4501-5-02 **School bus construction standards.**

[Comment: For dates and availability of material incorporated by reference in this rule, see paragraph ~~(R)~~(S) of rule 4501-5-01 of the Administrative Code.]

These standards apply to any school bus used to transport school children to and from school and/or school related activities and events.

(A) Access steps. (except "Type A" buses)

(1) Steps shall be installed on each side of the school bus to allow access to windshield for cleaning.

(2) Grab handles shall be securely mounted in a suitable position to assist in using the steps.

(3) In lieu of steps installed on each side, the steps are permitted in or on the front bumper if the windshield can be accessible for cleaning from that position.

(B) Air compressor for accessories.

An accessory compressor that supplies air to accessories only shall be sized appropriately. Accessory compressors shall not be connected to the braking system in any way.

~~(B)~~(C) Aisle.

(1) Minimum width of aisle shall be twelve inches at floor level.

(2) Minimum width of aisle between seats shall be twelve inches at seat level.

(3) The aisle shall not be less than twelve inches wide between any two objects from the service doors to the aisle in the passenger area from floor to ceiling.

(4) Hold-down fastening devices used on inside engine cover shall be designed to prevent hooking or catching on shoes or clothing.

~~(C)~~(D) Axles and suspensions.

(1) The front and rear axles, including suspension assemblies, and all frame-to-ground components, shall have a gross axle weight rating when measured at the ground at least equal to that portion of the load as would be imposed by the chassis manufacturer's maximum gross vehicle weight rating.

(2) 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.

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

~~(D)~~(E) Battery.

(1) "Type B, C and D" buses:

(a) A battery or batteries of at least eight hundred cold cranking amperes for a gasoline powered engine.

(b) A battery or batteries of at least one thousand two hundred fifty cold cranking amperes for a diesel powered engine.

(2) "Type A I and A II" buses:

(a) A battery or batteries of at least six hundred cold cranking amperes for a gasoline powered engine.

(b) A battery or batteries of at least one thousand cold cranking amperes for a diesel powered engine.

(3) A battery or batteries of at least one thousand two hundred cold cranking amperes if equipped with a lift.

(4) One-piece, non-spliced battery cables shall be provided by the chassis manufacturer. All cables shall conform to SAE standard J541 with respect to electrical resistance.

(5) "Type A I and A II" buses may have the battery/batteries located at the manufacturer's standard~~either under the hood, enclosed under the steps at the left side driver's door, or mounted as a "Type B, C or D" bus~~. Batteries for "Types B, C, and D" buses shall be mounted in the body skirt by the body manufacturer. Rear engine buses may have batteries mounted in engine compartment.

(6) A drawer-type pull-out tray shall be installed whenever the battery/batteries are ~~mounted in~~accessed through the body fender skirt. The batteries shall be enclosed by a compartment constructed of mill-applied zinc coated steel, or other acid resistant material, provided with drain ports, hold-down carrier mounted so as to avoid blocking filler ports, and latching device to prevent

accidental opening. Drawer assembly shall be covered with acid-resistant paint or material. ~~Rust proofing shall be 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.

~~(E)~~(F) Body construction.

(1) All construction components (except door handles, grab handles, interior decorative parts, other interior plated parts, and components heavier than twelve-gauge), shall be of prime commercial quality mill-applied zinc coated steel, other anti-corrosive coating or composite materials. Components must meet or exceed current strength and durability and all applicable "Federal Motor Vehicle Safety Standards." The zinc plating shall be one hundred twenty grams per meter square minimum coating weight (~~grade sixty~~G60) or equivalent applied by either hot dipping or electroplating. All such construction materials shall be fire resistant.

(2) All metal surfaces that will be painted shall be 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 ~~(E)(1)~~(F)(1) and ~~(E)(2)~~(F)(2) of this rule, particular attention shall be given to lapped surfaces, welded connections of structural members, cut edges, punched or drilled holed 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 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 571.220 and FMVSS 571.221.

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

(6) Exterior body panels shall meet or exceed FMVSS 571.221.

~~(6)~~(7) Floor.

(a) The floor shall be not less than fourteen-gauge mill, corrosive resistant coated steel or composite materials. If zinc plated, the plating shall be one hundred twenty grams per meter square minimum coating weight (grade sixty) or equivalent applied by either hot dipping or electroplating.

(b) The floor may be flat.

(c) "Type A" buses have an additional step from the step well.

~~(b)~~(d) A fuel access plate shall be installed for easy access to fuel gauge mechanism. ("Type A" buses excluded)

~~(7)~~(8) Rub rails.

(a) Manufacturers shall install one rub rail at approximately seat level, except for the opening for engine compartment side door in a rear engine bus. This rail shall extend from the main vertical post behind the service door to the forward-most vertical post on the left side of the body, including left side emergency door. (Rear emergency door exempted)

(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 needs only to extend to the radii of right and left rear corners.

(c) A third rub rail may be installed on the lower edge of the body skirt.

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

~~(d)~~(e) Each rub rail shall be four inches or more in width in its finished form and shall be constructed of sixteen gauge metal or other material of equivalent strength suitable to help protect body side panels from damage.

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

~~(f)~~(g) Additional external rub rails are permissible if they form an integral part of the body construction and meet the fastening requirements.

(9) Fold out steps may be installed at the regular service entrance.

(a) The fold out step will provide a step level that is six inches or less to ground level.

(b) The fold out step may be power activated or manually operated.

~~(8)~~(10) 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, flanged or otherwise treated to minimize sharp edges.

~~(9)~~(11) All body components shall be designed and constructed so as to avoid the entrapment of moisture.

~~(F)~~(G) Brakes.

All braking systems and components shall meet or exceed the minimum requirements specified in applicable Federal Motor Vehicle Safety Standards 571.105 or 571.121 and the following:

(1) Air or hydraulic brake systems are acceptable. If brakes are air actuated, they shall be of the cam drum type on front and rear wheels, disc front and drum rear or four-wheel disc. Brakes that are hydraulically actuated, shall be disc front and drum rear or four-wheel disc.

(2) All air brake systems shall have both visual and audible warning systems that activate as required by FMVSS 571.121. Hydraulic brake systems that utilize hydraulic power assist shall have both visual and audible warning systems that activate as required by FMVSS 571.105.

(3) For air brake systems, an air pressure gauge shall be provided in the instrument panel capable of complying with CDL pre-trip inspection requirements.

(4) Air compressors that supply air to brakes must have sufficient rated capacity that meets or exceeds FMVSS 571.121 (minimum of thirteen cubic feet per minute) and shall be pressure oil fed. Clean air to all compressors shall be supplied and filtered through engine air cleaner.

~~(5) Separate compressors that supply air to accessories only and not braking systems, shall be a minimum of nine and one half cubic feet per minute.~~

~~(6)~~(5) All air supplied from the air tanks shall be taken at or above the center line of the air tank to avoid contaminates entering the braking system or air operated accessories.

~~(7)~~(6) All school buses equipped with air brakes shall require a desiccant type air dryer with a renewable or replaceable desiccant cartridge (filter). Dryer shall incorporate an automatic purge and drain cycle with heating element.

