



OHIO SCHOOL BUS APPROVED OPTION LIST

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OHIO STATE HIGHWAY PATROL Licensing and Commercial Standards

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This list is prepared and maintained in compliance with Ohio Administrative Code 4501-5-04.

Summary of Changes

1. Doors
2. Driver Assist Equipment
3. Lights and Lamps
4. Undercoating

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Adjustable accelerator and brake pedals installed by the manufacturer.

Air conditioning.

- **Installed prior to 9-1-2003:** Units cannot protrude into the head impact zone of any passenger seat.
- **Installation or bid date of bus after 9-1-2003:** Units cannot protrude into the head impact area of any passenger seat as described in FMVSS 571.222. The units cannot decrease the inside body height per rule 4501-5-03 (O) and 4501-5-06 (M) effective 9-1-2003. The units shall not decrease the headroom at the entrance door, steps, aisle way or any emergency door.
- No unit shall interfere with any emergency exit in violation of FMVSS opening requirements.
- Air conditioning units may be installed above the rear emergency door under the following conditions:
 - Shall not interfere with any emergency exit in violation of FMVSS opening requirements.
 - Shall not extend into the passenger area of the vehicle beyond the following dimension:
 - Measuring from the interior surface of the emergency door at the location of the door latch, twelve inches excluding padding.
- All exposed edges shall be rounded or padded.
- Padding shall meet FMVSS 571.302

Alarm systems:

- Audible warning alarm may be located on the firewall or the front of the school bus, to work in conjunction with the warning light system. May do one or both:
 - The audible warning will sound to alert pedestrians that the bus is about to move. The audible warning will sound after the entrance door has been closed. The alarm shall be installed to manufacturer's recommendations.
 - The audible warning will sound to alert pedestrians that the bus is approaching the bus stop. The warning shall activate with the cycling of the amber warning lights. The audible warning will stop when the entrance door has been opened. The alarm shall be installed to manufacturer's recommendations.
- No automated warning sounds or announcements shall be permitted when the entrance door is open and students are boarding or leaving the school bus.
- Alarm system may be installed which requires the driver to go the rear of the bus to deactivate. An on-board internal alarm on the system may also be used. Directions for disarming these types of alarms shall be displayed on the front bulkhead in the driver's area.
- Drawstring alarm system in the entrance door.

Audio Devices:

- AM/FM radios, cassette, compact disc players must be permanently mounted, either OEM or automotive style aftermarket. If aftermarket, must be installed per manufacturers instruction.

Automatic radiator shutters.

Automatic tire chains:

- Power-operated but must be controlled from the driver compartment.

Auxiliary fuel-fired heaters:

- These auxiliary heaters should 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 manufacturer's recommendations so as not to exhaust in a manner which will endanger passengers. The heater should not require adjustment 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 meet all applicable federal and society of automotive engineers' tests. Ventech heaters have been approved as an auxiliary heater.

Battery box and fuel tank:

- On buses used to transport pupils with disabilities, the battery box and fuel tank may be located by the manufacturer to provide equal weight distribution to compensate for power lift weight.

Battery emergency disconnect switch:

- Must be installed and maintained to manufacturers specifications.
- Low voltage automatic battery disconnect switches are approved if the switch is connected to and works only off the accessory side of the ignition switch.

Brake equipment:

- "Visual" brake stroke indicators.

Broom, snow brush, ice scraper, and trash container:

- May be installed without a letter of authorization. All equipment must be secured in the driver's area.

Clocks:

- Either OEM or automotive style aftermarket. If aftermarket, must be installed per manufacturers specifications.

Cruise control:

- Installed by school bus manufacturer or authorized dealer.

Diesel engine starting systems.

Doors:

- Entrance service door lock. This lock may only be installed if a key is required to move the lock from the unlocked position to the locked position.
- Rear emergency door lock. Bus engine will not start when the door is locked (starter interlock).
- Service door may be black.
 - **Note:** Special service doors shall not be black.
 - **Note:** Left side driver's door on type A and A II buses shall not be black.
- Safety edges may be installed in the entrance door. The device must detect both pinch and drag potentials and must notify the operator visually and audibly.

