Kentucky Minimum Specifications for School Buses 2023

KDE

Jason E. Glass Commissioner of Education

Kentucky Department of EDUCATION

KDE Contact:
Elisa Hanley
300 Sower Blvd
Frankfort, KY 40601

(502) 564-5279, Ext. 4406

elisa.hanley@education.ky.gov

FOREWORD

The 2023 Kentucky Minimum Specifications for School Buses was developed through the cooperative efforts of the State School Bus Specifications Revision Committee, which is composed of local district superintendents, transportation supervisors, driver training instructors and bus maintenance technicians. Representatives of the manufacturers of school bus chassis and bodies provided technical assistance.

Upon approval by the Kentucky Board of Education, this document becomes the official school bus specifications for Kentucky, as provided by KRS 156.153, and will be in effect until revised.

These specifications hereby supersede and take precedence over all similar specifications previously adopted and cancels all existing “approved equal” certifications as well as construction approvals or waivers.

Contents

GENERAL PROVISIONS

SCOPE

The appropriate sections of these specifications apply to all school buses used for pupil transportation in Kentucky, which are purchased, owned or operated by a district board of education, and to all school buses leased or contracted to a district board of education by private owners for the transportation of pupils to and from school and school related events.

FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS)

All bidders and suppliers of school bus chassis and bodies are hereby instructed that all new school buses sold in Kentucky for use in transporting pupils to and from school and school related events shall be certified by the manufacturer as meeting all of the applicable Federal Motor Vehicle Safety Standards, herein named FMVSS.

SECTION I

This section applies to Type "A-1", Type "A-2", Type "C" and Type "D" school buses unless specified as an exception in another part.

TYPE "C" – A Type "C" school bus is a body installed upon a flat back cowl chassis with a gross vehicle weight rating of more than 10,000 pounds, designed for carrying more than ten persons. All the engine is in front of the windshield and the entrance door is behind the front wheels.

TYPE "D" FC – A Type "D" FC school bus is a body installed upon a chassis, the engine mounted in the front, with a gross vehicle rating of more than 10,000 pounds, designed for carrying more than 10 persons. The engine shall be behind the windshield and beside the driver's seat. The entrance door is ahead of the front wheels.

TYPE "D" RE – A Type "D" RE school bus is a body installed upon a chassis, the engine mounted in the rear, with a gross vehicle weight rating of more than 10,000 pounds, designed for carrying more than 10persons. The engine shall be aft of the rear axle. The entrance door is ahead of the front wheels.

SECTION II

This section applies to Type "A" school buses with a rated pupil capacity of 16 and 22.

TYPE "A" – A Type "A-1" school bus is a conversion or body mounted on a truck chassis cab with a gross vehicle weight rating of 10,000 pounds or less, designed for carrying more than 10 persons.

TYPE "A-2" – A Type "A-2" school bus is a conversion or body, constructed upon a van-type compact truck or a front-section vehicle with a gross vehicle weight rating of 10,000 pounds or more, designed for carrying more than 10 persons.

SECTION III

This section of the specifications applies to those buses designed for the transportation of special needs pupils. The specifications described are minimum specifications for the purpose of transporting special needs students in the Commonwealth of Kentucky. Any special needs requirement needing specification modifications greater than those listed within, or that would fall out of the recognized performance

parameter, shall require approval from the Kentucky Department of Education (KDE), Division of District Support Services, Pupil Transportation Branch.

SECTION IV

This section of the specifications applies to those buses designed for the transportation of students utilizing alternative fuels. Any special requirement needing specification modifications greater than those listed within, or that would fall out of the recognized performance parameter, shall require approval from the KDE, Division of District Support Services, Pupil Transportation Branch.

SECTION V

The specifications in this section apply to optional accessory equipment that may be installed by Kentucky school districts. Optional equipment installation is not to be considered by manufacturers when preparing bid quotations. Manufacturers may be required to quote on a bid document for the purchase cost of certain optional equipment. Cost of optional equipment in this section shall be borne by the purchasing school district.

