single state agency having primary administrative responsibility for pupil transportation, and employing at least one full-time professional to carry out its responsibilities for pupil transportation.

(B) The responsible state agency shall develop an operating system for collecting and reporting information needed to improve the safety of school vehicle operations, in accordance with the Safety Program Standard No. 10, "Traffic Records," 204.4.

(2) Identification and equipment of school vehicles. Each state shall establish and maintain compliance with the following requirements for identification and equipment of school vehicles. The use of stop arms is at the option of the state.

(A) Type I school vehicles shall:

(1) Be identified with the words, "School Bus," printed in letters not less than eight inches high, located between the warning signal lamps as high as possible without impairing visibility of the lettering from both front and rear, and have no other lettering on the front or rear of the vehicle;

(2) Be painted National School Bus Glossy Yellow, in accordance with the colorimetric specifications of Federal Standard No. 595a, Color 13432, except that the hood shall be either that color or lusterless black, matching Federal Standard No. 595a, Color 37038;

(3) Have bumpers of glossy black, matching Federal Standard No. 595a, Color 17038; unless, for increased night visibility, they are covered with a retroflective material.

(4) Be equipped with a system of signal lamps that conforms to the school bus requirements of Federal Motor Vehicle Safety Standard 108,49 CFR 571.21; and

(5) Have a system of mirrors that will give the seated drive a view of the roadway to each side of the bus, and of the area immediately in front of the front bumper, in accordance with the following procedure:

When the rod, thirty inches long, is placed upright on the ground at any point along a traverse line one foot forward of the forwardmost point of a school bus, and extending the width of the bus, at least seven and one half inches of the length of the rod shall be visible to the driver, either by direct view or by means of an indirect visibility system.

(B) Any school vehicle meeting the identification requirements of 1, A-D above that is permanently converted for use wholly for purposes other than transporting pupils to or from school shall be painted a color other than National School Bus Glossy Yellow, and shall have the stop arms, and equipment required by section IV.B.1.D, removed.

(C) Type I school vehicles being operated on a public highway and transporting primarily passengers other than school pupils shall have the words, "School Bus," covered, removed, or otherwise concealed, and the stop arms and equipment required by section IV.B.1.D shall not be operable through the usual controls.

(D) Type II school vehicles shall either:

(1) Comply with all the requirements for Type 1 school vehicles; or

(2) Be of a color other than National School Bus Glossy Yellow, have none of the equipment specified in IV.B.1.D, and not have the words, "School Bus," in any location on the exterior of the vehicle,

(3) The state shall establish conditions under which one or the other of the above two specifications for Type II vehicles shall apply.

(E) Operation. Each state shall establish and maintain compliance with the following requirements for operating schools vehicles:

(1) Personnel.

(a) Each state shall develop a plan for selecting, training, and supervising persons whose primary duties involve transporting school pupils, in order to assure that such persons will attain a high degree of competence in, and knowledge of, their duties.

(b) Every person who drives a Type I or Type II school vehicle occupied by school pupils shall, as a minimum:

(1) Have a valid state driver's license to operate such a vehicle(s);

(2) Meet all special physical, mental, and moral requirements established by the state agency having primary responsibility for pupil transportation; and

(3) Be qualified as a driver under the motor carrier safety regulations of the federal highway administration 49 CFR 391, if he or his employer is subject to those regulations.

(F) Pupil instruction. At least twice during each school year, each pupil who is transported in a school vehicle shall be instructed in safe riding practices, and participate in emergency evacuation drills.

(G) Vehicle operation.

(1) Each state shall develop plans for minimizing highway use hazards to school vehicle occupants, other highway users, pedestrians, and property, including but not limited to:

(a) Careful planning and annual review of routes for safety hazards;

(b) Planning routes to assure maximum use of school buses, and avoid standees;

(c) Providing loading and unloading zones off the main traveled part of highways, wherever it is practicable to do so;

(d) Establishing restricted loading and unloading areas for school buses at, or near schools;

(e) Requiring the driver of a vehicle meeting or overtaking a school bus that is stopped on a highway to take on or discharge pupils, and on which the red warning signals specified in IV.B.1.D are in operation, to stop his vehicle before it reaches the schoolbus and not proceed until the warning signals are deactivated; and

(f) Prohibiting, by legislation or regulation operation of any vehicle displaying the words, "School Bus," unless it meets the equipment and identification requirements of this standard.

(i) Use of flashing warning signal lamps while loading or unloading pupils shall be at the option of the state. Use of red warning signal lamps for any other purpose, and at any time other than when the school bus is stopped to load or discharge passengers shall be prohibited.

(ii) When vehicles are equipped with stop arms, such devices shall be operated only in conjunction with red signal lamps.

(iii) Seating.

(A) Seating shall be provided that will permit each occupant to sit in a seat in a plain view lateral location, intended by the manufacturers to provide seating accommodation for a person at least as large as a fifth percentile adult female, as defined in 49 CFR 571.3.

(B) School bus routing and seating plans shall be coordinated so as to eliminate standees when a school vehicle is in motion.

(C) There shall be no auxiliary seating accommodations such as temporary or folding jump seats in school vehicles.

(D) Drivers of school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

(E) Passengers in type II school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

(H) Vehicles maintenance. Each state shall establish and maintain compliance with the following requirements for vehicle maintenance:

(1) School vehicles shall be maintained in safe operating conditions through a systematic preventive maintenance program.

(2) All school vehicles shall be inspected at least semiannually, in accordance with Highway Safety Program Manual Vol. one, published by the department of transportation, January 1969. School vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be inspected and maintained in accordance with those regulations (49 CFR Parts 393 and 396).

(3) School vehicle drivers shall be required to perform daily pretrip inspections of their vehicles, and to report promptly and in writing any defects or deficiencies discovered that may affect the safety of the vehicle's operation or result in its mechanical breakdown. Pretrip inspection and condition reports for school vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be performed in accordance with those regulations (49 CFR 392.7, 392.8, and 396.7).

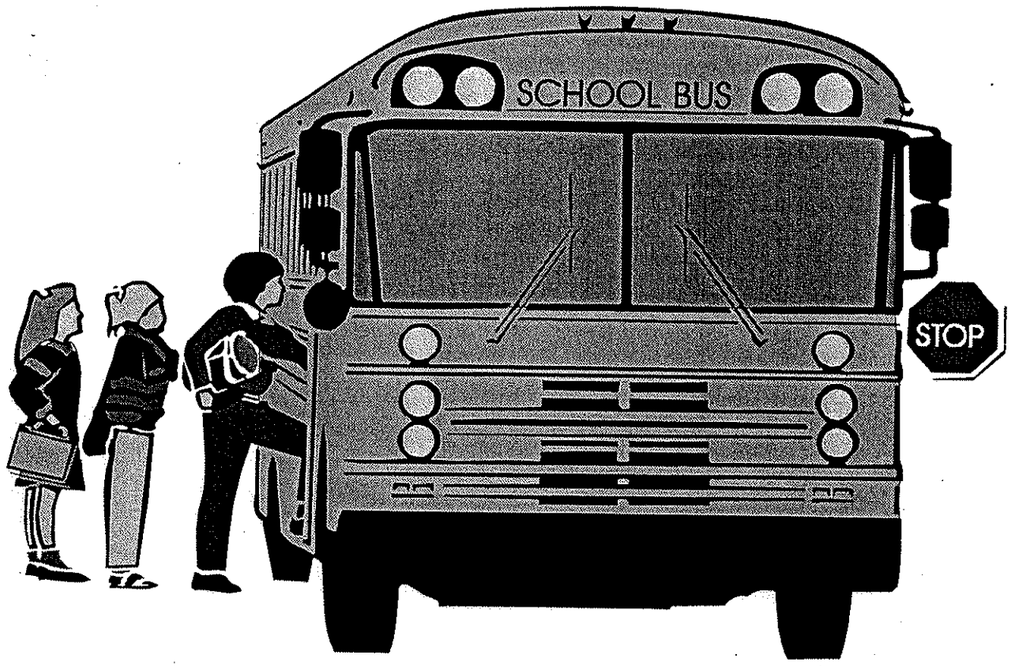
(I) Program evaluation. The pupil transportation safety program shall be evaluated at least annually by the state agency having primary administrative responsibility for pupil transportation. The National Highway Traffic Safety Administration shall be furnished a summary of each evaluation.

OHIO SCHOOL BUS MINIMUM CONSTRUCTION STANDARDS

INDEX

Page Number(s)

Ohio School Bus
Minimum Construction Standards



EFFECTIVE DATE: JANUARY 1, 1990

FRANKLIN B. WALTER
SUPERINTENDENT OF PUBLIC INSTRUCTION
OHIO DEPARTMENT OF EDUCATION
Equal Employment Opportunity

SCHOOL BUS MINIMUM CONSTRUCTION STANDARDS ADVISORY COMMITTEE

Timothy Stafford
Maintenance Supervisor
Dayton City School District

Ralph W. Shell
Area 1 Coordinator
Ohio Department of Education
Cincinnati, Ohio

Larry Lane
Transportation Supervisor
West Clermont Local School District
(Clermont County)

Stanley C. Frye
Chief Engineer
Transportation Research Center
of Ohio

Harry Waterman (Retired)
Transportation Supervisor
Mentor Exempted Village Schools

David Decsman
Transportation Administrator
Toledo City School District

Robert Butscher
Fleet Supervisor
Cuyahoga Board of MR/DD
(Cuyahoga County)

Douglas Winner
Transportation Director
East Muskingum Local School District
(Muskingum County)

Jim Hirzel
Maintenance Supervisor
Columbus City School District

Edward Schott
Transportation Supervisor
Warren Local School District
(Washington County)

Jim Dixon
Transportation Supervisor
Ridgedale Local School District
(Marion County)

Fred Stephens
Business Manager
Elyria City Schools

George R. Sontag, Jr.
Transportation Supervisor
Milford Exempted Village Schools

Jim Randall
Transportation Supervisor
Springfield City School District

Trooper Scott Harter
Office of Vehicle & Driver Services
Ohio State Highway Patrol

Table of Contents

Foreword

Contained herein are the minimum standards covering the construction and equipping of school buses, as recommended by the School bus Minimum Construction Standards Advisory Committee, adopted by the State Board of Education and filed with the Secretary of State. These standards were adopted with the advice and consent of the director of Department of Highway Safety and shall apply to all school bus chassis and bodies bid on and after January 1, 1990, which are owned and operated by any school district in this state. (Section 4511.76 of the Ohio Revised Code.)

The School Bus Minimum Construction Standards Advisory Committee is comprised of representative superintendents, transportation directors, and other school officials; members of the Ohio State Highway Patrol, representing the director of highway safety; and the staff members of the Pupil Transportation Section and the Ohio Department of Education.

The Ohio Department of Education appreciates the combined efforts of the members of the School Bus Minimum Construction Standards Advisory Committee and experts from the school bus body and chassis manufacturing industry who offered their services in the interest of formulating a standard designed for maximum safety, efficiency, and dependable service.

School officials and others responsible for pupil transportation should familiarize themselves with these standards and make certain that all school buses and equipment purchased after the effective date meet or exceed the same.

TABLE OF CONTENTS

3301-87-01 General provisions.

(A) All school buses bid on or after January 1, 1990 shall conform to the rules in this chapter.

(B) The Ohio school bus minimum standards, revised 1989, that are presented in the rules in this chapter of the Administrative Code, do hereby supersede and take precedence over all similar specifications previously adopted. These rules also cancel all existing "approved equal" certification and all construction approvals or waivers.

(C) Revision of this chapter will be considered annually at a meeting of the school bus minimum standards advisory committee. The assistant director, division of school finance, pupil transportation section, Ohio department of education, shall annually present the necessary revisions to the state board of education for adoption.

(D) Equivalency - Permission to use a device or material as an "equivalent" to that called for in the rule must be requested in writing by the manufacturer or owner. Any item supplied as an equivalent must have prior approval, in writing, from the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(E) Failure to comply with any of the rules in this chapter and the procedures as outlined may result in the suspension of authorization for sale of the chassis and/or body in the state of Ohio until such discrepancy is corrected by the manufacturer or the responsible representative and concurred with by the pupil transportation section, Ohio department of education.

(F) Each manufacturer shall file a statement of compliance within thirty days after the effective date of January 1, 1990. The statement shall certify that all products and components

manufactured for use in school buses sold for use in Ohio, as defined by division (F) of section 4511.01 of the Revised Code, will meet or exceed all rules in this chapter.

(G) The responsibility for compliance with the rules in this chapter rests with the dealers, manufacturers, and purchasers. Failure to comply with this chapter may result in the suspension of the authorization for sale or use of the chassis and/or body in the state of Ohio until such discrepancy is corrected and written approval is issued by the Ohio department of education.

(H) Specifications shall be filed in duplicate by the school bus chassis and/or body manufacturer that will meet or exceed this chapter. Specifications being submitted by the manufacturers shall also include any sales brochures and pertinent literature. Specifications shall be filed when new models are introduced.

(I) Predelivery inspection shall be conducted by both body and chassis manufacturers to assure the bus being delivered is in satisfactory operating order (all components) and meets all federal and Ohio standards. This predelivery inspection shall be according to the specific instructions of the purchaser and to the purchaser's satisfaction.

(J) The bus shall be delivered clean inside and out.

(K) Body and chassis manufacturers shall provide a written document specifying warranty provisions. The effective date of all warranties shall be the date of delivery to the purchaser.

(L) All specifications, literature, charts, and general communications should be sent to: "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, Room 815, 65 South Front Street, Columbus, Ohio 43266-0308."

(M) Predelivery service - chassis manufacturer.

(1) The chassis manufacturer shall provide for a predelivery service at the body plant location after the body is mounted and prior to delivery to the purchaser.

(2) At the time of delivery, the chassis dealer shall provide to the purchaser the following documents:

(a) Line set tickets.

(b) Predelivery service checklist.

(c) Predelivery check-out form by the chassis manufacturer or designated agent.

(d) Warranty book and statement of warranty.

(e) Service manual when requested.

(N) Any changes in design or equipment by school districts after receipt of the school bus must have prior approval in writing from the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(O) New products, buses, and related equipment must be in production one year prior to general use in the state. During the first year of production, new products will be subject to the experimental and field test evaluation procedures. (See rule 3301-87-07 of the Administrative Code.)

The interpretation of "new" will be made by the assistant director, division of school finance, Ohio department of education. "New" generally means any item that has not been used on a school bus before. Example: Six-speed transmission. This type of transmission is not new, but it has been redesigned by one company and never used on a school bus in Ohio. Therefore, it would need to be field tested. Another example is various types of air suspension.

(P) Definitions, school bus.

(1) A "type A school bus" is a conversion or body constructed upon a van-type compact truck or a front-section vehicle, with a gross weight rating of ten thousand pounds or less, designed for carrying more than ten persons.

(2) A "type B school bus" is a conversion or body constructed and installed upon a van or front-section vehicle chassis, or stripped chassis, with a vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. Part of the engine is beneath and/or behind the windshield and beside the driver's seat. The entrance door is behind the front wheels.