Drive wheel sanders.

Driver Assist Equipment:

- **Communication Equipment:**
 - Wireless web connectivity equipment may be installed on a school bus.
- **GPS:**
 - GPS tracking and telemetry equipment may be installed on a school bus that provides a record of the vehicle's position and operations. The device shall not require any driver intervention to operate while the vehicle is in motion.
 - GPS routing assistance equipment may be used, but does not replace the driver's responsibility to study the route prior to travel, and the school must provide all required elements of Ohio school bus route sheets as mandated by ODE.
- **Interior/exterior Cameras:**
 - Display(s) shall be in the rear view mirror.
 - The camera(s) will be mounted in such a way that they will not interfere with the safe operation of the bus, cause vision obstruction for the driver, or cause harm to any passenger.
 - Camera(s) that provide a picture or video of a red light violations shall be used in conjunction with driver testimony in accordance with all applicable sections of the Ohio Revised Code. Refer to 4511.751 of the Ohio Revised Code.
- **Monitoring Devices:**
 - The use of electronic vehicle monitoring devices is allowed. Some examples would be, vehicle information, detect speed, lane departure, following distance, brake assist, and identify persons and or objects in and around the school bus.
 - All alerts from these devices may be visual, audible, and or haptic warnings that provide tactile alerts (e.g. a driver's seat or steering wheel vibrates).

Equipment shall be installed so that it does not interfere with the driver's ability to operate the OEM controls of the vehicle, and shall be completely isolated from the vehicle's electrical system by means of a fuse or breaker. All devices shall be mounted in such a way that they will not interfere with the safe

operation of the bus, cause vision obstruction for the driver, or cause harm to any passenger. These devices do not negate the responsibility of the driver to remain in the driver's seat and at the controls at all times. Prior to the use of any new equipment, school bus operators should be trained in their use as outlined by the manufactures.

Dual tire air pressure equalizing system.

Eight lamp warning system:

- LED "strobelike" effects may be used in the eight lamp warning system. All lamps shall conform to Federal Motor Vehicle Safety Standards 571.108 S5.1.4, SAE J887 and Ohio School Bus Construction Standards. All eight yellow and red lamps must alternate between left and right at a rate between sixty and one hundred twenty cycles per minute.
- The "strobe" effect must appear as a flash of varying intensity and not as separate flashes.
- 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.

Electrical fuses:

- If a bus is equipped with a fuse box, proper assortment of replacement electrical fuses may be carried.

Electronic Pre-Trip Recorders:

- The installation of sensors on the bus is allowed if:
 - Does not interfere with the safe operation of the bus.
 - Does not cover any required markings.
 - No larger than two (2) inches by two (2) inches in size.

Engine hour meter.

Engine monitoring systems:

- These systems shall 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.

Fiberglass replacement fenders and cowl pieces.

Fire suppression system:

- Fire suppression systems must be installed per the manufacturer's recommendations and checked annually by a qualified technician.
 - Installation shall not interfere with the driver's ability to operate any OEM controls and shall be completely isolated from the vehicle's electrical system by means of a fuse or breaker.
 - The suppressant delivery points may be installed in the engine compartment, battery box, and undercarriage of the vehicle.

- Mounting of the system shall be outside of the passenger compartment and have no effect on the vehicles structure to include welding or drilling into the main frame.
- The cylinder and gauges shall be contained in a metal protective box and marked on three sides in 2 inch red letters "Fire Suppression" on a white background.
- The system shall be isolated to prevent accidental discharge of the suppression contents.
- A monitor to show the status of the unit may be installed in the driver's area in such a way as to not interfere with the safe operation of the bus.

Flat floors.

Fold-out step:

- Installed at the regular service entrance which will provide for the step level to be no more than six inches to ground level. The fold-out step may be power activated or manually operated.

Grab Handles:

- May also be yellow polymer coated.