~~(G)~~(H) Bumpers.

(1) Front bumper for all buses having a GVWR of twenty-one thousand five hundred pounds or less shall be manufacturers standard. ("Type A" buses)

(2) Front bumper for all buses having a GVWR greater than twenty-one thousand five hundred pounds rating:

(a) Bumper shall be at least three-sixteenths of an inch thick pressed steel channel, one-piece construction, with a minimum width of eight inches after forming. Materials other than pressed steel may be used if equivalent in strength and durability of pressed steel.

(b) Bumper shall be contoured to offer maximum protection of fender lines without permitting snagging or hooking.

(c) Bumper shall be attached to the frame and extended forward of grille, head lamps, fender, or hood sections and extend the entire width of the bus to provide maximum protection.

(d) The bumper shall be of sufficient strength to permit lifting the bus with a bumper type lift for servicing

~~(e) All shall have sufficient strength to permit pushing a vehicle of equal weight without permanent distortion to bumper, chassis, or body.~~

(3) Rear bumper.

(a) Bumper shall be of sufficient strength to permit lifting the bus with a bumper type lift for servicing and shall be one piece, heavy-duty type of pressed steel channel, at least three-sixteenths inch of thickness. Materials other than pressed steel may be used if equivalent in strength and durability of pressed steel.

(b) ~~Buses rear bumper~~Bumper shall be a minimum of eight inches in height after forming.

(c) 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.

(d) 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.

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

(f) No spaces, projections, or cutouts that will permit a handhold are permitted.

(g) Front ends of the bumper shall be enclosed by endcaps 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.

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

(i) The ~~bumper~~ vertical distance between the bottom of the bumper and the ground shall not exceed thirty inches when the vehicle is empty.

~~(H) Clutch – chassis using manual transmission shall be equipped with a clutch which shall have a rated capacity in a range from equal to the maximum net engine torque up to ten greater than the maximum net engine torque.~~

(I) Color.

(1) Bumpers shall be black.

(2) Fender and body shall be painted national school bus yellow.

(3) Hood ~~shall~~may be painted non-reflective national school bus yellow or flat black (except "Type A").

(4) Frame shall be painted black.

(5) Grille may be painted national school bus yellow, black or chrome or anodized aluminum in finish. Rear engine bus grille area(s) shall be national school bus yellow.

(6) ~~Wheels, spokes and rims~~Steel wheels shall be black~~,~~ and/or gray. Aluminum wheels are permitted.

(7) All lettering and numbering on exterior shall be black.

(8) Background area and optional hoods for warning lights shall be black.

(9) ~~Required rub~~Rub rails shall be black~~, optional rub rails may be color of body or black~~.

(10) Service door may be black. Note:

(a) Special service doors shall not be black.

(b) Left side driver's door on "Type A and A II" buses shall not be black.

(J) Cooling system.

(1) Cooling system shall be manufacturer's standard~~The cooling system radiator shall be of sufficient capacity to cool the engine at all speeds in all gears. Thermostatic controls shall keep the engine at the manufacturer's recommended operating temperature~~.

(2) Cooling fan(s) may be variable speed.~~Permanent anti-freeze shall be compatible with the cooling system and engine.~~

(3) The cooling system shall have a means of checking the coolant without having to remove the radiator cap~~The cooling system shall be equipped with a coolant recovery or a deaeration system. The system shall be of sufficient size to allow for the added expansion from the added coolant needed for the body heating system. The cooling system shall have a means of checking the coolant without having to remove the radiator cap~~.

~~(4) If equipped with an automatic transmission, shall have a heavy duty cooling system to provide additional cooling required by the automatic transmission.~~

~~(5) A fan/s shall be installed to aid the cooling system.~~

~~(6) On vehicles requiring hoses or extensions to a coolant recovery system from the radiator, the hose or extension shall be so designed to permit adding coolant without trapping air.~~

~~(7) The manufacturer shall add the required amount of appropriate antifreeze to protect the cooling system to minus twenty degrees fahrenheit tested at normal engine temperature.~~

(K) Defroster.

(1) Defroster system shall meet or exceed SAE standard J381 performance requirements without use of auxiliary fan.

(2) The defroster system shall be of sufficient capacity to keep windshield area, left front side driver's 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.

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

(4) Two adjustable six-inch auxiliary ~~defroster~~ fans shielded with small mesh metal or polypropylene guards shall be installed. Only one adjustable six-inch auxiliary ~~defroster~~ fan is required for "Type A" buses.

~~(a) Fan/s shall be mounted to complement the defroster system.~~

~~(b)~~(a) Each auxiliary ~~defroster fan/s~~fan(s) shall be controlled individually by a multi-speed switch.

~~(c)~~(b) The switch shall be located within easy reach of the driver while seated.

(L) Drive shaft and differential.

(1) Drive shafts and universal joints are to be original equipment manufacturer standard.

(2) Metal drive shaft guards are required for each drive shaft section extending lengthwise under the floor of the passenger compartment to prevent projecting through the floor or dropping to the ground if broken. The drive shaft guard shall be at the end of the shaft which is provided with a sliding connection (spline or other such device) to prevent whipping of the shaft in event of failure thereof or any of its component parts.

(3) The rear axle ratio shall be compatible with engine, transmission and tire size.

(M) 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.

(2) The driver's seat and driver's area shall have a restraining barrier meeting FMVSS 571.222 positioned immediately behind the driver's area.

(3) The driver’s seat upholstery shall meet FMVSS 571.302 (Flammability of interior materials).

(4) A ~~emergency locking retractor type~~"Type II" seat belt is required for the driver ~~shall be installed~~. 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.

(5) Seating options allowed:~~Belt and emergency locking retractor upper torso restraint shall be installed in compliance with FMVSS 571.209, FMVSS 571.210, and SAE standard J800.~~

(a) Adjustable air driver's seat;

(b) Internal heating provided by manufacturer; and

(c) Driver alert technology.

~~(6) An emergency locking retractor upper torso restraint shall be provided and shall work in unison with the seat belts.~~

~~(7) May be adjustable air drivers seat (six-way or eight way) and may be heated from the manufacturer.~~

(N) Electrical system.

(1) Alternator.

(a) Minimum of a one hundred forty five ampere alternator on all "Type A" buses.

(b) Minimum of a ~~one~~two hundred ~~eighty~~ ampere alternator on all other buses.

~~(c) Output must be approximately sixty amperes or more at engine manufactures recommended idle speed.~~

~~(2) Manufacturer shall provide an adequate electric power source terminal for bus body power connection.~~

~~(3)~~(2) All wiring shall conform to current society of automotive engineers standards.

(O) Emergency equipment.

(1) All shall be mounted in an easily accessible location.

(2) Bus shall be equipped with at least one dry-chemical-type fire extinguisher of at least five-pound capacity, 3A ~~-~~ 40 B.C. rating, located outside of the passenger area, mounted in a quick release-type bracket and easily accessible by the driver. The extinguisher shall 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 base to be refilled by ordinary procedures.