(3) A "type C school bus" is a body installed upon a flat back cowl chassis with a gross vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. All of the engine is in front of the windshield and the entrance door is behind the front wheels.

(4) A "type D school bus" is a body installed upon a chassis, with the engine mounted in the front, midship, or rear, with a gross vehicle weight rating of more than ten thousand pounds, designed for carrying more than ten persons. The engine may be behind the windshield and beside the driver's seat or at the rear axles. The entrance door is ahead of the front wheels.

3301-87-01

Effective:

Certification

Date

Promulgated under R.C. Chapter 119.
Rule authorized by R.C. section: 4511.76
Rule amplifies: R.C. section 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-02 Standards and specifications for school bus chassis with rated seating capacity of twenty-four through eighty-four.

(A) Air cleaner - dry element type air cleaner shall be provided. Air cleaner and element shall meet all appropriate S.A.E. J726 tests per engine application.

(B) Axles or other types of suspension.

(1) The front and rear axles including suspension assemblies, and all frame-to-ground components, shall have a gross axle weight rating at ground at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating. In no case shall capacities be less than those listed below.

(2) All vehicles shall be equipped with appropriate GAWR axles or suspension systems and tires by chassis manufacturer.

(3) Front axle shall be heavy-duty bus type. Oil bath wheel bearings on front axle are optional.

MANUFACTURER'S RATED PUPIL CAPACITY	FRONT AXLE OR OTHER FRONT SUSPENSION CAPACITY	REAR AXLE OR OTHER REAR SUSPENSION CAPACITY
TYPE A - 10-16	3,400 LBS. AT GROUND	5,300 LBS. AT GROUND
TYPE B - 16-23	4,000 LBS. AT GROUND	7,900 LBS. AT GROUND
24-32	4,500 LBS. AT GROUND	11,000 LBS. AT GROUND
TYPE C - 16-35	5,000 LBS. AT GROUND	12,000 LBS. AT GROUND
47-35	6,000 LBS. AT GROUND	15,000 LBS. AT GROUND
59	7,000 LBS. AT GROUND	17,000 LBS. AT GROUND
65	9,000 LBS. AT GROUND	18,500 LBS. AT GROUND
71-77	9,000 LBS. AT GROUND	19,000 LBS. AT GROUND
TYPE D - 42 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
48 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
54 (FC)	6,000 LBS. AT GROUND	17,000 LBS. AT GROUND
60 (FC)	7,000 LBS. AT GROUND	17,000 LBS. AT GROUND
66 (FC)	9,000 LBS. AT GROUND	17,000 LBS. AT GROUND
72 (FC)	10,800 LBS. AT GROUND	17,000 LBS. AT GROUND
77 (FC)	13,000 LBS. AT GROUND	19,000 LBS. AT GROUND
83 (FC)	13,000 LBS. AT GROUND	20,000 LBS. AT GROUND
60 (RE)	10,300 LBS. AT GROUND	18,000 LBS. AT GROUND
66 (RE)	10,300 LBS. AT GROUND	18,000 LBS. AT GROUND
72 (RE)	11,000 LBS. AT GROUND	19,000 LBS. AT GROUND
78 (RE)	11,000 LBS. AT GROUND	19,000 LBS. AT GROUND
84 (RE)	13,000 LBS. AT GROUND	23,000 LBS. AT GROUND

(SEE PARAGRAPH (D) OF RULE 3301-87-02 OF THE ADMINISTRATIVE CODE, BRAKES.)

(C) Battery.

(1) Gasoline power: Gasoline - Eight-hundred cold cranking amperes (CCA) or larger.

Diesel power: Diesel - One-thousand-two-hundred-fifty CCA minimum or larger depending on additional amperes draw.

(2) Type A and B buses diesel powered -- Two five-hundred CCA or larger depending on lift requirements if so equipped. If gasoline powered -- type A and B buses shall use manufacturer's standard.

(3) One-piece nonspliced battery cables shall be provided by the chassis manufacturer.

(a) All cables shall conform to S.A.E. standard J541 with respect to electrical resistance.

(b) All cable assemblies shall conform to "American Trucking Association-Truck Maintenance Council (ATA-TMC)" RP105.

(c) Chassis fifty-three-passenger school bus and above, with diesel engine, shall have copper wire circuit to and from starter.

(4) Batteries for types B, C, and D school buses shall be mounted in the body skirt by the body manufacturer. In this case the chassis manufacturer shall temporarily mount the battery on the chassis frame, with proper cables of appropriate length for mounting, etc., which shall conform to the "SBMI Design Objectives Booklet," January 1985 edition. Exception: Type D bus rear engine may have batteries mounted in engine compartment.

(D) Brakes - all braking systems shall comply with DOT standards ("Federal Motor Vehicle Safety Standard [FMVSS]") 105 or 121.

(1) Types of brake systems - chassis rated from twenty-four to sixty capacity shall be equipped with four-wheel power-assisted hydraulic brakes. Chassis rated from sixty-five-passenger conventional, or transit-type chassis with capacity of fifty-four-passenger school bus or greater, shall be equipped with air brakes. Option - hydraulic four-wheel disc or Ford disc front, drum rear hydraulic brakes.

(2) Air brakes - all air brake systems shall be S-cam type and shall be equipped with necessary limiting valve(s) to ensure the proper amount of air pressure to the front axle to permit efficient stopping.

(a) Service brakes - every bus, under all conditions of load, shall be equipped with service brakes of standard make designed to bring the vehicle to a safe stop in such a manner that will not interfere in any way with steering or control of the vehicle and shall be provided in accordance with FMVSS 121.

(i) Compressors - on buses using air brakes for service, emergency and parking brakes, the compressor shall be gear- or belt-driven with a twelve-cubic-foot displacement at a speed of one thousand two hundred fifty revolutions per minute.

(ii) Reservoir requirement - air brake system shall have at least two reservoirs, or one reservoir with dual chambers with a total capacity which is equal to or greater than twelve times the total volume of all brake actuators at full travel.

(iii) Air brake reservoir function

(a) Check valve - brake system reservoirs shall be equipped with a check valve or equivalent device that will prevent depletion of stored air

in the event of a leak or failure of components or connections. The check valve shall be mounted in such a manner as to provide easy access for maintenance.

(b) Safety valve - buses equipped with compressed air brakes shall require a safety valve installed in the first reservoir, designed to release air pressure in excess of one hundred fifty pounds per square inch.

(c) Drain cock - buses equipped with compressed air brakes shall be equipped with a drain cock to drain from the lowest point of the dry reservoir.

(d) All school buses equipped with air brakes shall have "Bendix Westinghouse Model No. AD 4, No. AD 9" or "Cyclo-Gard Models 1701140, 1701300" or equivalent air dryer.

(iv) Tubing and hose - brake tubing and hose shall conform to the "Society of Automotive Engineers Standards" and be equivalent to automotive engineering practice of the transit industry. These transmission lines and connections in the brake system shall be installed so as to accommodate all normal motions of the vehicle without damage or chafing. (S.A.E. J1402, FMVSS 106) See table below.

(v) A relay valve or quick release valve shall be installed in the rear application line.

(vi) Gauge and warning devices for brake systems - vehicles using air shall be equipped with an illuminated gauge, accurate to within ten per cent of the actual reservoir pressure. The vehicle shall be equipped with an audible warning device which will give a continuous warning to the driver when the air pressure in the system available for braking is sixty pounds per square inch or less.

(b) Stoplight switches - electric or mechanical pneumatic stoplight switches shall be installed by the chassis manufacturers to operate in the air lines to complete an electric circuit to the stoplight when a brake application of six pounds per square inch or more is made. Stoplight indication should always occur whenever brakes are being applied.

(c) Emergency stopping system, air or vacuum.

(i) All school buses shall be equipped with an emergency stopping system.

(ii) Brake system(s) shall perform emergency stopping function and be so designed and constructed that a single failure anywhere in the brake system, excepting mechanical parts of wheel brake assemblies, brake pedal or attachments to brake valve or master cylinder which performs service brake function, will not leave vehicle without operative brakes capable of stopping vehicle, when loaded up to and including manufacturer's GVWR (gross vehicle weight rating).

(iii) (a) Control requirements of air brake emergency stopping system.

(b) Control of emergency stopping system shall be designed and constructed to conform with the following:

(i) The control valve(s) shall be visible to the driver and shall be mounted on the steering column or on the dash panel within twelve inches to the right of the steering column. (Exception - transit-type buses may be mounted on dash panel within twelve inches to the left of the steering column.)

(ii) The emergency spring brakes shall start to apply when the air pressure in all reservoirs has been reduced to approximately sixty pounds per square inch.

(iii) The emergency spring brake shall be so constructed as to permit release by means of a manual release bolt.

(3) Hydraulic brakes - all hydraulic brake systems shall comply with FMVSS 105.

(a) Buses using a hydraulic-assist booster in the operation of the brake system shall be equipped with warning signals readily audible and visible to the driver. The warning signals shall be wired directly to the battery and sound continuously in the event of a loss of fluid flow from the primary source, or loss of electrical source powering the backup systems Exception: type A buses are not required to have an audible warning system.

(b) Buses equipped with hydraulic brake-assist booster systems shall also be equipped with a source of hydraulic pressure automatically initiated upon

loss of power from primary source and operating independently of the primary power source.

(c) Vacuum-assisted brakes are permitted.

(4) Parking brakes - parking brake system may be a parking brake on the drive shaft and/or emergency stopping system using the rear wheel brakes and shall be designed and constructed to meet the following requirements:

(a) Parking brake shall hold vehicle stationary or limit traction of braked wheels on twenty per cent grade under any condition of legal loading.

(b) When applied, parking brake shall remain in applied position with capability set forth as above, despite exhaustion of source of energy used for application or leakage of any kind.

(5) Brake pedal - surface of brake application shall be covered with a rubber pad or a nonskid surface.

(6) All brake lining material shall be asbestos-free and meet the following minimums for sixty-five-passenger and larger capacity type C school buses.

	Axle	Brake Lining
Front	9,000 lbs.	15" x 4"
Rear	18,500 lbs.	16 1/2" x 7"

(E) Bumper - front.

(1) Front bumper on all conventional-type buses shall be furnished by the chassis manufacturer.

(2) Front bumper on all transit buses shall be furnished by the body manufacturer.

(3) Front bumper shall be at least three-sixteenths of an inch pressed steel, channel one-piece construction, and a minimum of eight inches in width after forming.

(4) Front bumper shall be contoured to offer maximum protection of fender lines without permitting snagging or hooking.

(5) Front bumper shall be attached to the frame and extend forward of grille, head lamps, fender or hood sections to provide maximum protection.

(6) Front bumper shall be of sufficient strength to permit pushing of vehicle of equal weight without permanent distortion to bumper, chassis or body.

(7) Exception: type A bus front bumper is to be manufacturer's standard bumper.

(F) Clutch - chassis using manual transmission shall be equipped with a clutch torque capacity which shall not be less than ten per cent greater than or equal to the maximum net engine torque output.

(G) Color - chassis.

(1) Bumper shall be painted black.

(2) Cowl and fenders shall be painted national school bus yellow.

(3) Hood shall be painted nonreflective national school bus yellow. Exception: type A and D buses.

(4) Frame shall be painted black.

(5) Grille shall be painted national school bus yellow. (Exception: grilles can be chrome or anodized aluminum finish.)

(6) Wheels, spokes and rims shall be painted black. (Exception: rims that are natural iron gray [unpainted] need not be painted black.)

(H) Cooling system.

(1) The cooling system fan shall be heavy-duty reinforced type. The fan, alternator, and water pump, If belt driven, shall be driven by dual belts and shall be equipped with matched pulleys and matched belts. A single multiple-grooved, serpentine belt of equivalent or greater horsepower capacity may be used. Exception: type A bus.

(2) The cooling system radiator shall be of sufficient capacity to cool the motor at all speeds in all gears. Thermostatic controls shall be high temperature type.

(3) On all chassis requiring hoses or extensions to fill radiators, the hose or extension shall be so designed to permit adding of coolant without trapping air.

(4) Permanent ethylene-glycol base antifreeze shall be provided by chassis manufacturer to protect the cooling system to minus twenty degrees Fahrenheit when tested at normal engine temperature.

(5) When a chassis is equipped with an automatic transmission, said chassis shall have a heavy-duty cooling system with increased capacity in the radiator, fan, and other necessary components, to provide for the additional cooling required by the automatic transmission.

(6) Chassis shall be equipped with a coolant recovery system or a deairation system.

(I) Drive shaft - each drive shaft shall be equipped with adequate protective metal guard or guards to prevent whipping through floor or dropping to ground if broken.

(J) Electrical system.

(1) Alternator.

(a) School buses of rated capacity of thirty-five passengers or larger shall be provided with a minimum of one-hundred-thirty-ampere alternator with a matched regulator. Transit buses with a rated capacity of seventy-one, seventy-seven, and eighty-three passengers shall be equipped with a one-hundred-thirty-ampere alternator. One-hundred-thirty-ampere alternator output must be approximately sixty amperes at engine idle (fourteen-hundred to sixteen-hundred-rotor RPM).

(b) All school buses of twenty-four through thirty-four capacity shall be provided with a minimum of eighty-ampere alternator. School buses with twenty-four through thirty-four capacity equipped with a lift shall be provided with a one-hundred-thirty-ampere alternator. Twelve through twenty-three capacity school buses equipped with a lift shall have dual batteries with an eighty-ampere alternator. Each battery shall be CCA-625 minimum. School buses of ten through twenty-three capacity shall be provided with a minimum of seventy-ampere alternator. Exception: dual batteries are not required on type A buses.

(c) Alternator shall be driven by dual belts with matched pulleys and matched belts. A single multiple-grooved serpentine belt

of equivalent or greater horsepower capacity may be used. Exception: type A dual belt drive is not required.

(2) Battery. (See paragraph (C) of this rule.)

(3) Lamps and signals. (See paragraph (S) of this rule.)

(4) Voltage regulators. Regulator shall be full transistor matching capacity type.

(5) Wiring. (See paragraph (FF) of this rule.)

(6) Power terminal. Chassis manufacturer shall provide an adequate electric power source terminal for bus body power connection. This terminal shall be connected by number eight wire or larger wire of adequate gauge running from the power supply. The terminal shall be of the single-post type, a minimum of one-fourth-inch stud and located on the fire wall above the toeboard on the left-hand side.

(7) All buses shall be equipped with a voltmeter with graduated scale to sixteen volts.

(K) Exhaust system.

(1) Exhaust pipe, muffler, and tailpipe shall be outside bus body and attached to chassis.

(2) Muffler shall be heavy-duty truck type of aluminized or stainless steel or ceramic coated to offer maximum resistance to corrosion or oxidation.