Heated windshield wipers and heated washer fluid units.

Horn:

- Air horn.

Hybrid:

This standard is to address a hybrid-electric school bus which is powered by a combination of an electric motor and an internal combustion engine.

- A. Factory build hybrid electric school bus shall meet all Federal Motor Vehicle Safety Standards and all Society of Automotive Engineers standards that are applicable at time of manufacture. The school bus shall meet Ohio School Bus Construction Standards under Ohio Revised Code 4501-5 in effect at the time of manufacture or bid date.
- B. Retro-fitted or converted school bus shall meet all Federal Motor Vehicle Safety Standards and all Society of Automotive Engineers standards in effect at the time of the retro-fit or conversion. The school bus shall meet Ohio School Bus Construction Standards under Ohio Revised Code 4501-5 in effect at the time of the conversion or retro-fit.
- C. Additional requirements if not addressed in paragraph A or B.
 1. Markings
 - a. The outer layer of insulation or wiring conduit on high-voltage wiring shall be bright orange.
 - b. All enclosed compartments which contain high-voltage components shall be labeled with a High Voltage marking/warning.
 - c. "HYBRID ELECTRIC POWERED" shall appear on the school bus body in the following locations:

- 1) At the immediate rear of the service door below the floor level rub rail.
- 2) At or near the driver's side window.
- 3) On the rear of the bus below the window line.
- 4) All marking shall be black in color, two inch uppercase lettering and the maximum width consistent with the size of the lettering. Option color for the rear marking may be white if located on the rear bumper.
 - (a) If a manufacturer wishes to deviate from these marking requirements, the manufacturer shall submit a request in writing for consideration.
2. A power disconnect device or switch shall be provide at or near the power source of the electric propulsion system.
 - a. This disconnect device or switch shall be clearly marked.
 - b. If located inside a compartment, the compartment shall be clearly marked also.
 - c. This device or switch shall not be in or accessible from the passenger area.
3. Electric propulsion system power source.
 - a. Shall not be located in or accessible from the interior of the school bus.
 - b. Shall be contained in compartment/s
 - c. The compartment shall provide protection to the components in event of a crash.
 - d. The compartment shall be designed to prevent any dangerous fluids or fumes from entering the passenger area.
4. There shall be an automatic impact-actuated cut-off or disconnect switch or device to shut-off the high voltage components at the power source in the event of a crash.
5. A heat shield shall be installed at any point where the distance is 12 inches or less between the high voltage system and exhaust system.
6. The failure of the electrical system of the hybrid system shall not disable the school bus from operating with the internal combustion engine.
7. A retro-fitted/conversion school bus which modifies the drive train/chassis from original manufacture specifications shall maintain the structural integrity as originally designed.

Insulation:

- Equivalent non-wood material may be applied on top of the steel floor in lieu of plywood provided the material has equal or greater insulation R-value. The material shall be moisture resistant. Prior to installation, the installer/manufacturer of the product must provide in writing that the material meets the appropriate construction standards for insulation. All optional insulation products shall be approved by the Ohio School Bus Construction Standards Advisory Committee before installation.

Interlock Systems:

- **Service brake interlock:**
 - Service door - A system may be installed which automatically applies the service brakes when the red warning lights are activated and the service door is opened. If the service brake interlock system malfunctions a continuous amber light, mounted on the driver's control panel with an

identification label and a unique audible warning will activate. The system will do a self-test when activated with the amber warning light and audible warning momentarily going on and off indicating the system is working.

- Lift door - A system may be installed which automatically applies the service brake when the lift door is open. If the service brake interlock malfunctions a continuous amber light, mounted on the drivers control panel with an identification label, and a unique audible warning will activate. May be installed to meet FMVSS 571.403/404.
- **Transmission/Parking Brake Interlocking Devices:**
 - Interlocking device which will "lock" the transmission/parking brake. Prior to installation of the device, the device and installation must be approved by the guidelines established by OAC 4501-5-09.