(3) First aid kits shall be dustproof, plainly labeled, mounted in a location easily accessible to the driver, located outside of the passenger area, and securely mounted in a metal or plastic container.

(4) ~~Minimum units for the school bus shall be as follows: A sixteen-unit kit shall be used on buses less than fifty designed maximum capacity.~~ A twenty-four unit kit is required for all buses ~~of fifty or more designed maximum capacity~~. Note: The first aid kit may be installed at time of manufacture by the manufacturer, installed by dealer, or installed by the owner/operator of the school bus.

(5) Three triangle reflectors with weighted stands shall be properly encased for easy storage. The triangle reflectors shall meet FMVSS 571.125. The storage container shall be mounted to prevent movement and shall be mounted within easy access of the driver.

(6) Six thirty-minute fusees are permitted and shall be encased for easy storage. The storage container shall be mounted to prevent movement and shall be mounted within easy access of the driver. The fusees shall not be stored in the passenger area. No spiked fusees are permitted.

(7) One body fluid kit shall be required. The kit shall contain the following items:

(a) Effective chlorine absorbent deodorant.

(b) Effective germicidal detergent. If detergent contains alcohol, no more than one fluid ounce is permitted in a single-use disposable container.

(c) Single-use, disposable bag.

(d) Single-use, disposable scraper.

(e) Minimum of one pair of disposable, single-use, effective protective gloves.

(f) Effective hand rinse. If hand rinse contains alcohol, no more than one-half fluid ounce is permitted in a single-use disposable container.

(g) The body fluid clean-up kit shall be easily accessible to the driver in the area of the first aid kit and shall be securely mounted in a metal or plastic container.

(h) If alcohol is included, the body fluid clean-up kit shall not contain more than one and one-half fluid ounces of alcohol.

Note: The body fluid kit may be installed at time of manufacture, installed by dealer or the owner/operator of the school bus.

(P) Emergency exits.

Any installed emergency exit shall comply with the design and performance requirements of FMVSS 571.217 applicable to that type of exit, regardless of whether or not that exit is required by FMVSS 571.217. Additional exits are allowed in addition ~~of~~to the minimum required by this rule.

(1) Emergency doors.

(a) Emergency doors shall meet FMVSS 571.217. An interior handle shall be provided to pull the door shut from the inside which may be used as a protection against accidental release.

(b) When the interior handle~~fastening device~~ is not in the position that causes the emergency door to be closed, a continuous warning sound shall be audible at the ~~driver's~~driver's seating position and in the vicinity of the emergency door and the dome lights (~~driver's~~driver's dome light excluded) shall illuminate with the ignition switch in any position.

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

(f) There shall be a head bumper pad installed on the inside at the top of the emergency exit frame. This pad shall be approximately four inches in width and extend across the entire top of the emergency exit opening and shall meet FMVSS 571.302 for flammability standards of interior materials.

(2) Rear emergency door.

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

(b) 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.

(c) Rear emergency door shall be hinged on right side and shall open outward.

(d) The rear emergency door shall contain upper and lower glass panels. Glass in emergency door shall provide maximum area of visibility for safe operation of the school bus.

(e) The rear emergency door shall have a prop rod/lock out bar.

(3) Left side emergency door.

(a) On all rear-engine school buses, a left side emergency door shall be installed.

(b) If a door sill or heater line extends above the floor line, a ramp shall be provided covering the area over which a foot must pass ~~as~~when an individual exits through the door.

(c) The left side emergency door shall have a prop rod/lock out bar.

(4) Emergency side window exits.

(a) Emergency window shall display the words "emergency exit" at the top of or directly above, or at the bottom of the emergency window exit on both the inside and outside of the bus, in a color contrasting the background.

(b) Emergency windows, when not fully latched, shall activate a continuous warning sound that shall be audible in driver's compartment and activate all dome lights (driver’s dome lights excluded). Warning sound and dome lights shall be operational with the ignition switch in any position.

(5) Emergency window, rear-engine buses.

(a) An emergency window shall be installed above the engine compartment.

(b) Window shall be hinged from top and provided with a device to ensure against accidental closing when open.

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

(d) Emergency window shall display the words "emergency exit" at the top of or directly above, or at the bottom of the emergency window exit on both the inside and outside of the bus, in a color contrasting the background.

(e) Emergency window, when not fully latched, shall activate a continuous warning sound that shall be audible in the driver's compartment and all dome lights shall activate (driver dome lights excluded). Warning sound and dome lights will be operational with the ignition switch in any position.

(6) Emergency roof exits.

(a) A continuous warning sound that shall be audible in the driver's compartment and all dome lights shall activate when the hatch is opened in the escape position (driver dome lights excluded). Warning sound and dome lights shall be operational with ignition switch in any position.

(b) If a bus is not manufactured with a static vent, the emergency roof exit shall be a static-type with exhaust vent.

(7) Number of emergency roof exits required.

(a) One roof hatch is required for a bus with a manufacturer's rated ~~seating~~shell capacity of one to forty-five.

(b) Two roof hatches are required for a bus with a manufacturer's rated ~~seating~~shell capacity of forty-six and above.

(Q) Engine speed governor shall be installed on all buses. Setting shall comply with manufacturer's maximum recommended governed speed. A revolution per minute limiter in lieu of the engine speed governor is acceptable. Note: Recommended governed speed will reference maximum speed limits established in section 4511.21 of the Revised Code.

(R) Exhaust system.

(1) Exhaust pipe, muffler or a diesel particulate filter in lieu of the muffler, and tailpipe shall be outside bus body and attached to chassis.

(2) The tailpipe and after-treatment system shall be constructed of a corrosion-resistant tubing material at least equal in strength and durability to 16-gauge steel tubing of equal diameter.~~Muffler shall be heavy-duty truck type of aluminized or stainless steel or ceramic coated to offer maximum resistance to corrosion or oxidation.~~

(3) The tailpipe may be flush with, or shall not extend more than two inches beyond, the perimeter of the body for side-exit pipe or the bumper for rear-exit pipe. The exhaust shall be designed such that exhaust gas will not be trapped under the

body of the bus.~~All exhaust pipes and tailpipes shall be constructed of sixteen gauge or greater aluminized steel tubing or stainless steel tubing. Short sections of flexible pipe may be used between the exhaust manifold/s and the exhaust pipe to allow flexing of the exhaust system during vehicle operation.~~

(4) The tailpipe shall exit to the left or right of the emergency exit door in the rear of the vehicle to the left side of the bus, in front of or behind the rear drive axle, or the tailpipe may extend through the bumper.~~Diameter of~~ The tailpipe shall not exit beneath any fuel filler location, emergency door, or lift door~~ not be reduced after it leaves the muffler~~.

(5) The exhaust system shall be insulated in a manner to prevent any damage to any fuel system component.~~tailpipe shall extend to but not beyond one inch of the rear bumper. The rear end of tailpipe must be located at least twenty inches to the right or left of the center line of the chassis.~~

(6) The design of the after-treatment systems shall not allow active (non-manual) regeneration of the particulate filter during the loading and unloading of passengers. Manual regeneration systems will be designed such that unintentional operation will not occur.~~The tail pipe may go through the bumper.~~

(7) Right side discharge exhaust systems are not permitted.