(3) Tailpipe shall be constructed of seamless or electrically welded tubing of sixteen-gauge steel or equivalent, and shall extend at least five inches beyond chassis frame with sufficient length to reach the bumper but not to extend beyond rear bumper. Short sections of flexible pipe for gas and diesel engines are permitted. Exceptions: where frame

extends to the rear bumper, five-inch extension is not required. Type A AND B buses tailpipes shall be manufacturer's standard.

(4) Diameter of tailpipe shall not be reduced after it leaves the muffler.

(5) The rear end of tailpipe must be located at least twenty inches to the right or left of the centerline of the chassis. Option: left-side exit is permitted for gas and diesel-powered buses. Tailpipe must be at least three inches and not more than eighteen inches in front of the rear wheel and bent downward at a forty-five-degree angle six inches from the end of the pipe. Type A and B buses shall be manufacturer's standard.

(6) Exhaust system on gas-powered chassis shall be insulated from fuel tank and fuel tank connections by securely attached metal shield at any point where it is twelve inches or less from the fuel tank or fuel tank connections. Exception: fuel tank shield not required on diesel-powered buses.

(L) Fenders - front.

(1) Total spread of outer edges of front fenders measured at fender line shall exceed total spread of front tires when front wheels are in straight-ahead position.

(2) Front fenders shall be braced and free from any body attachment. Trailing edge of front fender shall extend to bottom of front body section. Fender extensions are acceptable.

(3) Chassis sheet metal shall not extend beyond rear face of cowl.

(4) Color. (See paragraph (G) of this rule.)

(M) Frame.

(1) Frame shall be designed to correspond with or exceed standard practice performance criteria for trucks of same general load specifications used for severe service.

(2) Frame side members shall be one-piece construction with the following exceptions:

(a) Extension of these members shall be designed, furnished, and guaranteed by chassis or body manufacturer. Installation shall be guaranteed by the company installing extension. Extension of frame lengths shall not be for the purpose of extending wheel base.

(b) No holes shall be permitted in the chassis rails except those drilled at the chassis plant or authorized by the chassis manufacturer.

(c) Welding to chassis rails is permitted and must be guaranteed by the company making the modifications.

(N) Fuel tank - all fuel tank specifications shall conform with FMVSS 301.

(1) Fuel tank shall have a minimum capacity of sixty gallons with a fifty-five-gallon actual draw on all school buses forty-seven-passenger and above. It shall be filled and vented outside of the body. Construction will prevent the spillage or drainage of fuel on any part of the exhaust system. Type B buses fuel tank shall be thirty gallons with twenty-five-gallon actual draw; otherwise, shall meet requirements of type C and D buses. Exception: type A bus - fuel tank shall be manufacturer's standard.

(2) Fuel filter with replaceable element shall be installed between fuel tank and injector pump. A flexible connection which is gasoline- and

oil-proof shall be provided at engine end of fuel line.

(3) A water separator shall be installed between fuel tank and all diesel engine fuel and/or fuel injector pumps.

(4) Drain plug of at least one-fourth-inch pipe tread shall be located in center of bottom of tank. Exception: type A school bus.

(5) Fuel tank installation shall be in accordance with "SBMI Design Objectives Booklet," January 1985 edition.

(O) Governor - engine speed governor shall be installed on all school buses. Settings shall comply with manufacturer's maximum recommended governed speed and set by the chassis manufacturers. Exception: type A school bus.

(P) Heating system - engine design shall provide inlet and outlet holes in accessible locations for attachment of school bus heating system water lines.

(Q) Horn(s).

(1) School bus shall be equipped with dual horns of standard make, each horn capable of producing complex sound in band of audio frequencies from two hundred fifty to two thousand Hz and having total sound level of eighty-two to one hundred two dBa within these frequency limits when measured at fifty feet from the vehicle.

(2) Sound level measurements shall be made with meter that complies with "American Standard Association, Inc." Measurement shall be made with meter set to flat response.

(3) All school buses shall be equipped with audible electrical warning device,

automatically actuated when the bus is in reverse gear. Device shall be ECCO model 630, one hundred seven decibels or equivalent, meeting S.A.E.-J9946. Device shall be mounted behind rear axle, between frame rails, and shall emit intermittent sound. Device to be provided and installed by body manufacturer.

(R) Instruments and instrument panel.

(1) Chassis shall be equipped with the following instruments and gauges. (Lights in lieu of gauges are not acceptable.)

(a) Speedometer.

(b) Odometer which will give accrued mileage including tenths of miles.

(c) A voltmeter with a graduated scale of sixteen volts. Voltmeter shall show the battery voltage. It shall be off when the engine is off.

(d) Electrical or mechanical oil pressure gauge. Warning light unacceptable.

(e) Electrical water temperature gauge. Warning light unacceptable.

(f) Fuel gauge.

(g) Upper beam headlamp indicator light.

(h) Left and right turn signal indicator.

(i) All chassis with air brake system shall be equipped with a visible gauge and audible low-pressure indicator to warn driver if air pressure in air brake system falls below sixty pounds per square inch.

(j) All chassis with vacuum brake system shall be equipped with a visible low-pressure indicator and lighted graduated

gauge. The gauge shall be accurate within ten per cent of actual reservoir pressure, which will indicate to the driver the vacuum, in inches of mercury, available for operation of brakes. Exception: type A and B buses, manufacturer's standard warning light acceptable.

(k) A pusher, transit type D chassis, shall be equipped with an electric tachometer.

(2) All instruments shall be easily accessible for maintenance and repair.

(3) The above instruments and gauges shall be mounted on instrument panel in such a manner that each is clearly visible to driver in a seated position. The visibility of the instruments must comply with FMVSS 101.

(4) All instrument faces shall be illuminated.

(5) The chassis manufacturer shall provide and cover instrument panel with plastic covering or equivalent in order to provide protection from precipitation from time of manufacture until body is mounted.

(S) Lamps and signals - chassis.

(1) All lamps and their installation shall conform to current FMVSS 108.

(2) Chassis shall be equipped with sealed beam head lamps; beams to be controlled by a foot-operated dimmer switch. Exception: type A and B buses, manufacturer's standard dimmer switch acceptable.

(3) A self-cancelling turn signal shall be installed by the chassis manufacturer as an integral part of the steering column assembly and shall have circuit wires of sufficient length for the connection of the bus turn signals by the school bus body manufacturers.

(a) Turn signal systems shall be independent units and the chassis manufacturer shall provide a four-way hazard warning switch to cause simultaneous flashing of turn signal lamps when needed as vehicular traffic hazard warning.

(b) The chassis manufacturer shall install a left and right turn signal direction indicator on the instrument panel plainly visible to the driver.

(c) Front turn signals shall be supplied by the chassis manufacturer in compliance with requirements of FMVSS 108. Placement shall be in an area most visible to other motorists.

(T) Oil filter - oil filter of replaceable element or cartridge type shall be provided and shall be connected by flexible high-pressure type hose with wire braid reinforcement that will withstand pressure and heat if it is not of built-in or engine-mounted design. Hose must meet FMVSS 106 and S.A.E. J1402. Diesel oil filter, manufacturer's standard capacity. See the following table.

HOSE I.D. (INCHES)	.19	.25	.31	.41	.50	.62	.88	1.12	1.38
HOSE O.D. (INCHES)	.52	.58	.68	.77	.92	1.08	1.23	1.50	1.75
MAXIMUM OPERATING PRESSURE (PSI)	2000	1500	1500	1250	1250	750	400	300	250
MINIMUM BURST PRESSURE (PSI)	8000	6000	6000	5000	5000	3000	1600	1250	1000

(U) Openings - all openings made by the chassis manufacturer in the floor board and firewall shall be sealed by the chassis manufacturer to prevent

gases from entering driver's compartment. Boots for the accelerator pedal, gearshift, and emergency brake, when required, shall be supplied by the chassis manufacturer.

(V) Power train.

(1) Under GVWR-loaded condition, the engine, transmission and other drive line components shall be capable of maintaining a speed of fifty-five miles per hour on a road grade of one per cent when the engine is operating at ninety per cent of the engine manufacturer's recommended maximum or governed revolutions per minute.

(2) Gasoline engine - chassis equipped with gasoline engines shall meet or exceed the cubic-inch displacement as shown in the following table. All gasoline engines shall be fuel-injected.

24	C*	passenger chassis	350 cubic inch
36	C*	passenger chassis	350 cubic inch
48	C*	passenger chassis	350 cubic inch
54	C*	passenger chassis	350 cubic inch
60	C*	passenger chassis	350 cubic inch
66	C*	passenger chassis	366 cubic inch
72	C*	passenger chassis	366 cubic inch

*C = type C school bus

Option - diesel engine type A, B, or C bus.

(3) All type D school buses (transit) must be diesel-powered.

(4) Diesel - chassis equipped with a diesel engine shall have one hundred sixty minimum horsepower and shall be equipped with sound abatement package which reduces the noise by nine decibels at the driver's ear. Engine components shall include:

(a) Dual belts on water pump and alternator. A single, multiple-grooved, serpentine belt of equivalent or greater horsepower capacity may be used.

(b) Coolant recovery system with overflow escape hose exiting engine compartment.

(c) Engine heater, minimum seven hundred fifty watts.

(d) Diesel oil filter shall be manufacturer's standard capacity.

(e) Primary fuel filter and water separator located between tank and engine transfer pump.

(f) All engines shall be equipped with an automatic engine cooling fan. Shutters are optional, but when used must be coordinated to cycle with automatic fan.

(g) All type C and D school buses shall be equipped with positive locking hand throttle. Air throttle is permitted as equivalent.

(W) Shock absorbers - heavy-duty double-acting shock absorbers compatible with the manufacturer's rated axle capacity shall be installed on the front and rear of the school bus chassis.

(X) Springs.

(1) Suspension assemblies as specified shall maintain control stability of school bus under all loading conditions.

(2) Springs or suspension assemblies shall be designed to carry their proportioned share of gross vehicle weight in accordance with the weight distribution as stated in paragraph (EE) of this rule (weight distribution).

(3) If leaf-type front springs are used, stationary eyes shall be protected by full wrapper leaf in addition to main leaf.

(4) If leaf-type rear springs are used, they shall be of progressive type. Wrapper leaves on rear springs are permissible.

(5) Air suspension systems are an approved option.

(Y) Steering gear assembly.

(1) All school bus chassis in all passenger capacities shall be equipped with heavy-duty, truck-type integral power steering. Power steering components shall be compatible with the GVWR for each capacity as shown in chassis manufacturer's literature.

(2) Steering mechanism shall provide for easy adjustment for lost motion.

(3) Steering gear assembly shall be so constructed and guaranteed by chassis manufacturer to provide maximum safety and steering performance of school bus under all conditions of load and speed.

(4) No changes shall be made in the steering mechanism unless approved by chassis manufacturer.

(5) There shall be a clearance of at least two inches between steering wheel and any other surface or control.

(6) Chassis manufacturers shall provide and cover steering wheel and column with a temporary plastic covering or equivalent in order to

provide protection from precipitation from the time of manufacture until body is mounted.

(Z) Tires, rims and wheels.

(1) All tires provided by chassis manufacturer shall meet performance standards for the current year of manufacture.

(2) All tire sizes and construction standards shall conform with current federal requirements.

(3) All rim sizes and construction standards shall conform with current federal requirements.

(4) Chassis manufacturer and/or authorized dealer shall balance all wheels and make necessary alignments prior to delivery.

(5) Dual rear tires (wheels) shall be provided on all vehicles. Exception: type A bus.

(6) All tires on a given vehicle shall be of same size, construction and capacity.

(7) See the following table for the type C conventional bus tire sizes.

CONVENTIONAL BUS TIRE SIZES

All School Buses Shall Be Equipped With Tubeless Radial Tires Of Proper Size And Load Range For Chassis GVWR Ratings And Body Combinations.
DISC OR SPOKE WHEELS MAY BE USED

	29-35	53	53	59	65	71
BIAS PLY EQUIVALENT FOR REFERENCE	825X20 E	825X20 E	825X20 E	900X20 E	900X20 F	900X20
MINIMUM STANDARD, TUBELESS RADIAL SIZES ->	9R22.5 E	9R22.5 E	9R22.5 E	10R22.5 E	10R22.5 F	10R22.5 G
	235/80R22.5 G	235/80R22.5 G	235/80R22.5 G	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G
	245/75R22.5 G	245/75R22.5 G	245/75R22.5 G	265/75R22.5 G	265/75R22.5 G	265/80R22.5 G
	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT
	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES	OPTIONAL SIZES
OPTIONAL TIRES	10R22.5 E	10R22.5 E	10R22.5 E	10R22.5 E	11R22.5 G	11R22.5 G
	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G	255/80R22.5 G	295/75R22.5 G	295/75R22.5 G
	265/75R22.5 G	265/75R22.5 G	265/75R22.5 G	265/75R22.5 G	275/80R22.5 G	275/80R22.5 G
	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT	OR EQUIVALENT

Type A - radial tires of proper size and ply rating for the GVWR of the bus
Type B - 14 - 23 8 X 8 19.5, 8 PLY on 6.0 rims
Type D - 53 - 71 capacity 10 X 22.5, 77 - 84 capacity 11 X 22.5

(AA) Tow hooks - optional.

(BB) Transmission.

(1) Manufacturer shall furnish best available automatic transmission compatible with power plant, unless local school district authorities request a manual-type transmission.

(2) When a manual-type transmission is specified, it shall come with full synchromesh in all forward speeds except first and reverse gears pursuant to the following chassis capacities:

(a) Twenty-three-rated capacity through fifty-three-rated capacity - minimum of four forward speeds and one reverse speed.

(b) Fifty-nine-rated capacity through eighty-four-rated capacity - five forward speeds and one reverse speed. (Option - six-speed manual transmission.)

(c) All transmissions shall be equipped with a backup light switch. This switch is to be activated when the gearshift lever is in the reverse position.

(3) Torque rating of the transmission shall exceed torque output of engine by at least five per cent.

(CC) Undercoating - chassis manufacturer shall coat undersides of front fenders with rustproofing compound which meets or exceeds federal specifications TT-C-520B. Exception: fiberglas fenders.

(DD) Vehicle identification number plate location.

(1) Conventional school bus chassis serial number identification plate (vehicle identification number) shall be securely mounted on the dash panel or the firewall area of the engine compartment by the chassis manufacturer.

(2) Transit type D school bus identification plate shall be mounted on the dash or an acceptable area in the driver's area. Engine compartment mounting is not acceptable.

(EE) Weight distribution.

(1) Conventional - weight distribution of fully loaded school bus on level surface shall be such that not more than seventy-five per cent of gross vehicle weight is on rear tires and not more than thirty-five per cent is on front tires.

(2) Transit type D - with engine inside front of body. If entrance door is ahead of front wheels, not more than seventy-five per cent of gross vehicle weight shall be on rear tires, nor more than fifty per cent on front tires. If entrance door is behind front wheels, not more than seventy-five per cent of gross vehicle weight shall be on rear tires, nor more than forty per cent on front tires. With engine in rear, not more than seventy-five per cent of gross vehicle weight shall be on the rear tires, nor more than forty per cent on front tires.