Lettering/Markings/Symbols:

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

- **Reflective markings:**
 - Additional markings permitted as follows; may be installed as a package or individually.
 - "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 of the helvetica type font.
 - Rear bumper may be marked diagonally forty-five degrees with two-inch wide strips of yellow grade five material two inches apart.
- **American Flag Decal:**
 - Maximum of two.
 - Overall size of each decal shall not exceed six (6) inches by eleven (11) inches.
 - The decal(s) shall not be affixed where the decal(s) will be a view obstruction for the driver.
 - The decal(s) shall not interfere with any other markings required by Ohio school bus construction standards.
- **Universal handicap symbols:**
 - 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.
- **Route number or marker bracket beside entrance door.**
- **Roof ID Numbers:**
 - Shall be black in color. Must measure 18 inches tall by 10 inches wide with a brush stroke of three inches.

Lights/Lamps:

- Red and white or red and amber LED lights. Installed on the corners above the front and rear bumpers. Red emergency exit lights to mark inside emergency doors/windows.
- Lamp monitoring system.
- Fog lamps. A maximum of two-fog lamps amber in color. Daytime running lights.

- Lighted school bus signs.
- White strobe light. One allowed, between sixty (60) to two hundred forty (240) flashes per minute. Strobe light shall be installed on the top center of the bus toward the rear.
- A twenty-candlepower under-hood light.
- Light emitting diode lamps and halogen lamps, which meet applicable requirements of FMVSS 571.108.
- Additional lighting as approved by the Americans with Disabilities Act and installed by the school bus manufacturer.
- Additional rear illumination lighting shall only operate when vehicle is in reverse gear. The lighting may be installed under the body in the area of the rear axle, one surface or flush mounted lamp on each side in the body skirt behind the rear wheel, or two surface or flush mounted on rear of body with one each on opposite sides of the emergency door. The light shall be white in color. Maximum of two auxiliary lamps permitted. Auxiliary lighting shall be at a candle power and location not to glare into other traffic.
- **Headlight Shields:**
 - Installed to reduce glare from crossover mirrors.
 - The shields (eyebrows) shall not cover, reduce the effectiveness or interfere with the headlight.
- **Headlight Warning Tone:**
 - An audible tone or buzzer will make the driver aware that the headlights are still on. This would occur when the key is in the off position or removed from the ignition.

Mirror:

- Interior observation mirror. One may be mounted at the rear of the school bus above the emergency door. This mirror must be made of shatterproof high-stress Plexiglas or equivalent. The edges of mirror must be protected with heavy vinyl coating. This mirror shall not exceed eighteen inches by twenty-four inches and shall have dual-mounting brackets.
- Remote-controlled mirrors. Must meet FMVSS 571.111 for school buses.
- These mirrors must be controlled from the driver compartment and may include the day/night option.

Mud Flaps/Fender Moldings:

- A system for suppressing flying spray on a wet surface. Such a 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.
- Rubber fender extensions.

Oil-lubricated wheel bearings.

Paint trim: This option is no longer in effect as of January 1, 2007.

- Window sash, window posts and window trim may be black in color. Any bus manufactured prior to January 1, 2007, with this option is allowed to continue to be painted as from the manufacturer. This option may not be added to any bus, if the option was not applied at time of manufacture.

Panels:

- Body panels if other than steel or composite material may be used only if meets FMVSS 571.221.
- Special padded/foam covered panels may be installed on the interior walls (to prevent head injury to self-abusive children) following these guidelines:
 - The padded panels shall be constructed of the same materials used in the construction of the bus seat(s).
 - The special panel may cover the window.
 - The panel(s) shall be attached to the sidewall of the bus.
 - The panels shall not obstruct any portion of an emergency window or exit.
 - Materials used in the construction of the special panels shall comply with FMVSS 571.302.

Power Outlet:

- 12-volt dc covered power outlet in driver's area.

Power ventilator.

Pressurized automatic lubrication systems:

- Such systems shall apply lubrication to specific components at a predetermined mileage interval.