~~(7)~~(S) For after treatment systems that require diesel exhaust fluid (DEF)An optional left side discharge exhaust system is permitted. If a left side discharge, the tailpipe shall be located at least three inches and not more than eighteen inches in front of the rear wheel opening and angled down at a forty-five degree angle six inches from the end of the pipe. The discharge shall extend to the edge of the body.

(1) The composition of the DEF must comply with ISO 22241-1.

(2) The DEF supply tank shall be sized to meet a minimum ratio of three diesel fills to one DEF fill.

~~(8) Right side discharge exhaust systems are not permitted.~~

~~(9) The exhaust system on a gas-powered chassis shall be insulated from the fuel tank and fuel tank connections by a securely attached metal shield at any point where it is twelve inches or less from the fuel tank.~~

~~(S)~~(T) Fenders.

(1) Total spread at 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) Fiberglass replacement fenders and cowl pieces are permitted.

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

~~(T)~~(U) Floor covering.

(1) All floor covering shall have a calculated burn rate of .1 mm per minute or less using the test methods, procedures and formulas listed in ~~meet~~ FMVSS 571.302 ~~(standard for flammability of interior materials)~~ and 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 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 fitted, rust-free metal or composite molding or reformed interior panel.

(3) Driver's compartment floor area shall ~~provide sure footing when wet and~~ be of the same quality material as the underseat floor covering. The driver's compartment floor covering shall be attached to the floor.

Exception - On "Type A" buses, the driver's compartment floor area shall be manufacturer's standard. It shall be attached to the floor.

~~(a) Exception - On "Type A" buses, the driver's compartment floor area shall be manufacturer's standard. It shall be attached to the floor.~~

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

~~(5) If the bus is equipped with a manual transmission, an inspection plate shall be installed for easy servicing of the clutch and transmission. The plate shall be installed above the regular floor covering when possible and shall not be undercoated.~~

~~(6) Brake, gear shift, and accelerator boots shall be installed.~~

~~(7)~~(5) Metal, composite molding, bonding or non-metal welding shall cover all floor-covering joints.

~~(8)~~(6) Molding around the wheel-well and floor covering shall be provided to seal floor covering with the wheel well.

~~(9)~~(7) 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 sealed to prevent any leakage or moisture. Diamond plate may be used as an access panel. ("Type A" buses and alternative fuel systems excluded)

~~(10)~~(8) Floor covering on top step landing shall be one piece.

(9) 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-eighths inch five-ply type CD exterior grade. Plywood shall extend to fire-wall 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. 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.

(10) Equivalent material applied to top of steel floor may be used in lieu of plywood, provided it has equal or greater insulation r-value, sound abatement, deterioration-resistant and moisture-resistant properties.

(11) If alternate materials are used in lieu of plywood, manufacturer must certify that FMVSS 571.222 and 571.302 are met.

~~(U)~~(V) Frame.

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

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

(3) 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 the 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 frame manufacturer.

(4) Welding to chassis rails is permitted only when guaranteed by the company making the modifications and authorized by the frame manufacturer. ~~School buses that require frame repairs shall be inspected by a factory authorized dealer or agent following the completion of repairs.~~ The Ohio state highway patrol shall be notified after the repair and authorized inspection have been completed and prior to the school bus being operated with students on board.

~~(V)~~(W) Fuel fill opening- shall be in the body and 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. "Type B, C, and D" buses may be provided without a door only if a fuel bucket/spill containment is provided. Exception: On "Type A" buses, the fuel fill opening shall be manufacturer's standard.

~~(W)~~(X) Fuel System-all fuel storage specifications shall conform to FMVSS 571.301 (fuel system integrity). In addition:

(1) Fuel tank shall have a minimum capacity of ~~thirty-three~~twenty-five gallons ~~with a thirty gallon actual draw~~, for buses up to and including a shell capacity of fifty-nine passengers. School buses of sixty passengers and above shall have a minimum capacity of sixty gallons ~~with a fifty-five gallon actual draw~~. 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.

(2) Fuel filter with replaceable element shall be installed. ~~A flexible connection which is gasoline and oil-proof shall be provided at the engine end of the fuel line.~~

(3) In addition to the fuel filter, all diesel fueled engines shall have a water separator installed between fuel tank and the injector pumps. The fuel/water separator may be incorporated with the fuel filter but the fuel/water separator shall not serve as the fuel filter.

(4) Drain plug of at least one-fourth inch pipe thread shall be located in center of the bottom of gas and diesel fuel tanks.

~~(X)~~(Y) Glass.

(1) All glass shall be manufactured and maintained as follows:

Glass table

Location	Glass type	Rating
Service door	Laminated	AS 1 or AS 2
Emergency door	Tempered or laminated	AS 2 or AS 3
Emergency window	Tempered or laminated	AS 2 or AS 3
Windshield	Laminated	AS 1
Driver's side glass	Laminated	AS 1 or AS 2
All other glass in passenger's area	Tempered or laminated	AS 2 or AS 3

Exception- On "Type A" buses the driver's door glass shall be manufacturer's standard.

~~All other glass not noted in table shall meet FMVSS 571.205 Glazing Materials.~~

(2) All other glass not noted in table shall meet FMVSS 571.205 glazing materials.

~~(Y)~~(Z) Heaters.

(1) Heating systems shall provide evenly distributed heat throughout the bus body and provide defrosting for windshield, ~~drivers~~driver's left side window and service door.

(2) Buses shall be equipped with heaters capable of maintaining inside temperature of fifty degrees ~~fahrenheit~~Fahrenheit using an ambient temperature of zero degrees ~~to ten degrees fahrenheit~~Fahrenheit as measured per SAE standard J2233.~~.~~

(3) Buses shall be equipped with a front heater.

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

(5) All heaters shall be independently controlled by multi-speed switches.

(6) All hot water lines inside the driver’s/passenger’s area shall be enclosed.

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

(8) ~~If applicable, heater~~Heater hose installation in the engine compartment shall include two shut-off valves able to shut off coolant completely when necessary.

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

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

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

~~(Z)~~(AA) ~~Hood on all vehicle types or an interior~~"Type D" buses with an interior engine cover ~~on "Type D" buses~~ shall have a device or design to secure the ~~hood or~~ engine cover~~,~~ when in the open position, or shall be fully removable ~~to prevent accidental closing~~.

"Type C" buses shall have a design for the hood that minimizes the risk of accidental closing.

~~(AA)~~(BB) Horns.

Buses shall be equipped with a ~~horn/s~~horn(s) of standard make capable of producing complex sound in band of audio frequencies from two hundred fifty to two thousand hertz and having total sound level of one hundred to one hundred twenty decibels within these frequency limits when measured at fifty feet from the vehicle. Air horns are permitted.

~~(BB)~~(CC) 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~~show accrued mileage up to nine hundred ~~ninety nine~~ninety-nine thousand nine hundred ~~ninety-nine~~ninety-nine.

(c) A voltmeter ~~with a graduated scale of sixteen volts. Voltmeter shall show~~showing the battery voltage. ~~It~~The voltmeter shall be off when the ignition switch is in the off position.