(FF) Wiring.

(1) All wiring shall conform to current standards of the "Society of Automotive Engineers."

(2) Tail light and stop light electrical connections shall be supplied by the chassis manufacturer through the main electrical terminal block, to be connected by the school bus body manufacturer.

3301-87-02

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7-1-88

3301-87-03 School bus body standard - twenty-four- through eighty-four-rated seating capacity.

(A) Aisle.

(1) Minimum clearance between seats shall be twelve inches at seat level and fourteen inches at top of seats.

(2) On type D transit forward control (engine front) buses, the aisle shall not be less than twelve inches, measured at floor level, between engine cover and any other object. Hold-down fastening devices used on engine cover shall be designed to prevent hooking or catching on shoes or clothing.

(B) Battery.

(1) Battery and all battery cable shall be provided by the chassis manufacturer.

(2) Body manufacturer shall provide a drawer-type pull-out tray on all buses with capacities of thirty or greater to facilitate servicing or removal of battery(ies). The battery(ies) shall be enclosed by a compartment constructed of mill-applied zinc steel provided with drain ports, hold-down carrier mounted as to avoid blocking filler ports, and locking device to prevent accidental opening. Drawer assembly shall be covered with acid-resistant paint. Rustproofing shall be provided and applied to battery box. Battery tray shall be equipped with a positive locking device to keep tray from sliding completely out to prevent battery from being dropped. Exception: type D rear engine buses - battery may be located in engine compartment.

(C) Bumper, rear.

(1) Rear bumper shall be one piece, heavy-duty type, or pressed steel channel, at least three-sixteenths inch of thickness and a minimum of eight inches in width (high) after forming.

(2) Rear bumper shall be wrapped around back corners of bus and extend forward at least twelve inches, measured from rear-most point of body at floor line. Rear bumper shall also protect rear corners of body by extending beyond the body exterior side panels. The bend of the rear bumper at the rear body corners shall be sufficient to allow the entire contour of the forward end of the rear bumper to extend no more than one inch beyond the body line of the exterior side panels.

(3) Bumper shall be fastened to chassis frame side rails in such a manner as to develop full strength of bumper section from rear or side impact. Bracing materials shall have an impact ratio comparable to that of bumper material and shall be fastened at the ends and radii of the bumper, attached to the side of the frame only and not to the body at any point.

(4) Rear bumper shall extend beyond rear-most part of body surface at least one inch, measured at floor line.

(5) No spaces, projections, or cutouts that will permit a handhold shall be permitted.

(6) Two rear tow hooks shall be installed, with the hooks and their mountings of sufficient strength to tow the vehicle at the vehicle's curb weight.

(7) Front ends of the bumper shall be enclosed by end caps or other protective metal or shall have the ends rounded or tucked in and shall be free from sharp edges or projections likely to cause injury or snagging.

(8) A rubber or metal strip shall be installed to close any opening exceeding one-fourth inch between rear bumper and body metal.

(9) Type A school bus shall have chassis manufacturer's standard rear bumper.

(D) Capacity (rated) seating spacing shall conform to and be in full compliance with FMVSS 222 - school bus passenger seating and crash protection. See the following table.

Row of Seats	Rated Capacity 3-3 Plan; Rump Width of 13 Inches	Rated Capacity 3-2 Plan; Rump Width of 15 Inches
4	23 conventional	19 conventional
6	35 conventional	29 conventional
7	42 forward control	35 forward control
8	47 conventional	39 conventional
8	48 forward control	40 forward control
9	53 conventional	44 conventional
9	54 forward control	45 forward control
10	59 conventional	49 conventional
10	60 forward control	50 forward control
11	65 conventional	54 conventional
11	66 forward control	55 forward control
11	66 rear engine	55 rear engine
12	71 conventional	59 conventional
12	72 forward control	60 forward control
12	72 rear engine	60 rear engine
13	78 forward control	65 forward control
13	78 rear engine	65 rear engine
14	84 forward control	70 forward control
14	84 rear engine	70 rear engine

(E) Color - body exterior and interior.

(1) Body exterior.

(a) All exterior metal shall be painted national school bus yellow with exception of those areas listed below. All components (as listed) not painted yellow shall be painted black enamel.

(b) Components to be painted black:

(i) Lettering and numbering.

(ii) Bumpers.

(iii) Floor level rub rail.

(iv) Seat level rub rail.

(v) Background area and hoods for warning light system.

(2) All interior panels, walls, and roof surfaces shall be painted by the body manufacturer.

(3) Use of Imron or equivalent special paint is permitted.

(F) Construction - body.

(1) All school bus body construction components shall be of prime commercial quality mill-applied zinc-coated steel. The zinc plating shall be one hundred twenty grams/meter two minimum coating weight (G60) applied by either hot dipping or electroplating or equivalent. All such construction materials shall be fire-resistant. (Zinc-coated items shall include structural members, inside and outside panels, floor panels, joints, floor sills, and step wells; excluded are door handles, grab handles, interior decorative parts, other interior plated parts, and components heavier than twelve-gauge.)

(2) All metal surfaces that will be painted shall be (in addition to above requirements) chemically cleaned, etched, zinc-phosphate-coated, and zinc-chromate or epoxy-primed or conditioned by equivalent process.

(3) In providing for the requirements in paragraphs (F)(1) and (F)(2) of this rule, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges, punched or drilled hold areas in sheet metal, closed or box sections, unvented or undrained areas, and surfaces subject to abrasion during vehicle operation.

(4) Upon final assembly of the school bus body and after mounting body upon chassis, the total unit strength of the school bus shall meet or exceed all strength criteria as established by FMVSS 220 and 221.

(5) Body construction shall provide a reasonably dustproof and watertight unit.

(6) When water leaks or dust leaks, due to workmanship at point of manufacture, occur during the first year of use, these leaks shall be repaired entirely at the expense of the school bus body manufacturer as a part of the regular warranty.

(7) Floor.

(a) The floor shall be not less than fourteen-gauge mill-applied zinc-coated steel sheet. The zinc plating shall be one hundred twenty grams/meter two minimum coating weight (G60) applied by either hot dipping or electroplating or equivalent.

(b) There shall be a main floor cross member of at least ten-gauge steel or equivalent placed at each side post extending the full width of the floor plate and permanently attached.

(c) There shall be a minimum of two intermediate floor cross members of at least sixteen-gauge steel equally between the main floor cross members and permanently attached.

(8) Longitudinal strainers - all longitudinal side strainers and members shall be a minimum of sixteen-gauge steel.

(a) There shall be one longitudinal side strainer (or impact rail) mounted at belt line (window sill level) and

extending at least from the front main vertical post (excluding the front door entrance) to the last main vertical post on each side of body. This member shall be attached at each vertical post.

(b) There shall be one longitudinal side strainer mounted at the side window header level and extended completely around the school bus body. This member shall be attached at each vertical post.

(c) Additional longitudinal side strainers are permissible if they form an integral part of the school bus body construction and meet all fastening requirements.

(d) Side strainers used in basic construction at floor level and extending above floor line may be utilized as mounting base at wall line for rail-mounted seats.

(9) Rub rails.

(a) Body manufacturers shall install one rub rail at approximately seat level (except for opening for emergency door). This rail shall extend from the main vertical post behind the entrance door to the forwardmost vertical post on the left side of the body.

(b) A second rub rail shall be installed at approximately the floor line and cover the same longitudinal area as the seat level rail (except at wheel housings) and shall extend to the radii of right and left rear corners. A third rub rail installed on the lower edge of the body skirt is optional. If used, it shall be painted black.

(c) All rub rails shall be attached at each body post and all other upright structural members.

(d) All rub rails shall be four inches or more in width (after formed) and shall be a minimum of sixteen-gauge steel, corrugated or ribbed pattern.

(e) All rub rails shall be mounted outside body panels.

(f) External longitudinal members are permissible in addition to all previously specified members if they form an integral part of the body construction and meet the fastening requirements.

(10) Roof strainers - two or more roof strainers or longitudinal members shall be provided to connect, to reinforce flattest portion of roof skin, and to space roof bows. These strainers may be installed between roof bows or applied externally. They shall extend from the windshield header and are to function as continuous longitudinal roof members. At all points of contact between strainers or longitudinal members and other structural material, attachment shall be made by means of welding, riveting, or bolting.

(11) Rear corner reinforcements - rear corner construction of the bus body between the floor and window sill and between the emergency door posts and last vertical side posts shall consist of at least three structural members which will provide impact and penetration resistance equal to or greater than that provided by frame members in the sides of the body. Such structural members shall be securely attached at each end.

(12) Ceiling panel construction - if the ceiling is so constructed to contain lap joints, the forward panel shall be lapped by the rear

panel and the exposed edges shall be beaded, hemmed or flanged or otherwise treated to minimize sharp edges.

(13) All body components shall be designed and constructed so as to avoid the entrapment of moisture.

(G) Defroster.

(1) A defroster system shall be installed of sufficient capacity to keep windshield area, left front side window to rear of the driver's vision, and service door glass area free of condensation or ice under all possible combinations of pupil load and climatic conditions.

(2) Defroster system shall be capable of providing at least sixty per cent fresh air.

(3) Two adjustable six-inch auxiliary defroster fans shielded with small mesh metal or polypropylene guards shall be installed. Exception: type A school buses, one fan required.

(a) Fans shall be mounted to complement the defroster system used by the manufacturer.

(b) Auxiliary defroster fans shall be controlled individually by two speed switches located in the electrical control panel.

(H) Doors.

(1) Service doors.

(a) Service door shall be power or manually operated, under control of the driver, so designed as to afford easy release, and to prevent accidental opening. When manual lever is used, no parts shall come

together so as to shear or crush fingers.

(b) Manual door control mechanism shall be heavy-duty bearing type, adjustable for wear, noncorrosive, anodized steel, or equivalent.

(c) Service door shall be located on right side of bus opposite the driver and within the driver's direct view.

(d) Service door shall have minimum horizontal opening of twenty-four inches and minimum vertical opening of sixty-eight inches.

(e) Service door shall be split or folding type. Split-type door includes any sectional door which divides and opens outward.

(f) All door glass shall comply with current FMVSS 205. Glass in service door shall provide maximum area of visibility for operation of bus.

(g) All edges of service door shall be sealed by flexible rubber or equivalent material to prevent air from entering door entrance when closed.

(h) There shall be no safety rail or hand-holds mounted on the service door.

(i) There shall be a head bumper pad installed on the inside at the top of the entrance door. This pad shall be approximately four inches in width and extend across the entire top of the entrance door opening.

(j) Service door shall have suitable access for easy lubrication.

(k) Type A school bus may be equipped with a sedan-type door.

(2) Emergency doors.

(a) Emergency door shall meet FMVSS 217 and be designed to be opened from inside and outside of bus and shall be equipped with a fastening device which may be quickly released but is designed to offer protection against accidental release.

(b) Emergency door shall be equipped with slide bar-, cam- or gear-operated latch. Slide bar shall have minimum stroke of one inch. Emergency door latch shall be equipped with suitable electric plunger-type switch connected with buzzer located in driver's compartment. Switch shall be enclosed in metal case, and wires leading from switch shall be concealed in school bus body. Switch shall be so installed that plunger contacts farthest edge of slide bar in such manner that any movement of slide bar will immediately close circuit on switch and activate buzzer. A separate interior handle shall be provided to pull the door shut from the inside.

(c) Exterior door handle shall be of permanent hitch-proof design and mounted with enough clearance to permit opening without touching door surface.

(d) All emergency door openings shall be completely weather-stripped.

(e) Operation instructions for opening the door shall be lettered or decaled on the inside of the emergency door.

(f) There shall be no step-type mechanism in the use of the emergency door.

(g) No seat or chassis or body component shall be installed in the aisleway leading to the emergency door.
Exception: does not apply to type D bus.

(h) Emergency door shall bear words "EMERGENCY DOOR" both inside and outside in letters at least two inches high. Words shall be placed directly above the emergency door or on the upper portion of the door.

(i) Rear emergency door.

(i) On all buses, except rear-engine transits, an emergency door shall be located in the rear of the school bus body and centered with respect to the body.

(ii) Emergency door shall have a minimum horizontal opening of twenty-four inches and a minimum vertical opening of forty-eight inches measured from floor level.

(iii) Rear emergency door shall be hinged on right side and shall open outside.

(iv) The rear emergency door shall contain upper and lower glass panels which comply with FMVSS 205.

(v) Glass in emergency door shall provide maximum area of visibility for safe operation of school bus.

(vi) There shall be a head bumper pad installed over the emergency door on the inside of the school bus body. This pad shall be at least the width of the door opening. Padding shall be of the same material as the padding used over the service door exit.

(j) Side emergency door.

(i) On all rear-engine transit school buses, a side emergency door shall be located in the rear half of the left side of the bus body. The door shall be hinged on the front side.

(ii) The glass inside emergency door shall be one piece and compatible with the design of the side windows and shall contain glass which meets FMVSS 205.

(3) Emergency side window exits.

(a) All type A, B, C and D school buses shall be equipped with side window emergency exits.

(b) School buses with a rated capacity of less than fifty-three shall have one emergency swingout window on each side of the body.

(c) School buses with a rated capacity of fifty-three or greater shall have two emergency swingout windows on each side of the body.

(d) The emergency window shall meet FMVSS 205. Glass shall be tempered unless specified laminated by the purchaser.

(e) Emergency window shall bear words "EMERGENCY EXIT" in letters at least two inches high both inside and outside the window. Words shall be placed no more than three inches directly above window.

(f) Emergency window shall be equipped with a buzzer. When not fully latched, it shall actuate a signal audible to the driver. Buzzer shall be in the driver's compartment.

(4) Emergency windows type D rear-engine buses.

(a) An emergency window shall be installed above the engine compartment and shall be no smaller than sixteen inches in height and fifty-four inches in width.

(b) The emergency window shall meet FMVSS 205. Glass shall be tempered unless specified laminated by the purchaser.

(c) Windows shall be hinged from top and provided with a device to ensure against accidental closing during an emergency.

(d) Emergency window in rear shall be equipped with latch on the inside, and also be equipped with a handle of hitchproof design which will permit opening from the outside.

(e) Emergency window shall bear words "EMERGENCY EXIT" in letters at least two inches high both inside and outside the window. Words shall be placed no more than three inches directly above window.

(f) Emergency window shall be equipped with a buzzer. When not fully latched, it shall actuate a signal audible to the driver. Buzzer shall be in the driver's compartment.

(I) Emergency equipment - shall be mounted in the driver's compartment area in an accessible

location. Quick access to all emergency equipment shall be provided.

(1) Fire extinguisher - bus shall be equipped with at least one dry-chemical type fire extinguisher of at least five-pound capacity, twenty B.C. rating, mounted in a quick release type bracket and easily accessible from the driver's compartment. The extinguisher is to be equipped with a dial-type, graduated gauge, which indicates loss of pressure. Fire extinguisher shall be of the type that permits the dry-chemical case to be refilled by ordinary procedures. Fire extinguisher shall be equipped with metal head.