MANUFACTURERS' SERVICE RESPONSIBILITIES

Prior to the award of bid to the successful chassis bidder, the manufacturer of said chassis shall designate an appropriate truck service engineer, based in the zone of the selling dealer, whose purpose shall be to provide service for Kentucky school buses. The designated truck service engineer shall be responsible for Kentucky school buses, regardless of overlapping zone boundaries. The designated truck service engineer shall also be responsible for working with the selling dealer, the Pupil Transportation Branch and the pre-delivery service dealer to ensure purchasers of receiving adequate pre-delivery service and warranty repairs.

Manufacturers of completed Type "C" and "D" school buses (chassis and bodies) shall provide for chassis representation in the manner as stated in the preceding paragraph.

CHANGES IN SPECIFICATIONS

Any part of these specifications may be changed at any time by addenda adopted by the Kentucky Board of Education. Changes may be made at any time by the Director of the Pupil Transportation Branch in order to bring the specifications into compliance with the changing FMVSS.

VENDOR'S RESPONSIBILITIES

It is the responsibility of all bidders and vendors to avail themselves of any changes in these specifications, made by addenda, and approved by the Kentucky Board of Education after the effective date of these specifications. Vendors shall only provide districts items for the school bus which are approved in this manual and priced during the bid process.

CERTIFICATION FOR PURCHASE

Purchasers of Kentucky school buses may receive from KDE's's Pupil Transportation Branch in Frankfort information concerning those manufacturers meeting the requirements as outlined in the 2023Kentucky Minimum Specifications for School Buses.

Manufacturers shall furnish the Pupil Transportation Branch with necessary information and specifications to determine compliance with the 2023 Kentucky Minimum Specifications for School Buses.

CERTIFICATION OF PRE-DELIVERY SERVICE

All school bus bodies and chassis shall receive pre-delivery service prior to delivery of the completed bus. The chassis and body shall receive the normal manufacturer's pre-delivery service and complete the requirements of the Pupil Transportation Branch as outlined on the Pre-Delivery Service Form.

WARRANTY

Body and chassis warranty shall be five years, 100,000 miles, bumper to bumper, excluding normal wear and tear items. Repairs under $500 may be completed at the district's maintenance facility with the dealer supplying the parts and the district supplying the labor at the district's discretion. The date in which the body warranty shall begin will be stated as part of the invitation to bid on Kentucky school buses. Major component pass through warranty shall be filed with the KDE at the pre-bid award conference. All bus bodies shall be warranted against rust for 10 years (not pro-rated).

CHASSIS WARRANTY

One copy of the chassis/body manufacturer's bus warranty and service handbook shall be shipped to each purchasing school district. Pass through warranty shall be handled by the selling dealer without additional charges to the local district.

NOTE: The in-service date of the chassis warranty shall be stated as part of the invitation to bid on Kentucky school buses (normally Aug. 15).

PARTICIPATION IN PRODUCT PILOTS

All product pilots shall be done at no cost to the state of Kentucky or to a local school district. Any district that wishes to participate in a pilot is required to receive written permission from the KDE's Pupil Transportation Branch prior to performing the pilot. A detailed written monthly report shall be provided to the KDE. At least one school district representative with in-depth knowledge of the pilot must be present at the Kentucky School Bus Specification Meetings to answer questions from the committees. Each vendor providing the piloted item must provide a quarterly report to the KDE reflecting any changes, upgrades, issues or other pertinent information regarding the product and its current pilot status.

SPECIAL INSTRUCTIONS TO SUPPLIERS

PILOT MODEL

Body and/or chassis supplier representatives shall meet with the Pupil Transportation Branch for a pre-pilot conference to clarify and interpret specifications prior to the building of pilot models.

The body and/or chassis supplier shall provide a pilot model that the manufacturer proposes to furnish to meet the 2023 Kentucky Minimum Specifications for School Buses for inspection by representatives of KDE's, Pupil Transportation Branch in Frankfort, KY. This is to be done prior to placing the body or chassis into production. All components approved at the time of the pilot model inspection shall be those components installed throughout the completion of the chassis or body build.