(d) Oil pressure gauge.

(e) Engine temperature gauge.

(f) Fuel gauge.

(g) Air brake systems shall have independent gauges indicating air pressure in the primary and secondary air tanks.

(h) ~~All buses shall~~Buses may be equipped with a tachometer ~~(except "Type A")~~.

(i) A diesel exhaust fluid (DEF) gauge is required for diesel engines.

(2) All buses shall have a warning system consisting of a light and optional audible warning to notify driver of low engine oil pressure, low engine coolant level, and coolant overheating. System shall not automatically shut off engine, unless warning signals have been displayed to the driver and the engine has derated for a period of time.

~~(3) All instruments shall be easily accessible for maintenance and repair.~~

~~(4)~~(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 and illumination of the instruments must comply with FMVSS 571.101.

~~(5) All instruments/gauges required by Federal Motor Vehicle Safety Standards to be illuminated shall be illuminated.~~

~~(CC)~~(DD) Insulation.

(1) Bus body shall be fully insulated in the roof and all body panels to deaden sound, reduce vibrations and heat transfer. ~~Insulation,~~

(2) Fire resistant fiberglass insulation or equivalent material of at least one-inch ~~minimum~~ thickness shall be added in the roof, in addition to the usual sprayed on material.~~, shall be a fiberglass or equal material and fire-resistant.~~

~~(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-eighths inch five-ply type CD exterior grade. Plywood shall extend to fire-wall 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.~~

~~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.~~

~~(3) Option to plywood floor: Equivalent material applied to top of steel floor may be used to replace plywood, provided it has equal or greater insulation R-value, sound abatement, deterioration-resistant and moisture-resistant properties.~~

~~(DD)~~(EE) Interior.

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

(2) All school buses shall require inner lining on ceiling and walls and shall include ~~sound abatement package~~ acoustical (perforated) headlining in the driver area.

(3) The interior sound level at the driver's seating position shall not exceed ninety decibels when measured in accordance with test procedures found in 49 CFR 393.94(C).

(4) Cameras and other monitoring devices may be installed inside the bus as long as they do not intrude into the head impact zone. For "Type C and D" buses, cameras may be installed in the ceiling as long as they are above the window ling. Cameras mounted on the sidewall cannot protrude more than three inches. All camera mounting shall meet FMVSS 571.222.

(5) Padded/foam covered panels may be installed on the interior walls to prevent head injuries by self-abusive pupils.

(a) The padded panels shall be constructed of the same materials used in the construction of the bus seats.

(b) The padded panel may cover the window.

(c) The padded panel shall be attached to the sidewall of the bus.

(d) The padded panels shall not obstruct any portion of an emergency window or exit.

(e) Materials used in the padded panel shall comply with FMVSS 571.302.

~~(EE)~~(FF) Inside body height shall be a minimum of seventy-two inches ~~or more~~ measured from floor to ceiling at any point on longitudinal center line from the beginning of the aisle of the passenger compartment to the end of the aisle.

For "Type A" buses, the inside body height shall be a minimum of sixty-eight inches ~~or more~~ measured from floor to ceiling at any point on longitudinal center line from the beginning of the aisle of the passenger compartment to the end of the aisle.

Inside height measurement does not apply to air conditioning equipment.

~~(FF)~~(GG) Lamps, signals and backing warning device.

(1) All lamps herein listed and their installation shall conform to current standards and recommendations of the society of automotive engineers and meet FMVSS 571.108.

(2) Construction of components:

(a) Directional signal, stop light, taillight, marker light, clearance light, identification light, back up light and reflector lenses shall meet applicable society of automotive engineers standards.

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

(c) Alternately flashing warning signal lamps, body-mounted directional signals and stop lamps shall be grounded.

(3) When the ignition switch is in the off position, the hazard warning, stop light, marker lights, headlamps, passenger dome lights and emergency exit audible warnings shall be operational.

(4) The service door step-well light shall automatically operate when the headlights are in operation and be activated by a switch controlled by the service door. ~~The light shall be a minimum of six candlepower.~~

(5) High beams are to be controlled by a column mounted dimmer switch.

(6) A maximum of two fog lamps may be installed. Fog lamps shall be amber in color.

(7) Daytime running lamps are required.

(8) One white strobe light shall be installed on the roof of the bus. The strobe light shall cycle sixty to two-hundred forty flashes per minute. The roof strobe light shall be installed on the top of the bus toward the rear as close to the center of the bus as is practical.

~~(6)~~(9) Interior dome lights.

(a) Passenger dome lights when activated shall adequately and uniformly illuminate aisleway to three to four foot candles.

~~(b) Each dome light shall have a minimum candle power of fifteen.~~

~~(c)~~(b) All dome lights shall be equipped with clear/white shatter-proof lenses.

~~(d)~~(c) Passenger dome lights shall be controlled by ~~a switch~~switches in the driver's console. Passenger zones may be switched separately. Power shall be provided when the ignition switch is in the "On" or "Accessory" position and shall be on a protected circuit.

~~(e)~~(d) A separate driver dome light shall be provided and controlled by a single switch in the driver's console.

~~(7)~~(10) Directional signals.

(a) Side and rear directional signals shall be wired to operate properly with the front directional signals.

(b) 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.

(c) Direction signals, when illuminated, shall be amber in color and shall meet society of automotive engineers specifications.

(d) Rear directional signals shall have a minimum of thirty-eight square inches of illuminated surface each. The rear directional signals shall be identical in type, shape, size, and location.

~~(8)~~(11) Backing warning devices.

(a) Two back up lights are required and shall be mounted on or below the belt line on the school bus body. Back up lights shall conform to FMVSS 571.108.

(b) All school buses shall be equipped with an audible electrical warning device, automatically actuated when the bus is in reverse gear. Device shall be one hundred seven decibels or more, meeting SAE standard J994. Device shall be installed in an area on or behind the rear axle ~~(except "Type A")~~. A variable volume sounding device ranging from eighty-seven to one

hundred twelve decibels may be used, maintaining a minimum of five decibels above the ambient noise level. Audible electric warning devices shall meet FMVSS 571.112.

~~(9)~~(12) Stop/tail lights.

(a) Each bus shall have two combination stop/tail lamps as required in FMVSS 571.108. These two lamps shall be identical in type, shape, and size.

(b) In addition to the two stop/tail lamps required by FMVSS 571.108, each bus shall be equipped with two combination stop/tail lamps with a minimum illuminated surface area of thirty-eight square inches, emitting red light plainly visible from a distance of five hundred feet to the rear. These lamps shall be as high as practical 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. These additional two lamps shall be identical in type, shape, and size.

~~(10)~~(13) A white light shall be installed to illuminate the area on the body near the left lower brake/tail lamp to illuminate the state identification number. This light may be incorporated into the lower left brake/tail lamp.

This light may be incorporated into the lower left brake/tail lamp.

~~(11)~~(14) All school bus body lamps and reflectors shall comply with FMVSS 571.108.

Reflectors shall not be combined with any other lamp or items of associated equipment. Exception-front amber reflectors may be incorporated into a front lamp.