(2) First-aid kits shall be dustproof, plainly labeled and mounted in a location easily accessible to the driver. Minimum units for the school bus shall be as follows: a sixteen-unit kit shall be used on forty-two-passenger and smaller buses, and twenty-four-unit kits for forty-eight-passenger and larger buses.

(3) Contents of sixteen-unit first-aid kit:

2 units - 1" adhesive compress
2 units - 2" bandage compress
1 unit - 3" bandage compress
1 unit - 4" bandage compress
1 unit - 3" x 3" plain gauze pads
1 unit - 4" gauze roller bandage
2 units - plain absorbent gauze - 1/2 square yard
2 units - plain absorbent gauze - 24" x 72"
3 units - triangular bandages
1 unit - scissors, tweezers

(4) Contents of twenty-four-unit first-aid kit:

3 units - 1" adhesive compress
3 units - 2" bandage compress
2 units - 3" bandage compress

1 unit - 4" bandage compress
1 unit - 3" x 3" plain gauze pads
2 units - 4" gauze roller bandage
4 units - plain absorbent gauze - 1/2 square yard
3 units - plain absorbent gauze - 24" x 72"
4 units - triangular bandages
1 unit - scissors, tweezers

(5) Reflectors - three triangle reflectors with weighted stands shall be properly encased for easy storage. Six fusee, thirty-minute type, shall be encased with the triangle reflectors. The triangle reflections shall meet FMVSS 125. The reflectors and fuses shall be encased together in a heavy duty container. The lockable metal bracket shall be provided to hold these items. The bracket shall be mounted within easy access of the driver.

(6) Wrecking bar - one twenty-four-inch wrecking bar shall be required.

(J) Floor covering.

(1) All floor covering shall be permanently bonded to the floor and must not crack or lose its adhesive power when vehicle is subjected to sudden changes in temperature. Bonding or adhesive material shall be waterproof and recommended by the manufacturer of the floor covering material.

(2) Underseat areas shall have a smooth fire-resistant floor covering having a minimum overall thickness of one-eighth inch. The entire joint between the floor covering and the wall of the school bus body shall be covered with a curved, fitted, rustfree metal molding or preformed interior panel.

(3) Driver's compartment floor area shall be of the same quality material as the underseat

floor covering. It shall be permanently bonded to the floor. Floor mat is not acceptable.

(4) Center aisle covering shall be fire-resistant rubber, nonskid, wear-resistant and ribbed. Minimum thickness shall be one-hundred-eighty-seven-thousandths inch measured from the top of the ribs.

(5) The transmission inspection plate:

(a) Shall be installed for easy access and servicing of the clutch and transmission installed above the regular floor covering when possible; and

(b) Shall not be undercoated.

(6) Brake, gear shift, and accelerator boots supplied by the chassis manufacturer shall be installed by the school bus body manufacturer.

(7) Metal molding or stripping.

(a) Metal stripping or molding shall cover all floor-covering joints between the ribbed center aisle and smooth underseat floor covering.

(b) Cove molding is required at the junction of the floor covering and side wall. Molding may be formed to the side wall panel or separate cove base.

(c) Molding around the wheelwell and floor covering shall be provided to seal floor covering with the wheelwell.

(8) Accelerator boot will be used around the accelerator rod passing through the toe board or floor board to prevent fumes or dust from entering the driver's compartment.

(9) Entrance step treads, including the edge at floor level, shall be of the same quality as

the aisle material and shall be formed with a minimum turndown lip of three-fourths inch. Step treads shall have an integral white, yellow, or orange nosing of one and one-half inch or more or use diagonal stripes. Treads shall be permanently bonded to the metal steps and sealed to prevent water from getting underneath the step tread.

(10) A fuel access plate shall be installed for easy access to fuel gauge mechanism and shall be installed above the regular floor covering when possible. The access plate shall not be undercoated. Panel shall be identical to floor material in thickness and coating and shall be sealed to prevent any leakage or moisture. Interior shall not be undercoated. exception: type A AND B school buses.

(K) Fuel opening - the fuel fill opening in the body skirt shall be equipped with a hinged cover held closed by a spring or other conveniently operated device. The mechanism that holds this cover closed shall be sufficient to keep it closed under severe operating conditions. The fuel fill opening shall be large enough to permit the entire pump nozzle to pass through the opening and reach the fill neck of the fuel tank. Exception: type A and B school buses.

(L) Heaters.

(1) All school buses shall be equipped with two or more hot water heaters capable of maintaining inside temperature of fifty degrees Fahrenheit with one hundred fifty degrees Fahrenheit of water being delivered to the system at a rate of six gallons per minute using an ambient temperature of zero degrees to ten degrees Fahrenheit.

(2) Conventional-type buses shall be equipped with a right and left front heater with an integrated defroster system of a capacity to provide heat for the front part of the bus,

driver's compartment, to keep the windshield area, service door glass, driver's left glass area and stepwell clear of moisture, ice and snow.

(3) Type D transit-type buses shall be equipped with front heater(s) with integrated defroster system of sufficient capacity to provide heat for the front part of the bus and the driver's compartment, to keep windshield area, driver's left glass area, service door glass area and stepwell clear of moisture, ice and snow.

(4) Hot water heaters shall bear the name plate rating in accordance with the standard code for testing and rating automotive bus hot water heater and ventilating equipment.

(5) A third heater is required on all sixty- and larger capacity buses and is to be mounted to the rear of the rear wheelwell.

(6) Two-speed switches shall operate all heater fans independently.

(7) All hot water lines shall be a minimum of one inch inside diameter and shall be enclosed.

(8) Heater cores and fans shall be completely encased, but designed to permit servicing heating assembly by removing all or part of case.

(9) Heater hose installation in the engine compartment shall include two brass shut-off valves able to shut-off coolant completely when necessary.

(a) One shut-off valve shall be mounted between the water pump outlet and heater hose connection.

(b) One shut-off valve shall be mounted between the motor block and the return heater hose connection.

(10) The body manufacturer shall add the required amount of permanent ethylene-glycol base anti-freeze after heaters have been connected to protect cooling system of the school bus to minus twenty degrees Fahrenheit tested at normal engine temperature.

(11) There shall be a heater water-flow regulating valve installed for convenient operation when the driver is in a normal seated position.

(M) Identification - body shall bear the following words:

(1) "SCHOOL BUS" in black letters at least eight inches high on both front and rear of body. Lettering shall be placed as high as possible without impairment of visibility.

(2) "STOP" on the rear of the school bus in letters approximately ten inches high on the door or the center of the school bus.

(3) "STATE LAW" on the rear in letters at least five inches high below "STOP" on the door or the center of the school bus.

(4) Name of the school district shall appear on both sides of the vehicle at the belt line and be at least five inches high.

(5) County of the school district shall appear on both sides of the vehicle in five-inch letters with the school district name unless the city or exempted village appears as a part of the district name. City or exempted village districts that are not geographical locations must also list the name of the county.

(6) Ownership of the vehicle shall appear on the entrance door side in two-inch high letters.

(7) District-assigned school bus numbers shall be

five inches high and shall be located as follows:

(a) Bus number shall be located on body of the bus above the entrance door.

(b) Bus number shall be on the rear of the bus in the area of the right side of the taillight.

(c) Bus number shall be on the left side of the bus in the vicinity of the driver's window.

(d) Bus number shall be on the front of the bus in the area designated by the buyer.

(N) Inside heights - inside body height shall be nominal, seventy-two inches or more measured metal-to-metal at any point on longitudinal center line from front vertical bow to rear vertical bow.

(O) Insulation.

(1) Bus body shall be fully insulated in the roof and all body panels to deaden sound, reduce vibrations and heat transfers. Insulation one-inch minimum thickness in addition to the usual sprayed-on material shall be a fiber-glass or equal and fire-resistant material.

(2) A plywood floor shall be applied on top of the steel floor. Floor covering shall be applied on top of the plywood. Plywood shall be five-eights of an inch thick five-ply CD exterior grade. Plywood shall extend to firewall and under the driver's seat. Plywood shall be sanded and vacuumed before covering is applied. Waterproof sealing material shall be applied to seams in the sections of plywood floor. Plywood shall be four feet by eight feet sections, pieced only as necessary. Drawings shall be provided which show how the plywood is to be installed.

Clarification - waterproof sealing applied on top of the plywood to hold the floor covering is considered as one method of sealing the seams in the plywood floor. This method is acceptable.

(P) Interior.

(1) Interior of the school bus shall be free of all projections.

(2) All school buses shall require inner linings on ceiling and walls and shall include sound abatement package in the driver area.

(Q) Lamps and signals - all lamps herein listed and their installation shall conform to current standards and recommendations of the "Society of Automotive Engineers" and meet FMVSS 108.

(1) Construction of components.

(a) All lamps, reflectors and their installation shall conform to federal motor vehicle safety standards where applicable, S.A.E. J887, and national minimum school bus standards where not covered by federal standards or additional requirements stated herein.

(b) Directional signal, stop light, tail-light, marker light, clearance light, identification light, backup light and reflector lenses shall be of acrylic plastic. Alternately flashing red and amber signal lamps shall be sealed beam of acrylic plastic lens construction. Body-mounted stop lamps, directional signals and red signal lamps shall be visible throughout one hundred eighty degrees.

(c) All exterior lamp sockets shall be zinc-plated or chromated steel, or other suitable noncorrosive materials such as plastic or stainless steel.

(d) Alternately flashing red signal lamps, body-mounted directional signals and stop lamps shall be grounded by attaching a ground wire or strap from the lamp socket or negative side of the bulb to the school bus body or ground wire included in the wiring.

(e) Wiring shall conform to current S.A.E. standards. A body load disconnect solenoid of one-hundred ampere continuous duty shall be supplied and installed so that when the ignition switch is in the off position all body electrical circuits will be inoperative except the directional signals, hazard warning, stop light, backup light, marker, clearance, identification, and head lamp circuits.

(2) Additional requirements.

(a) The service doorstep well light shall be wired with the marker light circuit and activated by a switch controlled by the service door. On type C bus the light shall be a minimum of ten candlepower. (Weldon No. 3-8025-1400 stepwell light or equivalent.)

(b) Interior dome lights shall be provided and activated whenever the rear emergency door is opened, or when activated by independent switch or switches. Dome lights shall be equipped with plastic or shatterproof lens.

(c) Combination stop and tail lamps: each bus shall be equipped with two combination stop and tail lamps. These shall have double filament lamp bulbs. These shall be connected to the brake-operated stop lamp circuit.

(d) Each bus shall be equipped with two combination stop and tail lamps with a diameter of not less than seven inches with plain red lens, emitting red light plainly visible from a distance of five hundred feet to the rear. These lamps shall be as high as practicable but below the window line and spaced as far apart laterally as practicable, but not less than three feet. Measurements shall be taken from lamp centers. The stop lights are to be activated by the brake switch.

(i) These lamps are to use double-contact bulbs.

(ii) These lamps are to have a red lenses approximately seven inches in diameter.

(iii) Grounding instructions: the socket of these stop lamps shall be grounded separately, either by use of a wire with one end permanently affixed to the socket and the other end affixed to the lamp base or bus body metal or by the use of a lamp socket flange grounded to the bus body metal by a screw or bolt.

(e) Directional signals.

(i) Front, side, and rear directional signals shall be wired to operate properly with the front directional signals supplied by the chassis manufacturer on all conventional-type school buses. Transit-type school buses shall have front, side, and rear directional signals installed by the school bus body manufacturer.

(ii) School bus body manufacturer shall install required signal lamps to the

directional signal control switch so all directional signal lamps shall be operative. The directional signal system shall be installed on an integral part of the hazard warning signal switch activated by an independent switch furnished by the chassis manufacturer.

(iii) Color of lenses shall be amber. All front and rear directional signals installed by the body manufacturer shall be at least seven inches in diameter. Side directional signals shall be armor protected.

(f) Warning lamp control switches - a warning control switch shall be provided to operate the warning signals. The warning control shall include one manual switch, one master switch, one door control switch which will close the warning light circuit when the door is open, and an indicator lamp to show when the master switch has been activated.

(g) Two backup lights are required and shall be mounted on or below the belt line on the school bus body. Backup lights shall conform with FMVSS 108. These lamps shall have a white lenses at least seven inches minimum in diameter and shall be thirty-two candle power.

(3) School bus alternately flashing warning signal lamp.

(a) Each school bus body shall be equipped with a system of four red signal lamps and four amber signal lamps. Both red and amber lamps shall be installed in accordance with S.A.E. J887.

(i) Each amber signal lamp shall be located near each red signal lamp, 25 at the same level but closer to the vertical centerline of the bus; and

(ii) The system shall be wired so that the amber signal lamps are activated only by a manual switch, and if activated, are automatically deactivated when the bus entrance door is opened.

(b) These lamps shall flash at a designed rate from sixty to one hundred twenty cycles per minute.

(c) Operation of warning lights and stop arm system.

(i) With the entrance door closed, activate manual start switch. The amber pilot light and amber warning lights flash.

(ii) When the entrance door handle is moved toward the open position, the amber pilot and amber warning lights go off and red pilot and red warning lights flash. Stop arm is automatically extended and lights on the stop arm flash.

(iii) Close entrance door. All lights go out and the stop arm retracts automatically. The entrance door switch that activates the red lights in the eight-light system shall be located in a position or shall be protected by a cover or guard that will prevent the likelihood of this switch being activated or deactivated by pupils boarding or leaving the bus.

(iv) With master switch closed, open the entrance door. Red lights flash and the stop arm extends.

(v) With the entrance door open, depress the manual push button. The red pilot and red warning lights flash. The stop arm is automatically extended and the lights on the stop arm flash.

(vi) Both the amber pilot light and the red pilot lenses shall be approximately one-half inch in diameter. These pilot lights shall be installed in a position clearly visible to the driver.

(vii) An emergency system for extending the stop arm and flashing the red Warning lights on the bus body and the stop arm shall be installed on each bus body.

(A) An emergency override switch shall be installed in the bus body electrical accessory panel in an area isolated from the other switches. This switch shall be installed with a standard switch identification decal with the Words "WARNING LIGHTS" or "EMERGENCY WARNING LIGHTS."

(B) This system shall operate the red flashing lights, extend the stop arm, and Pperate the red pilot light.

(d) Installation requirements.

(i) Each flashing signal lamp shall be mounted with its axis substantially parallel to longitudinal axis of vehicle.

(ii) Front and rear alternately flashing signal lamps shall be spaced as far apart laterally as practicable.

(iii) Alternately flashing signal lamps shall be mounted at the front above the windshield and at the rear so that the lower edge of the lens is not lower than the top line of the side window.

(iv) Vertical and lateral vision of the front and rear alternately flashing warning lights shall not be obstructed by any part of the body of the lamphouse insofar as standard bus body construction will permit.