Prism:

- Mounted to the upper window of the rear emergency door, designed to give the driver a wide-angle view of the area immediately behind the school bus.

Programmable engine idle time limit.

Public address system:

- An outside speaker is permitted. If an outside speaker is used, it shall be yellow or gray in color.

Ramp device:

- May be installed to load and unload students.
- Ramps shall be of nonskid construction. 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.

Rear window air dam:

- To direct wind down across the back of the bus to keep the rear window clean.

Right-side sun visor:

- Must be at least six inches by sixteen inches in size.

Route sheet clipboard:

- A clipboard containing route sheets may be securely attached to the bus within reach of the driver.

Safety lugs and clamps:

- May be used on wheels that use multi-piece rims.

School bus crossing control arms/gates:

- Gates shall be activated automatically with the initiation of the red warning lights.

Seat belt cutter:

- Will be stored in the first aid kit or securely mounted to the left of the driver.

Seats:

- Adjustable air driver's seat (six-way or eight-way). Heated driver's seat from the manufacturer.
- Child restraint seats built into regular school bus seats that meet FMVSS 571.213.
- Seat belt seats or seat belt ready seats. Seat belt seats and seat belt ready seats shall meet all applicable FMVSS.
- Minimum width of isle between seats shall be twelve inches at seat level and top of seat back.

Sound abatement package:

Overall length of the bus.

Spare tire and rim:

- Must be securely mounted underneath the vehicle.

Speed retarder system:

- Performance standard – shall maintain the speed of a fully loaded school bus at 19.0 mph on a seven (7) percent grade for 3.6 miles.
- If equipped with electro-magnetic retarder(s) shall have increased electrical system capacity commensurate with the needs of the retarder system.
- Pilot lights shall indicate when retarder is in operation.
- The driver shall be able to disengage the system when road/weather conditions warrant.

Storage compartments:

- Storage compartments outside the school bus under the floor and in place of the skirt side panels. Equipment type storage boxes, supplied by manufacturers, installed under the bus seats.
- An emergency equipment cabinet installed in the driver's compartment to include the body fluid cleanup kit, fire extinguisher, first aid kit, and the highway warning kit. This cabinet, if installed, shall be labeled in contrasting colored letters at least two inches high and identify the contents within and shall not protrude into the driver or passenger impact zones as established in FMVSS 571.222. The cabinet shall not decrease the headroom at the entrance door, steps, aisle way or any emergency door.
- Fireproof storage pouch may be secured to the barrier behind the driver's seat or on barrier at stair well.

Student tracking device (RFID) readers:

- RFID tags will be mounted to the right of the driver/controls and at the top of the stair well. No driver interaction and no catch points.

Tachograph.

Third rub rail:

- Installed on the lower edge of the body skirt. If installed shall be painted black or yellow.

Tilt or tilt telescoping steering wheel.

Tires and Lug Nut Indicators:

- Multi-seal; Water-based high performance tire sealant.
- Indicators must match the color of the rim.

Windows:

- Tinted windows pursuant to section 4513.241 of the Revised Code and in compliance with FMVSS 571.205.
- Insulated windows – Window frame shall not protrude into the passenger compartment.

Two-way radios:

- Either OEM or aftermarket. If aftermarket, must be installed per manufacturers specifications.

Undercoating:

- The entire underside of the bus body, including floor sections, cross member and below floor-line side panels, may be coated with rust-proofing material that meet or exceed all performance requirements of SAE J1959.

White painted exterior roof panels.

Prior Installed Options:

- Any options installed prior to the effective date of this option list, under the previous School Bus Standards (OAC 4501-5-09 and 45-1-5-10), will continued to be allowed if in compliance with the appropriate construction standard.
- Any option installed after the effective date of the revised 4501-1-09 shall meet the requirements of this list.

Approved option(s) must work to pass annual inspection:

- All approved options installed must be in working order during the annual inspection. If the approved option is not installed properly, or not working, no decal will be issued until the item is removed or fixed.