~~(12)~~(15) All marker, clearance and identity lamps shall conform to society of automotive engineers standards for the type of lamp. These lamps shall be activated by the chassis headlight ~~swith~~switch.

~~(13)~~(HH) Alternately flashing warning signal lamps.

~~(a)~~(1) Each school bus 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 FMVSS 571.108 and the SAE standard J887. The four red signal lamps shall be identical in type, shape, and size.

~~(i)~~(a) There shall be a system in place to allow the deactivation of the amber signal lamps without the need to open the service door or placing the ignition switch in the off position.

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

~~(b)~~(2) Operation of alternately flashing warning signal lamps, stop signal arm and optional crossing control arm.

~~(i)~~(a) Power for these devices shall be provided when the ignition switch is in the on position. An optional master switch may be installed for these devices. If installed, a green pilot light shall illuminate to indicate the system is ready for operation.

~~(ii)~~(b) With the service door closed and the manual momentary (amber) start switch activated and released, the amber pilot light and amber warning lamps shall flash.

~~(iii)~~(c) When the service door is moved toward the open position, the amber pilot light and the amber warning lamps shall turn off and the red pilot light and red warning lamps shall flash.

~~(iv)~~(d) The stop signal arm and, if installed, the crossing control arm shall automatically extend when the red warning lamps flash. The stop arm signal lamps shall flash when extended.

~~(v)~~(e) When the service door is closed, the red warning lights shall deactivate, the stop signal arm and, if installed, crossing control arm shall retract.

~~(vi)~~(f) With the service door open and the manual momentary (amber) start switch activated and released, the red pilot light and the red warning lamps shall flash and the stop signal arm and, if equipped, the crossing control arm shall extend. The stop signal arm lamps shall flash when extended.

~~(vii)~~(g) The service door switch that activates the red warning lamps shall be located in a position by a cover or guard that will prevent the switch from being activated or deactivated by persons boarding or leaving the bus.

~~(viii)~~(h) An emergency override system for activating the red warning lamps and extending the stop signal arm shall be installed.This emergency override system shall be operational with the ignition switch in any position.

~~*(a)*~~(i) A red colored or red outlined emergency override switch shall be installed. This switch shall be marked with the words ~~"~~"Emergency warning lights"~~"~~ (abbreviation is acceptable). This shall be the only red colored or red outlined switch on the switch panel.

~~*(b)*~~(ii) When the emergency override system is activated, the red pilot light and the red warning lamps shall flash and the stop signal arm shall extend with the door in any position.

~~*(i)*~~*(a)* The stop signal arm lamps shall flash when extended.

~~*(c) The system shall be operational with the ignition switch in any position.*~~

~~*(d)*~~(iii) Power for the system shall be on a protected circuit.

~~(c)~~(3) Hoods may be installed above the lamps. If installed, all the lamps shall have hoods.

(4) Eight lamp warning system.

(a) LED "strobelike" effects may be used in the eight lamp warning system. All lamps shall conform to FMVSS 571.108.

(b) All eight amber and red lamps must alternate between left and right at a rate of sixty to one-hundred twenty cycles per minutes.

(c) The "strobe" effect must appear as a flash of varying intensity and not as separate flashes.

(d) All the warning lamps, amber and red, must "strobe" in the same pattern. The same pattern is defined as the same number of flashes per lamp before the system alternates to the other side.

~~(GG)~~(II) Length of a school bus shall not exceed forty-five feet, excluding safety devices/ bumpers.

~~(HH)~~(JJ) Markings - body shall display the following identification (in black lettering):

(1) ~~"~~"School Bus"~~"~~ at least eight inches high on both the front and rear of the body. Lettering shall be placed as high as possible without impairment of visibility. The “School Bus” marking shall be on a background of retro reflective national school bus yellow material. The material shall be the same quality and type as

Federal Motor Vehicle Safety Standards requires for the marking of emergency exits.

(2) “"Stop"” on the rear of the bus in letters not less than ten inches centered on the metal panel of the rear emergency door or for rear engine buses, centered on the rear of the bus.

(3) Name of the private school, school district, school bus owner or operator shall appear on both sides of the vehicle at the belt line and be at least five inches high.

(4) The county in which the private school or the school district resides shall appear on both sides of the vehicle in a minimum of three-inch letters, unless the name of the city or exempted village appears as a part of the school district or private school name.

(5) When required by FMCSR 390.21, the ownership of the school bus (company name, city, state and USDOT number as required by FMCSR 390.21) shall appear on both sides of the bus. The right side markings shall be to the rear of the service door below the floor rub rail. The left side markings shall be in the area of the stop signal arm below the floor rub rail. The markings shall be in two inch high letters. Only the information required by FMCSR 390.21 shall be displayed.

(6) Local school bus numbers approximately five inches high and shall be located as follows:

(a) On body near the service door.

(b) On the body, near the right lower tail light.

(c) On the left side of the body in the area of the driver's window.

(d) Visible to the front, in an area designated by the operator.

(7) Buses shall be marked with reflectorized material as follows: All reflectorized material shall be a ~~tetro~~retro reflective material which meets FMVSS 517.217 for marking of emergency exits. In addition:

(a) All reflective material shall be able to retain at least fifty per cent of the reflective values for a minimum of seven years.

(b) All reflective material shall be warranted against peeling, cracking, separation and lifting due to weather conditions, pressure and mechanical washing for a minimum of seven years.

(c) Reflective yellow material two inches in width (plus/minus one forth inch) shall be applied to both corners of the rear of the bus and extend from the bumper vertically up to the top of the rear windows.

(d) All emergency doors and windows shall be outlined in yellow only. Emergency roof exits shall be outlined in either red, yellow or white around the outside perimeter with reflective material as required by FMVSS 571.217.

(e) Both sides of the bus body shall be marked with retro reflective national school bus yellow material, extending the length of the body (passenger area) and located at approximately the floor line. This marking shall be two inches in width and run parallel with the rub rails.

(f) Three seven by fourteen-inch wide pieces of white to white-silver in color reflective material shall be applied to the front and rear of the bus to accommodate the state identification and local bus numbers as follows:

(i) State identification number on the front of the vehicle shall be placed on a seven by fourteen-inch piece of reflective material which shall be applied and centered on the front bumper. If the bumper is manufactured with the holes in the center for two hooks, the seven by fourteen-inch piece of material may be located on the driver's side of the bumper. If the bumper is less ~~that~~than six inches in height, a seven by fourteen-inch plate will be permanently attached to the bumper to accommodate the seven by fourteen-inch reflective material.

(ii) In the rear, the state identification number and the local number shall be placed on individual seven by fourteen-inch pieces of reflective material which shall be applied and centered on the flat surface near the left and right lower taillights as the bus body design will allow.

(8) Additional markings are permitted as follows and are optional:

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

~~(b) "Stay Back 10 Feet" in four-inch white-silver material may be applied and centered to the front and rear bumpers. Letters shall be italicized and be Helvetica typle font.~~

~~(c) Rear bumper may be marked diagonally forty-five degrees with two-inch wide strips of yellow grade-five material two inches apart.~~

~~(d)~~(b) Maximum of two American flags, overall size of each decal shall not exceed six inches by eleven inches, shall not interfere with required markings and shall not ~~be a~~obstruct the view of the driver~~obstruction~~.