(v) A square or rectangular area around the lens of each alternately flashing signal light and extending outward approximately three inches shall be painted black. In installations where there is no flat vertical portion of the body immediately surrounding the entire lens of the lamp, a square or rectangular band of black, approximately three inches wide, immediately below and to both sides of the lens, shall be painted on the body or roof area against which Signal light is seen from a distance of five hundred feet along the axis of the vehicle.

(4) School bus body lamps and reflectors - all lamps and reflectors shall comply with FMVSS 108 - clearance lamps.

(a) Body shall be equipped with a red armored clearance lamp at each of the rear corners and an amber armored clearance lamp at each of the front corners. These lamps shall be mounted at the highest and widest position on these corners.

(b) Body shall be equipped with an amber armored intermediate or mid-body marker or clearance light on both sides. These lamps shall be mounted in accordance with FMVSS 108.

(c) Armored clearance lamps shall conform to S.A.E. code PC. Lamps shall be equal to Weldon no. 5050 with armor. Bulbs in these lamps shall be a minimum of five-thousand-hour bulbs with a four-candle power illumination.

(d) These clearance lamps shall be connected to the chassis headlight circuit and shall be activated by the chassis headlight switch.

(R) Mirrors.

(1) Interior clear-view mirror shall be at least six by thirty inches overall. Mirror shall be metal-backed and framed and shall be of safety glass. It shall have rounded corners and protected edges. Exception: type A buses - the mirror may be six by sixteen inches.

(2) Two heated adjustable driver exterior side-view mirror systems shall be provided, one on the left and one on the right of the driver. The brackets used for the mirror systems shall minimize mirror vibration and give the driver an unobstructed view of all exterior mirrors through the portion of the windshield cleared by the windshield wipers. Exception: type A, B and D buses -- mirrors may be mounted to give the driver the best possible view through the side windows if necessary.

The exterior side view mirror systems shall meet all federal standards including FMVSS 111, and shall provide a field of view from behind the entrance door to the rear-most part of the school bus. The mirror system shall also make the area from the top of the side windows to the ground clearly visible to the school bus driver. Any object or twelve-inch traffic cone located within six inches of the rear dual wheels shall be visible and clearly identifiable to the seated school bus driver on either side of the bus.

(3) Each type B and C school bus will be equipped with a fender and/or forward mounted system of heated convex mirrors that will provide the seated driver with indirect observation of the front bumper and the area in front of the front bumper of the bus not under direct observation of the seated driver. Mirror system shall include a clear view around the front wheels and shall include the area from the front bumper back to the entrance door on the right and from the front bumper to the driver's window on the left side of the bus.

(4) Two convex mirrors measuring not less than seven and one-half inches in diameter shall be mounted on all transit type D school buses. One will be mounted on each front corner of the bus in such a manner that the seated driver may observe all areas in front of the bus where direct observation is not possible.

(5) Two convex mirrors measuring not less than seven and one-half inches in diameter shall be mounted on all transit type D school buses, one on each front corner, in such a manner that the seated driver may observe the areas along each side of the bus from the front corner to the rearmost part of the bus.

(S) Mounting, body on chassis.

(1) Insulating material shall be placed between all main cross-sill and intermediate members. Insulating material shall be at least one-fourth inch thick and shall be attached to chassis frame or body members so that the body will not move under severe operating conditions.

(2) Chassis frame shall extend to rear edge of rear body cross member.

(3) Bus body shall be attached to chassis frame in such a manner as to prevent shifting or separation of the body from the chassis under severe operating conditions.

(4) Body front shall be attached and sealed to the chassis cowl in such a manner as to prevent entry of moisture.

(T) Mud flaps - all buses shall be equipped with two front fender mud flaps and two rear mud flaps.

(U) Openings - all openings created in mounting of bus body to chassis shall be sealed by body manufacturer to prevent entrance of gases, dust or moisture into passenger and driver compartments.

(V) Overall length - overall length of a school bus shall not exceed forty feet.

(W) Overall width - overall width of the school bus shall not exceed ninety-six inches.

(X) Seat belt and upper torso restraint system for driver.

(1) A locking retractor-type seat belt for driver shall be provided. Belts shall be equipped with protective boots of sufficient quality and strength to keep it retracted and off the floor and within easy reach of the driver. Belt shall be adjustable on one side only and keep the driver from sliding sideways under the belt.

(2) Belt and emergency locking retractor upper torso restraint shall be installed in compliance with current federal and S.A.E. standards.

(3) An emergency locking retractor upper torso restraint shall be provided and work in unison with the seat belt.

(Y) Driver's seat.

(1) Minimum distance between steering wheel and back rest of driver's seat shall be eleven inches. Driver's seat shall have vertical adjustment of not less than four inches and horizontal adjustment of not less than four inches. Exception: type A and B school bus.

(2) All sewing on cushions and backs shall be single-stitched, with a minimum of number twelve four-ply glaze finish thread of the best grade or its approved equal. Seams in cushions and seat backs shall be forty-two-ounce or equivalent material strength as upholstery.

(Z) Passenger seats.

(1) All seating and restraining barrier design and construction must meet the provisions of FMVSS 222 (school bus seating and crash protection). All seat back barriers must be a minimum of twenty-eight inches in height, as measured from the intersection of the forward surface of the seat back and the undepressed surface of the seat cushion. The top surface of the barriers shall be the same height as the top surfaces of the seat backs.

(2) All seats shall have a minimum depth of fifteen inches.

(3) All seats shall be forward-facing.

(4) Rear-engine transit-type D school buses shall be equipped with one jump seat. Such seat will be located only immediately adjacent to side emergency exit(s) and shall conform to all applicable federal standards.

(5) Seats shall be mounted so as to provide a minimum of thirty-six-inch headroom for sitting position above the top of undepressed cushion line of all seats. Measurement shall be made vertically not more than seven inches from side wall at cushion height and at fore-and-aft center of cushion.

(6) Seat construction.

(a) Backs of all seats shall be the same width at the top and same height from floor, also slanting at the same angle with the floor.

(b) Seat, seat back cushion and crash barrier shall be covered with flame-barrier fire-retardant seating material. Such material must pass the "Boston Brown Bag" test. Flame-barrier fire-retardant seating material shall meet the following criteria:

(i) The flames will not spread to seat back in front of the fire.

(ii) The flames on the rear seat will self-extinguish.

(iii) The flame barrier seating material will successfully prevent the underlying padding material from being exposed to the flames.

(c) Padding - all seat backs and rails shall be covered with energy-absorbing material as required by FMVSS 222.

(d) A passenger seat cushion retention system shall be employed to prevent the passenger seat cushion from disengaging from the seat frame in the event of an accident. Each seat cushion retention system shall be capable of withstanding a vertical static load equal to a minimum of five times the weight of the cushion. The system shall also be capable of withstanding a forward or rearward static load equal to twenty times the weight of the cushion.

(e) Type A school bus. A barrier/padded guard panel shall be placed forward of all seats not having another passenger seat in front of it.

(AA) Steps - service door.

(1) The first step of the service door shall be not less than twelve inches and not more than sixteen inches from the ground.

(2) Service door entrance shall be equipped with three steps. Risers in each case shall be approximately equal. Exception: type A and B buses.

(3) Steps shall be enclosed to prevent accumulation of ice and snow.

(4) Steps shall not protrude beyond side body line.

(5) Grab handles of maximum length but not less than ten inches long shall be installed on both sides of the interior step well area. These handles shall be stainless-steel clad. Both grab handles must be securely fastened. Exception: grab handles not required on type A school buses. On type B school buses, grab handles may be mounted on jackknife door.

(6) Surface of steps shall be of nonskid material.

(a) Steps shall be covered with first-quality step-covering material which shall have nonskid characteristics and be of ribbed or corrugated design. Step covering shall have a turned-down nosing of a contrasting color of either white, yellow, or bright orange.

(b) Step covering shall be securely fastened to the steps in a manner that will minimize tripping. This requires that the heads of mounting screws or bolts be below the top surface of the step tread.

(BB) Access steps.

(1) Steps shall be installed on each side of the school bus to allow access to windshield for cleaning. Exception: access steps not required on type A school buses.

(2) Grab handles shall be securely mounted in a suitable position. Exception: grab handles not required on type A school buses.

(CC) Sun visor.

(1) The school bus shall be equipped with at least one interior adjustable transparent sun visor, folding type, which is a minimum of six by thirty inches in size. Exception: type A school bus.

(2) A right sun visor which is at least six by sixteen inches in size is permitted. Exception: type A school bus.

(DD) Rustproofing - entire underside of bus body including floor section, emergency and entrance doors, cross member, below floor-line side panels, cowl area, metal fenders or fenders with metal liners shall be coated with commercial-grade

asbestos-free rustproofing compound for which compound manufacturer has issued notarized certification of compliance to bus body builder that compound meets or exceeds all performance and qualitative requirements of paragraph 3.4 of federal specification TT-C-520B using modified field test procedures for following requirements:

(1) Salt spray-resistance pass test modified to five per cent salt and one thousand hours.

(2) Pass abrasion-resistance.

(3) Pass fire-resistance.

(4) Rustproofing compound shall be applied with suitable airless or conventional spray equipment to a thickness recommended by the product manufacturer and shall show no evidence of voids in cured film.

(5) Any openings drilled for rustproofing operations shall be plugged except in cases where a solvent system is used.

(EE) Ventilation - body shall be equipped with a suitable controlled ventilating system of sufficient capacity to maintain a satisfactory ratio of outside-to-inside air under operating conditions without opening of windows except in extremely warm weather.

(FF) Wheel housings.

(1) Wheel house shall be attached to floor components in such a manner to prevent water, dust or fumes from entering the bus body.

(2) Wheel house openings shall allow for easy tire removal and service.

(3) Inside height of wheel housing above floor line shall not exceed ten inches.

(4) Wheel housing shall provide clearance for dual wheels as established by the "National Association of Chain Manufacturers."

(GG) Windshield and windows.

(1) All glass in windshield windows and driver's windows shall be approved safety glass with A.S.A. "one" rating or better, as specified by the "American Standards Association."

(2) Glass in windshield shall be heat-absorbent, laminated plate. Windshield shall be large enough to permit the driver to see the roadway clearly, installed to reduce glare, and be installed between front corner posts that are designed and placed to provide maximum visibility for the driver.

(3) Window at the left of the driver shall be A.S.A. "one" or better and capable of opening, equipped with a lock-type closure.

(4) Windshield shall have horizontal gradient band starting slightly above line of driver's vision and gradually decreasing in light transmission to twenty per cent or less at the top of the windshield. Windshield may be fully tinted in lieu of above.

(5) Glass in all side windows and doors shall be of A.S.A. "two" or better grade, as specified in the "American Standard Code Z26.1." All A.S.A. "two" glass shall be tempered unless specified laminated by the purchaser.

(6) Each side window shall be double sash and provide unobstructed emergency opening at least nine inches high and twenty-two inches wide obtained by lowering the upper sash.

(7) Individual windows shall not have a vertical opening greater than twelve inches. Stops shall be installed where needed to obtain this dimension.

(8) All exposed edges of glass shall be banded.

(HH) Windshield wipers.

(1) Bus body to be equipped with two heavy-duty parallelogram-type windshield wipers. Parallelogram-type windshield wipers are required after January 1, 1991. Until then, conventional-type wipers are permitted. Exception: type A and B school bus.

(2) Each windshield wiper to be operated by a separate electric motor. Exception: type A school bus.

(3) Each windshield wiper motor to be operated by a separate electric switch properly identified. Exception: type A school buses.

(4) Switches shall provide for two-speed operation.

(5) The windshield wiper motor or motors shall have sufficient power and the wiper arms and blades shall be of sufficient length to provide the largest cleaning area possible.

(6) Wiper blades shall be a minimum of sixteen inches in length. These blade holders shall be the type that require only the replacement of the rubber blade.

(7) The left-side windshield wiper shall be so positioned that the approximate center of the wiped area will be directly in front of the driver in a normal seated position. The right-side windshield wiper shall be so positioned that the wiped area will provide the driver with maximum vision to the right in a normal seated position.

(II) Windshield washers (electric).

(1) The school bus body shall be equipped with an electrically operated windshield washer by which a stream of washing fluid is directed to both sides of the windshield in the approximate center of the wiped area.

(2) The windshield washer fluid reservoir shall have a minimum capacity of two quarts in a rigid plastic container. It shall be mounted in a position readily accessible for refilling.

(3) This washer shall be operated by a separate switch properly identified. This switch shall be easily reached by the driver in a normal seated position.

(JJ) Wiring.

(1) All wiring shall conform to current S.A.E. standards. All wires shall be coded and numbered as required by the "National School Bus Minimum Standards" book. Wiring diagrams must be made available to school districts upon request.

(2) Circuits.

(a) There shall be no less than eight regular circuits, as follows:

(i) Head, tail, stop (brake), and instrument panel lamps.

(ii) Clearance lamps - step well.

(iii) Dome.

(iv) Starter motor.

(v) Ignition and emergency door signal.

(vi) Turn signal lamps.

(vii) Alternately flashing red and amber signal lamps

(viii) Horn.

(b) Any of the above combination circuits may be subdivided into additional independent circuits.

(c) Whenever heaters and defrosters are used, at least one additional circuit shall be installed.

(d) Whenever possible, all other electrical functions, such as sanders and electric-type windshield wipers, shall be provided with independent and properly protected circuits.

(e) Each body circuit shall be color-coded and a diagram of the circuits shall be attached to the body in a readily accessible location.

(3) A separate fuse or circuit breaker shall be provided for each circuit except starter motor and ignition circuits.

(4) All wires within body shall be insulated and protected by a covering which will protect them from external damage and minimize dangers from short circuits. Whenever wires pass through body members, additional protection in form of appropriate type of insert shall be provided.

(5) Wires not enclosed within body shell shall be fastened securely at intervals of not more than twenty-four inches. All joints shall be soldered or joined by equally effective connectors.

(KK) Stop arm sign-specifications.

(1) All school buses shall be equipped with an octagonal "stop" sign. The background shall be a minimum of eighteen inches in height and eighteen inches in width and shall be reflective material red in color with white lettering. The sign shall be so mounted as to not interfere with the driver's vision to the rear when the sign is extended. The standard octagonal sign shall contain two flashing red lamps which are visible from both sides of the extended sign. Strobe lights are optional and should be used only as warranted.

(2) The word "stop" shall be reflective white letters. The signal shall be manual, vacuum, electric or air-power-controlled and so constructed as to lock in extended and closed position. The signal shall be approved by the assistant director, pupil transportation section, division of school finance, Ohio department of education.

(3) The stop arm shall operate when the service door is opened and when the red flashing warning lights come on during the warning light cycle.

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-04 School bus body and chassis with a manufacturer's rated seating capacity of sixteen through thirty-six passengers.

(A) School buses of this rated capacity shall meet all requirements of rules 3301-87-01 to 3301-87-03 of the Administrative Code with the following modifications.

(B) Chassis.

(1) Axle.