(c) Buses used for transporting special needs may display two universal handicap emblems. The emblems shall be reflectorized white on blue located on the front and rear bumpers.

~~(e) Buses with wheelchair lifts, used for transporting children with physical disabilities, may display two universal handicap symbols located below the window line. Such emblems shall be white on blue and shall not exceed twelve inches in size and may be reflective.~~

~~(f)~~(d) Route number or marker bracket beside entrance door.

~~(g)~~(e) ~~Roof~~Optional roof ID numbers, if used, shall be black in color and must measure eighteen inches tall by ten inches wide with a brush stroke of three inches.

~~(II)~~(KK) Mirrors.

(1) The buses shall be equipped with mirrors meeting the requirements of FMVSS 571.111 for school buses.

(2) Interior rear view mirror shall be a minimum of six by thirty inches. Exception: "Type A" - Six by sixteen inches.

(3) All exterior mirrors shall be heated and fully adjustable.

(4) Mirror assemblies shall be warranted one hundred per cent replacement coverage for thirty-six months against rust, and corrosion, and against any reduction in clarity of view due to discoloration or other deterioration of the lens.

~~(JJ)~~(LL) Mounting of body on chassis.

(1) Isolators shall be placed between the frame and body main cross-sill and intermediate members. The isolators shall be at least one-fourth inch thick and

shall be attached to chassis frame or body members in a fashion to prevent the isolators from shifting, separating or displacement of the isolators under severe operating conditions.

(2) 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.

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

~~(KK)~~(MM) Mud flaps - All buses shall be equipped with mud flaps at all wheel positions. The mud flaps shall be installed as close as practical to the wheel. May use a system for suppressing flying spray on a wet surface. Such system may consist of filament type, which is installed around the fender wheels. A full width mud flap or a full-width filament type plastic skirt may be placed at the rear wheels. May utilize rubber fender extensions. Length shall be in accordance with section 5577.11 of the Revised Code.

~~(LL)~~(NN) Noise suppression switch.

(1) Shall be installed within easy reach of the driver in a seated position.

(2) Switch shall be an on/off type.

(3) Shall deactivate factory installed devices that produce noise. (Exception - devices installed in "Type A" buses during the manufacture of the chassis/cowl).

(a) AM/FM radios

(b) Heaters

(c) Air conditioner fans

(d) Fans

(e) Defrosters

(4) This switch shall not deactivate safety systems, such as windshield wipers, lighting systems or two-way communication systems.

~~(MM) 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 shall meet SAE standard J1019.~~

~~(NN)~~(OO) Openings created in mounting of bus body to chassis shall be sealed by manufacturer to prevent entrance of gases, dust or moisture into passenger and driver's compartments. All openings made by the manufacturer in the floorboard and fire-wall shall be sealed by the manufacturer to prevent gases from entering the driver's compartment. ~~Boots for the accelerator pedal, gearshift, and emergency brake, when required, shall be supplied by the manufacturer.~~

~~(OO)~~(PP) Paint standard.

(1) Paint finish coats to bus body, hood, cowl and all attaching sheet metal and fiberglass parts shall be warranted for sixty months or one-hundred thousand miles whichever comes first~~with no mileage limit~~, one hundred per cent parts and labor, for adhesion and color retention.

(2) Paint finish to bus body, hood, cowl and all attaching sheet metal and fiberglass parts shall be applied for a total dry thickness at a minimum of one and eight tenths mils over all painted surfaces.

(3) Body exterior.

All exterior body and chassis sheet metal including fiberglass shall be painted with polyurethane paint or equivalent.

(4) All interior panels, walls, and roof surfaces shall be painted. ~~May be unpainted finished~~Finished metal/plastic may be unpainted.

~~(PP)~~(QQ) Passenger seats.

(1) All seating and restraining barrier design and construction must meet the provisions of FMVSS 571.222. ~~In addition, 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 unpressed surface of the seat cushion.~~ The top surface of the restraining 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) Equipment installed above the seating area must comply with head impact zone requirements found in FMVSS 571.222.

(4) All school buses equipped with attachment points, securement devices (seatbelts), and/or wheelchair securement systems shall also be equipped with a durable webbing cutter having a full width hand-grip and protected blade. The cutter must be appropriately stored in the driver's compartment to the left of the driver.

This equipment may be excluded from the manufacturer's bid and purchased separately.

~~(4)~~(5) Seat construction.

(a) Seat, seat back cushion, seat bottom and restraining barrier shall be covered with flame-barrier fire-retardant seating material. Such material must pass the "National School Transportation Specifications and Procedures" school bus seat upholstery "Fire Block" test.

(i) The flame 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, fire retardant seating material will successfully prevent the underlying padding material from being exposed to the flames.

(b) All seat backs and restraining barriers shall be covered with energy-absorbing padding material as required by FMVSS 571.222.

~~(QQ)~~(RR) ~~Power train~~Engine power.

(1) Diesel engines shall have a minimum of two-hundred horsepower and five-hundred twenty foot pounds of torque.

(2) Gasoline engines shall have a minimum of two-hundred sixty-five horsepower and four-hundred sixty foot pounds of torque.

~~Diesel engines~~

~~Passengers~~	~~Minimum horse power~~	~~Minimum torque~~	~~Maximum revolutions per minute~~
~~10-48~~	~~160~~	~~350 foot/pounds~~	~~3000~~
~~49-54~~	~~165~~	~~350 foot/pounds~~	~~3000~~
~~55-59~~	~~175~~	~~400 foot/pounds~~	~~3000~~
~~60-84~~	~~185~~	~~400 foot/pounds~~	~~3000~~

~~Gasoline engine~~

~~Passengers~~	~~Minimum horse power~~	~~Minimum torque~~	~~Maximum revolutions per minute~~
~~10-48~~	~~160~~	~~275 foot/pounds~~	~~3800~~
~~49-54~~	~~180~~	~~290 foot/pounds~~	~~3800~~
~~55-59~~	~~180~~	~~290 foot/pounds~~	~~3800~~
~~60-84~~	~~190~~	~~310 foot/pounds~~	~~3800~~

~~(1)~~(3) All diesel engines shall be equipped with a block heater. Heater shall be a minimum of seven hundred fifty watts.

~~(2)~~(4) Dry type air cleaner with an air filter restriction indicator is required.

~~(3)~~(5) Engine shall be equipped with a fast idle (air, electronic, or manual) throttle.

~~(RR)~~(SS) School safety zone decal

(1) The decal shall be approximately seven inches by seven inches. At the top of the decal shall be the word "NOTICE", underlined, and immediately below the word “NOTICE” the symbol for no handgun allowed. Below the no handgun symbol, the decal shall state in black lettering on a white background “Unless Otherwise Authorized By Law, Pursuant to Ohio Revised Code Section 2923.122, No Person Shall Knowingly Possess, Have Under The Person’s Control, Convey Or Attempt To Convey A Deadly Weapon Or Dangerous Ordnance Onto A School Bus (School Safety Zone).”