Seating Rows	Capacity	Wheel Base Inches	Front Axles GVWR Pounds	Rear Axles GVWR Pounds
4	16-20	125	3,400	6,000
4	16-24	125	4,000	6,000
4-5	22-30	133	4,000	8,000
5-6	26-36	157	4,000	10,000

(2) Brakes.

(a) Service brakes shall be hydraulic power-assisted.

(b) Disc-type brakes are permitted.

(c) Parking brake - manual - manufacturer's standard.

(3) Bumpers - front, chassis manufacturer's standard, painted black.

(4) Electrical system (see paragraph (J) of rule 3301-87-02 of the Administrative Code.)

(5) Engine - not less than three hundred cubic inches.

(6) Exhaust system - manufacturer's standard.

(7) Fenders - manufacturer's standard, painted national school bus yellow.

(8) Fuel tank - manufacturer's standard.

(9) Governor.

(a) All school buses rated below thirty-six-passenger capacity may be equipped with a road and engine speed governor. Such governor shall be set at fifty-five miles per hour maximum.

(b) Road and engine speed control shall be equal to or exceed the performance of model RSC2-5 manufactured by "Sturdy Controls Division, 1839 Carolina Beach Road, Wilmington, North Carolina 28401."

(c) Road speed control may be installed and set prior to delivery of vehicle to purchaser.

(10) Transmission.

(a) Manual - three speeds forward, one reverse.

(b) Automatic (optional) - three speeds forward, one reverse.

(C) School bus body.

(1) Heaters - two required, one front and one rear.

(2) Interior height - minimum sixty inches.

(3) Windshield washer - fluid capacity, two quarts minimum in a rigid plastic container.

(4) Windshield wipers - wiper blade length shall be the maximum possible for the windshield.

(D) All seats shall provide each passenger with not less than thirteen inches of rump room.

3301-87-04

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies R.C. 4511.76
Prior effective dates: 11/1/71,
4/1/78,
7/1/88

3301-87-05 School bus body and chassis with manufacturer's rated seating capacity of ten through fifteen passengers.

(A) School buses of this rated capacity shall meet all requirements of rules 3301-87-01 to 3301-87-04 of the Administrative Code with the following exceptions.

(B) Chassis.

(1) Axles - GVWR.

(a) Front - three thousand one hundred GVWR.

(b) Rear - five thousand three hundred GVWR.

(2) Alternator - see paragraph (J) of rule 3301-87-02 of the Administrative Code.

(3) Battery - see paragraph (C) of rule 3301-87-02 of the Administrative Code.

(4) Brakes - manufacturer's standard, disc brakes permitted.

(5) Fuel tank - manufacturer's standard.

(6) Governor - road and engine speed governor required and to be set not to exceed fifty-five miles per hour.

(7) Instruments - manufacturer's standard.

(8) Tow hooks - not required.

(9) Fiberglas panels permitted on type A buses between sedan entrance door and chassis window post and other areas with written permission from assistant director, division of school finance, pupil transportation section, Ohio department of education.

(C) Body.

(1) Heaters - two heaters required. Second heater to be installed near the rear of the bus.

(2) Inside height - sixty inches minimum.

(3) Turn signals - manufacturer's standard.

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule amplifies: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-06 School buses used to transport handicapped pupils.

(A) General requirements.

(1) School buses designed for transporting children with special transportation needs shall comply with rules 3301-87-01 to 3301-87-05 of the Administrative Code when applicable.

(2) School buses designed for transporting children with special transportation needs shall comply with school bus "Federal Motor Vehicle Safety Standards" as applicable to their GVWR category.

(3) Any school bus that is used for the transportation of children who are confined to a wheelchair and/or other restraining devices which prohibit use of the regular service entrance shall be equipped with a power lift.

(4) Lift shall be located on the right side of the body, in no way attached to the exterior sides of the bus, but confined within the perimeter of the school bus body when not extended.

(B) Aisles - all aisles leading to the emergency door(s) from the wheelchair area shall be of sufficient width (minimum of thirty inches) to permit passage of maximum size wheelchair.

(C) Fastening devices.

(1) Wheelchair securement devices shall be provided and attached to the floor or walls or both to enable securement of wheelchairs in the vehicle. The devices must be of the type that require human intervention to unlatch or disengage. The fastening device shall meet random static testing forces equal to six thousand plus pounds each on the rear

assembly, two thousand plus pounds each on the front assembly, and six thousand plus pounds each on the floor attachment assembly. There shall be tightening clamps on both front and both rear assemblies. All components must be dynamically tested at thirty miles per hour, twenty G force conditions with an impact sled at a recognized test facility on both a standard wheelchair and a battery-powered electric chair.

(2) Additional fastening devices may be needed to restrain the student due to the many different chair configurations.

(D) Glazing - windows may be tinted. Such tinting shall meet the applicable state laws.

(E) Heaters - an additional heater(s) may be installed in the rear portion of the bus behind the wheelwells. Auxiliary fuel-fired heaters are permitted. (See approved options in paragraph (F) of rule 3301-87-10 of the Administrative Code.)

(F) Identification - buses with wheelchair lifts used for transporting physically handicapped children may display universal handicap symbols located on the front and rear of the vehicle below the windowline. Such emblems shall be white on blue, shall not exceed twelve inches in size, and may be reflective.

(G) Occupant restraint - wheelchair.

(1) A system of positive occupant restraint shall be provided that secures the occupant.

(2) The lap belt shall be attached to the vehicle or to the wheelchair securement fastening devices.

(3) The upper torso restraint may be provided and attached to the vehicle and/or the wheelchair securement fastening devices.

(4) The lap belt and upper torso restraint must be installed pursuant to FMVSS 209 and 210.

(H) Power lift.

(1) Lifting mechanism shall be able to lift minimum payload of eight hundred pounds. A clear opening and platform to accommodate a thirty-inch-wide wheelchair shall be provided.

(2) 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 in the door.

(3) Controls shall be provided that enable the operator to activate the lift mechanism from either inside or outside of the bus. There shall be a means of preventing the lift platform from falling while in operation due to a power failure.

(4) Power lifts shall be so equipped that they may be manually raised in the event of power failure of the power lift mechanism.

(5) Lift travel shall allow the lift platform to rest securely on the ground.

(6) All edges of the platform shall be designed to restrain wheelchair and operator's feet from being entangled during the raising and lowering process.

(7) Platform shall be fitted on both sides and rear with full-width shields which extend above the floor line of the lift platform.

(8) A restraining device shall be affixed to the outer edge (curb end) of the platform that will prohibit the wheelchair from rolling off the platform when the lift is in any position other than fully extended to ground level.

(9) A self-adjusting skid-resistant plate shall be installed on the outer edge of the platform to minimize the incline from the lift platform to the ground level. This plate, if so designed, may also suffice as the restraining device explained in paragraph (H)(8) of this rule. The lift platform must be skid-resistant.

(10) A circuit breaker shall be installed between power source and lift motor if electrical power is used.

(11) The lift mechanism shall be equipped with adjustable limit switches and/or by-pass valves to prevent excessive pressure from building in the hydraulic system when the platform reaches the full up position or down position. If the lift is not powered down, mechanism shall be designed to cause a slow descent of platform to ground level. Rapid descent of lift is not acceptable.

(12) An actuating switch shall be installed in the circuit to prevent the lift mechanism from operating when doors are closed.

(13) Lift structure must have adequate padding and barriers for passenger protection.

(I) Regular service entrance.

(1) In type C and D buses there shall be three step risers, of approximately equal height, in the entrance well.

(2) An additional fold-out step may be provided which will provide for the step level to be no more than six inches to ground level.

(J) Restraining devices - seat frames may be equipped with attachments and/or devices to which belts, restraining harnesses, and/or other devices may be attached.

(K) Seating arrangements - flexibility in seat spacing to accommodate special devices shall be permitted due to the constant changing of passenger requirements.

(L) Special light - lights shall be placed inside the bus to sufficiently illuminate lift area and shall be activated when the door is opened.

(M) Special service entrance.

(1) Bus bodies may have a special service entrance constructed in the body to accommodate a wheelchair lift for the loading and unloading of passengers.

(2) The opening to accommodate the special service entrance shall be at any convenient point on the right (curb side) of the bus.

(3) The opening may extend below the floor through the bottom of the body skirt. If such an opening is used, reinforcements shall be installed at the front and rear of the floor opening to support the floor and give the same strength as other floor openings.

(4) The opening, with doors open, shall be of sufficient width and depth to allow the passage of wheelchairs. The minimum clear opening shall be thirty inches in width.

(5) A drip molding shall be installed above the opening to effectively divert water from the entrance.

(6) Entrance shall be of sufficient width and depth to accommodate various mechanical lifts and related accessories as well as the lifting platform.

(7) Door posts and headers from entrance shall be reinforced sufficiently to provide support and strength equivalent to the areas of the side of the bus not used for service doors.

(8) A head bumper pad shall be installed above the lift door and/or on the lift frame.

(N) Special service entrance doors.

(1) A single door may be used if the width of the door opening does not exceed forty-three inches.

(2) Two doors shall be used if any single door opening would have to exceed forty-three inches.

(3) All doors shall open outwardly.

(4) All doors shall have positive fastening devices, T or clip type, to hold doors in the open position and door bumpers to prevent door-to-body contact.

(5) All doors shall be weather-sealed, and on buses with double doors, they shall be so constructed that a flange on the forward door overlaps the edge of the rear door when closed.

(6) If optional power doors are installed, the design shall permit release of the doors for opening and closing by the attendant from the platform inside the bus.

(7) When manually operated dual doors are provided, the rear door shall have at least a one-point fastening device to the header. The forward mounted door shall be to the header, one to the floor line of the body, and the other shall be into the rear door. These locking devices shall afford maximum safety when the doors are in the closed position. The door and hinge mechanism shall be of a

strength that will provide for the same type of use as that of a standard entrance door.

(8) 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.

(9) Each door shall have windows set in rubber, compatible within one inch of the lower line of adjacent sash.

(10) Doors shall be equipped with a device that will actuate a green flashing visible signal located in the driver's compartment when doors are not securely closed and ignition is in "on" position.

(0) Other.

(1) Battery box and fuel tank may be relocated to provide equal weight distribution to compensate for power lift weight.

(2) All school buses which transport handicapped pupils shall be equipped with two-way radios, and roof ventilator emergency escape exit(s). Fifty-two capacity or less buses shall have one roof exit located in the middle of the school bus. Buses fifty-three or greater capacity shall have two roof exits. (See paragraph (T) of rule 3301-87-10 of the Administrative Code for specifications on the roof ventilator emergency exits.)

(3) Electric-powered wheelchairs, or other carrying devices, transported on school buses shall be equipped with sealed lead acid batteries or batteries containing dry- or gel-type electrolyte. Batteries shall be effectively secured to the carrying device.

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-07 Policy for evaluation of new equipment for school buses.

(A) Experimental phase - during this initial phase, a product will be used and tested by a few school districts (from three to ten) to determine the potential of the item. Between one and ten of the items should be used per school district. Final criteria and sites will be determined by the assistant director, division of school finance, pupil transportation section, Ohio department of education. During this period the manufacturer will be expected to maintain, adjust, and modify the product at no cost to the school district. The ownership of the product, except bus, remains with the manufacturer. It cannot be purchased by the school districts of Ohio, nor can the manufacturers make reduced price offers during the experimental phase.

(B) Field test phase - during this phase the product will be used and tested on a larger scale (twenty to forty school districts, and from twenty to one hundred items).

The product would be made available to the school district for sixty days at no cost during which time it would either be purchased or returned to the vendor. If purchased during this phase, the product would remain experimental until added to the list of approved options in the "Ohio School Bus Minimum Construction Standards."

The department of education would reserve the right to abort the test of a product if it were determined to jeopardize the safety of any pupil.

(C) Consideration for options list - upon successful completion of the field test phase, the product would be considered for addition to the approved options list. (See rules 3301-87-08 to 3301-87-10 of the Administrative Code.)

3301-87-07

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective date: 7/1/88

3301-87-08 Approved chassis options.

(A) Air brake automatic slack adjusters.

(B) Black hood - flat black paint on top of conventional bus hood of type C bus.

(C) Disc-type wheels, two or five handholds.

(D) Drain valve control inside driver compartment.

(E) Drive wheel sanders.

(F) Engine heater, one thousand watts.

(G) Engine meter.

(H) Oil-lubricated wheel bearings.

(I) Road and engine speed control shall be equal to or exceed the performance of model RSC2-5 manufactured by "Sturdy Controls Division, 1839 Carolina Beach Road, Wilmington, NC 28401."

(J) Rubber suspension for rear axle shall be equal to or exceed the suspension manufactured by "Mor/Ryd Inc., P.O. Box 579, Elkhart, IN 46515-0579."

(K) Spare tire and rim.

(L) Tachograph.

(M) Tachometer.

(N) Under hood light, twenty candlepower, activated by switch in driver area.

3301-87-08

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78,
7/1/88

3301-87-09 Approved body options.

(A) Body panels - bright metal interior body panels and exterior aluminum side panels which meet FMVSS 221 joint strength requirements.

(B) Air door - power-operated service door.

(C) Horn - air horn.

(D) Lights.

(1) Fog lamps.

(2) Lamp monitoring system.

(3) Single white strobe light, minimum of ten joules with double flash, seventy-two FPM rating.

(4) Back-up type lights along body skirts to be activated when door is opened.

(5) Heavy-duty double marker and clearance lights.

(E) Locks - entrance service door lock is permitted. Rear emergency door lock is permitted only if the bus engine will not start when the door is locked.

(F) Mirrors - stainless steel mounting brackets for fender-mounted mirrors, type B and C buses.

(G) Padded interior side rails.

(H) Public address systems.

(I) Radios - FM radio, two-way, and twenty-five watts.

(J) Rubber fender extensions.

(K) Seats - six- or eight-way adjustable driver seats.

(L) Signs - lighted school bus signs.

(M) Stop arm equipped with two red flashing strobe lights is permitted. Lights shall be six to ten joules with a regulated switch to control intensity.

(N) Sound abatement package - overall length of bus.

(O) Student crossing gate.

(P) Storage compartments (outside).

(Q) Ventilator - powered.

(R) Windows. Thermal pane windows. Window frame shall not protrude into passenger compartment.

Effective:

Certification

Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective dates: 4/1/78, 7/1/88

3301-87-10) Additional approved options.

(A) Air conditioning - air conditioning is permitted on school buses for the handicapped. Units cannot protrude into the head impact zone of any passenger seat.

(B) Air suspension - air suspension systems are permitted. Such systems shall equal the axle weight rating required for the rear suspension capacity of the vehicle.

(C) Automatic lubrication system - pressurized automatic lubrication systems are permitted. Such systems shall apply lubrication to specific components at a predetermined mileage interval.

(D) Automatic radiator shutters - automatic radiator shutters are permitted on diesel or gasoline engines.

(E) Automatic tire chains - power-operated automatic tire chains are permitted, but must be controlled from the driver compartment.