(2) No other markings, symbols or lettering are allowed on the decal.

(3) The location of the decal shall be on the flat metal surface just above the seat rub rail to the immediate left of the service door. The right edge of the decal shall be within two inches of the end of the rub rail.

~~(SS)~~(TT) Service door.

(1) Service door shall be outward-opening, split-type on all buses. Service door shall be air, electric, or manually-operated. Door shall be under the control of the driver and designed to afford easy release and prevent accidental opening.

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

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

(4) Glass in service door shall provide maximum area of visibility for operation of the bus.

(5) All edges of service door shall be sealed by a flexible material to prevent air from entering the door entrance when closed.

(6) There shall be no safety rail or handholds mounted on the inside of the service door.

(7) Only one handle or handhold may be placed on the outside of the service door.

(8) There shall be a head bumper pad installed on the inside at the top of the service door frame. This pad shall be approximately four inches in width and extend across the entire top of the service door opening and shall meet FMVSS 571.302 for flammability standards of interior materials.

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

(10) Manual service door.

(a) When a manual lever is used, no parts shall come together so as to shear or crush fingers. Lever shall be equipped with an approved safety latch to prevent accidental opening which will lock in the over-center position when door is fully opened. Manually operated doors shall require no more than twenty-five pounds of pull to close and may be hydraulically assisted.

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

(11) On power-operated service doors, the emergency release valve, switch or device to release the service door must be placed above the required head bumper or at the same height to the immediate left or right of the service door and must be clearly labeled.

(a) When the switch or lever is in the released position, it will override door control in driver’s area making it non-operational in any of the door control positions.

(b) Whenever the switch or lever is placed in the released position, it will allow the service door to be opened or closed freely.

(c) This switch and distribution block that control eight light warning system shall be securely fastened near the door control valve and shall be easily accessible for service and repair.

~~(TT)~~(UU) Service door steps.

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

(2) Service door entrance shall be equipped with step risers that do not exceed ten inches. Risers in each case shall be approximately equal.

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

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

(5) Hand rails 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 hand rails shall be securely fastened and designed so as to prevent clothing or any other item from being caught. Hand rails may also be yellow polymer coated.

(6) Surface of steps shall be of non-skid material.

(a) Steps shall be covered with a covering material which shall have non-skid characteristics. Step covering shall have a turned-down nosing of a contrasting color of either white, silver, 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.

(7) The service door steps shall have a restraining barrier that is in compliance with FMVSS 571.222 positioned between the stairwell and the passenger compartment. This barrier shall be equipped with a modesty panel.

~~(UU)~~(VV) Steering system.

(1) All school buses shall be equipped with heavy-duty, truck-type integral power steering.

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

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

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

~~(VV)~~(WW) Stop signal arm.

The stop signal arm(s) shall comply with the requirements of FMVSS 571.131 (School bus pedestrian devices).

~~(WW)~~(XX) Sun visor.

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. If only one sun visor is installed, it shall be positioned for use by the driver. Exception - "Type A" shall be manufacturer's standard.

~~(XX)~~(YY) Tires, rims and wheels.

(1) Manufacturer or authorized dealer shall balance all wheels and make necessary alignments prior to delivery.

(2) Dual rear tires and wheels shall be provided (except "Type A".)

(3) All tires on a given axle shall be of same size, tread design, construction and capacity.

(4) All shall be equipped with tubeless radial tires of proper size and load range that meets or exceeds~~for~~ chassis gross vehicle weight ratings and body combinations as required by FMVSS 571.120.

(5) Disc wheels shall be used.

(6) Wheel composition - wheels shall be made of steel or aluminum.

~~(YY)~~(ZZ) Tow hooks.

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

(2) Two front tow hooks may be installed, with the hooks and their mounting of sufficient strength to tow the vehicle at the vehicle's curb weight.

~~(ZZ)~~(AAA) Transmission.

(1) Manufacturer shall furnish an automatic transmission or automated manual transmission ~~unless the school bus owner specifies a manual transmission~~.

(2) The torque rating of the ~~automatic~~ transmission shall meet or exceed the maximum torque output of the engine.

~~(3) Manual transmissions shall be full synchromesh in all forward gears except first and reverse.~~

~~(AAA)~~(BBB) Vehicle identification plates - All chassis serial number identification plates shall be attached to the bus and be clearly identifiable and legible for the entire life of the bus.

~~(BBB)~~(CCC) 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 to permit the installation of tire chains per SAE standard J683.

~~(CCC)~~(DDD) Width - Overall width of a bus shall not exceed one hundred and two inches, excluding mirrors.

~~(DDD)~~(EEE) Windows.

(1) Driver's side window shall be capable of opening and be equipped with a lock-type closure. Exception - "Type A" buses shall be manufacturer's standard.

(2) Each side window in the passenger area shall be split sash and provide unobstructed opening at least nine inches high and twenty-two inches wide, obtained by lowering the upper sash. If the bus body design does not allow for all windows to meet the width dimension requirement, up to two side windows per side in the passenger area may be less than the twenty-two inches. They may or may not open.

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

(4) Windows may be tinted pursuant to section 4513.241 of the Revised code. Any window tinting must also meet FMVSS 571.205.

~~(EEE)~~(FFF) Windshield washers.

(1) The windshield washer fluid reservoir shall have a minimum capacity of two quarts in a rigid plastic container. It shall be mounted outside the interior of the bus and in a position readily accessible for refilling,

(2) Windshield washer shall incorporate a check valve in supply line. Check valve will not allow washer fluid to drain back into washer tank when not in use.

(3) Heated windshield wipers and heated washer fluid units are permitted.

~~(FFF)~~(GGG) Windshield wipers.

(1) ~~Will be equipped with two~~Two heavy-duty windshield wipers are required.

(2) Windshield wipers to be operated by one or more electric motors.

(3) Windshield wipers shall be controlled with one switch. Switch shall provide multi-speed operation and shall incorporate an intermittent position.

(4) Wipers shall be wet arm type.

(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. The blade holders shall be the type that permits replacement of only 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.~~

~~(GGG)~~(HHH) Wiring.

(1) All wiring shall conform to current society of automotive engineers standards. Wiring diagrams must be made available to school bus owners.

(2) Short circuit protective devices shall be provided for each major circuit and all other electrical functions, except starter motor and ignition circuits. ~~If equipped with a fuse box, replacement fuses shall be carried.~~

(3) 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 the form of an appropriate type of insert shall be provided.

(4) Wires not enclosed within body shell shall be fastened securely at intervals of not more than twenty-four inches.

(5) All joints shall be soldered or joined by equally effective connectors.

~~(IIIII)~~(III) Lift equipped buses.Buses equipped with wheel chair lifts shall also meet all applicable paragraph of rule 4501-5-03 of the Administrative Code.~~If~~

~~the bus is used to transport pupils with disabilities, the bus shall also meet all applicable paragraphs of rule 4501-5-03 of the Administrative Code.~~

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Certification

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