(F) Auxiliary heaters - auxiliary fuel-fired heaters are permitted. These auxiliary heaters should be specified to use the same fuel as the engine is designed to use. These heaters can be either direct hot air systems or connected to the engine's coolant system. When connected to the engine, the heaters can be used to preheat the engine for starting, or to preheat and add supplementary heat to the bus's heating system. These heaters must be installed pursuant to manufacturers' recommendations so as not to exhaust in a manner which will endanger passengers. The heater should not need to be adjusted if fuel is being changed from "Diesel-1" to "Diesel-2" or a blend, and should be equipped with low voltage protection. These heaters must have all applicable federal and "Society of Automotive Engineer" tests. These test results must be filed with the "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, 65 South

including FMVSS 301

Front Street, Room 815, Columbus, Ohio 43266-0308." Such standards shall include S.A.E.-J1024, 49 C.F.R. 571 - standard 301 TE-12 impact testing.

(G) Diesel engine starting systems - diesel engine starting systems are permitted.

(H) Disc brakes - disc brakes installed by the chassis manufacturers are permissible. (See air and hydraulic brakes in paragraph (D) of rule 3301-87-02 of the Administrative Code.)

(I) Dual tire air pressure equalizers - a system whereby the tire pressure in each set of rear dual wheels on a school bus can be equalized is permitted.

(J) Electronic sensors - electronic sensors for detecting persons or object(s) in blind spots are permissible. Such sensor devices must have an audible alarm inside and outside of the bus. They shall be automatic with the initiation of the red warning lights and cover the area known as the "danger zone." Approved training program for students and bus drivers must be provided.

These units must meet all federal and occupational safety and health administration tests. The test results must be filed with the "Assistant Director, Division of School Finance, Pupil Transportation Section, Ohio Department of Education, 65 South Front Street, Room 815, Columbus, Ohio 43266-0308." The tests shall include GM-4298P, PF-5996, PF-7273, PF-7648, or their equivalent.

(K) Engine monitors - engine monitoring systems are permitted. These systems may warn the driver, by use of a light or audible signal, that the engine is in need of attention. Such systems may not automatically shut off the engine.

(L) Exhaust - left side exit exhaust pipe is permitted. Such pipe must exit at least three inches and not more than eighteen inches in front of the rear wheels and shall bend downward at a forty-five-degree angle, six inches from the end of the pipe. Left-side exhaust pipe is permitted on gasoline- or diesel-powered school buses. Right-side exhaust systems are not permitted.

(M) Fiberglas replacement body parts - fiberglas replacement fenders and cowl pieces are permitted.

(N) Fire extinguisher - a halon gas fire extinguisher is permissible. The rating shall be at least five pounds in capacity with a twenty B.C. rating. The halon-type fire extinguisher may be mounted for regular use or as an engine compartment fire suppressant system, in which instance the hose must have a special fitting which will direct the halon into the engine compartment. Halon units must be refillable; have a quick release bracket; and have a dial indicating the amount of pressure.

(O) Interior observation mirror - one interior observation mirror mounted at the rear of the school bus above the emergency door is permissible. This mirror must be made of shatterproof high-stress plexiglas. The edges of irror must be protected with heavy vinyl oating. This mirror shall be approximately ighteen by twenty-four inches and shall have dual-mounting brackets.

(P) Paint - Imron or equivalent special paint is permitted.

(Q) Ramps.

When a power lift system is not adequate or an extra emergency system is desired to load and unload students for type A, B, and C buses, a ramp device may be installed.

(1) If a ramp is used, it shall be of sufficient strength and rigidity to support the special device, occupant, and attendant(s). It shall be equipped with a protective flange on each longitudinal side to keep special device on the ramp.

(2) Floor of ramp shall be of nonskid construction.

(3) Ramp shall be of weight and design, and equipped with handle(s), to permit one person to put ramp in place and return it to its storage place. Ramp storage must protect ramp from dirt and weather.

(R) Reflective markings - reflective markings which set a school bus apart and make it more visible in the dark are permitted. The design for the over-markings must be approved by the assistant director, division of school finance, pupil transportation section, Ohio department of education.

(S) Remote-controlled mirrors - remote-controlled mirrors which are adjusted by a power source that permits the mirror to swivel from right to left are permitted. These mirrors must be controlled from the driver compartment and may include the day/night option.

(T) Roof ventilators - roof ventilators are permissible. Such ventilators shall be adjustable and of sufficient capacity to provide adequate fresh air under operating conditions without the opening of windows, except in extremely warm weather. This ventilator shall have multi-positions and shall be static-type with exhaust ventilation that cannot be reclosed. The ventilator shall have a release handle or handles permitting operation as an emergency exit which can be opened from inside or outside the school bus. A buzzer shall sound when the ventilator is opened in the escape position. These ventilators/ emergency exits are required on buses for the handicapped, "Transpec Safety Vents" or equivalent.

(U) Safety lugs - the use of safety lugs and clamps are permitted on wheels that use multipiece rims. Lugs must be rimlock or equivalent.

(V) School bus crossing control arms - school bus crossing control arms shall be designed to work in conjunction with the opening of the service door.

(W) Spray-suppressant skirting - a system for suppressing flying spray on a wet surface is permitted. Such a system shall consist of filament-type plastic which is installed around the front fender wells. Rear installation shall include a full width filament-type plastic skirt.

(X) Standard transmissions - six-speed transmissions are permitted.

(Y) Stop arms equipped with strobe lights - a stop arm with two red flashing strobe lights is permitted.

(Z) Tinted side windows - tinted windows are permitted on school buses for the handicapped. Such tinting shall meet the applicable state laws.

(AA) Vehicle use monitors - the use of various types of monitoring devices to record vehicle movement, speed, RPM, and other measurements are permitted.

(BB) Vinyl lettering - vinyl stick-on lettering is permitted in lieu of painted-on letters, either on original equipment or as replacement letters.

Effective:

_____
Certification

_____
Date

Promulgated under: R.C. Chapter 119.
Rule authorized by: R.C. 4511.76
Rule amplifies: R.C. 4511.76
Prior effective date: 7/1/88

APPENDIX A

Applicable Federal Motor Vehicle Safety Standards as They Apply to School Bus Construction:

No.	Title
101	Control Location, Identification, and Illumination.
101-80	(effective 9-1-80)
102	Transmission Shift Lever Sequence, Starter Interlock, and Transmission Braking Effect.
103	Windshield Defrosting and Defogging Systems.
104	Windshield Wiping and Washing Systems.
105-75	Hydraulic Brake Systems.
106-74	Brake Hoses.
107	Reflecting Surfaces.
108	Lamps, Reflective Devices, and Associated Equipment.
111	Rearview Mirrors.
112	Headlamp Concealment Devices.
113	Hood Latch System.
115	Vehicle Identification Number (effective 9-1-79/80).
116	Motor Vehicle Brake Fluids.
119	New Pneumatic tires for Vehicles Other Than Passenger Cars.
120	Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars.
121	Air Brake Systems.
124	Accelerator Control Systems.
125	Warning Devices.
127	Speedometers & Odometers (effective 9-1-79/80).
205	Glazing Materials.
207	Seating System.
208	Occupant Crash Protection.
209	Seat Belt Assemblies.
210	Seat Belt Assembly Anchorages.
212-76	Windshield Mounting.
213	Child Seating Systems.

217	Bus Window Retention and Release.
217-76	
219	Windshield Zone Intrusion.
220	School Bus Rollover Protection.
221	School Bus Body Joint Strength.
222	School Bus Passenger Seating and Crash Protection.
301-75	Fuel System Integrity.
302	Flammability of Interior Materials.

APPENDIX B

Highway Safety Program Standard No. 17

Pupil Transportation Safety

(A) Scope. This standard establishes minimum requirements for a state highway safety program for pupil transportation safety; including the identification, operation, and maintenance of school buses; training of personnel; and administration.

(B) Purpose. The purpose of this standard is to reduce, to the greatest extent possible, the danger of death or injury to schoolchildren while they are being transported to and from school.

(C) Definitions. "Type I school vehicle" means any motor vehicle with motive power, except a trailer, used to carry more than sixteen (16) pupils to and from school. This definition includes vehicles that are at any time used to carry schoolchildren and school personnel exclusively, and does not include vehicles that only carry schoolchildren along with other passengers as part of the operations of a common carrier.

"Type II school vehicle" means any motor vehicle used to carry sixteen or less pupils to or from school. This does not include private motor vehicles used to carry member of owner's household.

(D) Requirements. Each state, in cooperation with its school districts and its political subdivisions, shall have a comprehensive pupil transportation safety program to assure that school vehicles are operated and maintained so as to achieve the highest possible level of safety.

(1) administration.

(A) There shall be a single state agency having primary administrative responsibility for pupil transportation, and employing at least one full-time professional to carry out its responsibilities for pupil transportation.

(B) The responsible state agency shall develop an operating system for collecting and reporting information needed to improve the safety of school vehicle operations, in accordance with the Safety Program Standard No. 10, "Traffic Records," 204.4.

(2) Identification and equipment of school vehicles. Each state shall establish and maintain compliance with the following requirements for identification and equipment of school vehicles. The use of stop arms is at the option of the state.

(A) Type I school vehicles shall:

(1) Be identified with the words, "School Bus," printed in letters not less than eight inches high, located between the warning signal lamps as high as possible without impairing visibility of the lettering from both front and rear, and have no other lettering on the front or rear of the vehicle;

(2) Be painted National School Bus Glossy Yellow, in accordance with the colorimetric specifications of Federal Standard No. 595a, Color 13432, except that the hood shall be either that color or lusterless black, matching Federal Standard No. 595a, Color 37038;

(3) Have bumpers of glossy black, matching Federal Standard No. 595a, Color 17038; unless, for increased night visibility, they are covered with a retroflective material.

(4) Be equipped with a system of signal lamps that conforms to the school bus requirements of Federal Motor Vehicle Safety Standard 108,49 CFR 571.21; and

(5) Have a system of mirrors that will give the seated drive a view of the roadway to each side of the bus, and of the area immediately in front of the front bumper, in accordance with the following procedure:

When the rod, thirty inches long, is placed upright on the ground at any point along a traverse line one foot forward of the forwardmost point of a school bus, and extending the width of the bus, at least seven and one half inches of the length of the rod shall be visible to the driver, either by direct view or by means of an indirect visibility system.

(B) Any school vehicle meeting the identification requirements of 1, A-D above that is permanently converted for use wholly for purposes other than transporting pupils to or from school shall be painted a color other than National School Bus Glossy Yellow, and shall have the stop arms, and equipment required by section IV.B.1.D, removed.

(C) Type I school vehicles being operated on a public highway and transporting primarily passengers other than school pupils shall have the words, "School Bus," covered, removed, or otherwise concealed, and the stop arms and equipment required by section IV.B.1.D shall not be operable through the usual controls.

(D) Type II school vehicles shall either:

(1) Comply with all the requirements for Type 1 school vehicles; or

(2) Be of a color other than National School Bus Glossy Yellow, have none of the equipment specified in IV.B.1.D, and not have the words, "School Bus," in any location on the exterior of the vehicle,

(3) The state shall establish conditions under which one or the other of the above two specifications for Type II vehicles shall apply.

(E) Operation. Each state shall establish and maintain compliance with the following requirements for operating schools vehicles:

(1) Personnel.

(a) Each state shall develop a plan for selecting, training, and supervising persons whose primary duties involve transporting school pupils, in order to assure that such persons will attain a high degree of competence in, and knowledge of, their duties.

(b) Every person who drives a Type I or Type II school vehicle occupied by school pupils shall, as a minimum:

(1) Have a valid state driver's license to operate such a vehicle(s);

(2) Meet all special physical, mental, and moral requirements established by the state agency having primary responsibility for pupil transportation; and

(3) Be qualified as a driver under the motor carrier safety regulations of the federal highway administration 49 CFR 391, if he or his employer is subject to those regulations.

(F) Pupil instruction. At least twice during each school year, each pupil who is transported in a school vehicle shall be instructed in safe riding practices, and participate in emergency evacuation drills.

(G) Vehicle operation.

(1) Each state shall develop plans for minimizing highway use hazards to school vehicle occupants, other highway users, pedestrians, and property, including but not limited to:

(a) Careful planning and annual review of routes for safety hazards;

(b) Planning routes to assure maximum use of school buses, and avoid standees;

(c) Providing loading and unloading zones off the main traveled part of highways, wherever it is practicable to do so;

(d) Establishing restricted loading and unloading areas for school buses at, or near schools;

(e) Requiring the driver of a vehicle meeting or overtaking a school bus that is stopped on a highway to take on or discharge pupils, and on which the red warning signals specified in IV.B.1.D are in operation, to stop his vehicle before it reaches the schoolbus and not proceed until the warning signals are deactivated; and

(f) Prohibiting, by legislation or regulation operation of any vehicle displaying the words, "School Bus," unless it meets the equipment and identification requirements of this standard.

(i) Use of flashing warning signal lamps while loading or unloading pupils shall be at the option of the state. Use of red warning signal lamps for any other purpose, and at any time other than when the school bus is stopped to load or discharge passengers shall be prohibited.

(ii) When vehicles are equipped with stop arms, such devices shall be operated only in conjunction with red signal lamps.

(iii) Seating.

(A) Seating shall be provided that will permit each occupant to sit in a seat in a plain view lateral location, intended by the manufacturers to provide seating accommodation for a person at least as large as a fifth percentile adult female, as defined in 49 CFR 571.3.

(B) School bus routing and seating plans shall be coordinated so as to eliminate standees when a school vehicle is in motion.

(C) There shall be no auxiliary seating accommodations such as temporary or folding jump seats in school vehicles.

(D) Drivers of school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

(E) Passengers in type II school vehicles equipped with lap belts shall be required to wear them whenever the vehicle is in motion.

(H) Vehicles maintenance. Each state shall establish and maintain compliance with the following requirements for vehicle maintenance:

(1) School vehicles shall be maintained in safe operating conditions through a systematic preventive maintenance program.

(2) All school vehicles shall be inspected at least semiannually, in accordance with Highway Safety Program Manual Vol. one, published by the department of transportation, January 1969. School vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be inspected and maintained in accordance with those regulations (49 CFR Parts 393 and 396).

(3) School vehicle drivers shall be required to perform daily pretrip inspections of their vehicles, and to report promptly and in writing any defects or deficiencies discovered that may affect the safety of the vehicle's operation or result in its mechanical breakdown. Pretrip inspection and condition reports for school vehicles subject to the Motor Carrier Safety Regulations of the Federal Highway Administration shall be performed in accordance with those regulations (49 CFR 392.7, 392.8, and 396.7).

(I) Program evaluation. The pupil transportation safety program shall be evaluated at least annually by the state agency having primary administrative responsibility for pupil transportation. The National Highway Traffic Safety Administration shall be furnished a summary of each evaluation.

OHIO SCHOOL BUS MINIMUM CONSTRUCTION STANDARDS

I N D E X

Page Number(s)