Subsequent changes, after the pilot model inspection, will require written approval from KDE's, Pupil Transportation Branch and can be made only after a determination of equal has been made.

During construction and/or completion, a representative of KDE's, Pupil Transportation Branch, Frankfort, KY, shall have the right to inspect school bus chassis, school bus bodies or any combination thereof. For the purpose of this contract, not more than two pilots and one production visit shall be considered reasonable compliance. Subsequent production/pilot inspections, required at the discretion of the approval agent, shall result in the vendors being charged $1,000.00 per additional inspection.

SERVICE MANUALS AND DIAGNOSTICS

Body and/or chassis suppliers, including integral suppliers, shall provide each school district purchasing school buses with one complete set of the most current service manuals available or access to them electronically at no additional cost during the life of the bus including: body, chassis, engine, wiring locator. Body parts manuals shall also be provided during the life of the bus at no additional cost. Body and/or chassis suppliers shall also supply the ability to access first level diagnostics, for the engine and transmission or access to them at no additional cost during the life of the bus. The on-board diagnostics (OBD) system is identified as first level diagnostics.

In order to meet the requirement of first level diagnostics, all Kentucky school buses shall be equipped with on-board diagnostics (OBD) which can identify fault codes for the engine, emissions system, transmission, body, and chassis modules. Body and/or chassis suppliers, including integral suppliers, shall provide training on the OBD systems at no additional cost to the local district.

If the new bus OBD data port is incompatible with the previous year's data cables, or the district has not previously received the needed bus data port cables from the selling vendor, the vendor shall supply the appropriate cables or adaptors, at no additional cost to the district, on the basis of one complete set per school district.

The ability to force a regeneration on the diesel particulate filter shall be included.

Manuals shall be provided based on one complete set per school district with the bus invoice, prior to delivery of the completed school bus.

Districts shall be responsible for purchasing any additional cables, software, or tools needed to diagnose or repair the school bus that goes beyond the first line diagnostics provided.

APPROVAL OF DESIGNS, CONSTRUCTION AND EQUIPMENT

In all cases in these specifications, in situations where approved equals or exceptions may be required, as meeting the 2023 Kentucky Minimum Specifications for School Buses, KDE's, Pupil Transportation Branch, Frankfort, KY, shall be the approval agency.

In the case of an "approved equal" or an "exception" to the 2023 Kentucky Minimum Specifications for School Buses the school bus chassis manufacturers, the school bus body manufacturers and/or the school bus equipment manufacturers are required to have written approval prior to the installation of an "approved equal" item or an "exception." This information must be presented at the annual specification's revision meeting with documentation, or must be presented, along with all documentation, to the Pupil Transportation Branch no later than 30 days prior to the bid opening. "Exceptions" or "approved equals" will NOT be accepted for consideration after this date.

For Kentucky's school bus purchasers to have the advantage of improved designs, improved type of construction, new and improved equipment and to facilitate the manufacturing and delivery of these buses, said approval agent shall have the discretion to waive minor formalities and variations for these specifications.

In determining the relative merits of certain designs, types of construction and equipment, said approval agent shall have the discretion to authorize the use of certain non-specified designs, types of construction and equipment to be used on an experimental basis, provided that adequate safety measures are maintained.

All buses where an approved equal has been utilized, a copy of the KDE approval letter shall be provided to the school district by the vendor upon delivery of the school bus.

All approved equals are only valid for the year of the specification it was requested. The vendor shall request an update to the specifications the following year, or no longer utilize the approved equal the following year.

ACKNOWLEDGMENTS

The KDE's, Pupil Transportation Branch, wishes to acknowledge the following individuals for their participation in developing the 2023 Kentucky Minimum Specifications for School Buses.

STATE MECHANICAL SPECIFICATION COMMITTEE MEMBERS

Marcus Dobbs, Meeting Mgr. Transportation Director Fayette County Schools	Chris Schadler Transportation Director Walton/Verona Ind Schools	Jeff Aulick Superintendent Hazard Ind. Schools
Mark Yaden Lead Mechanic Laurel County Schools	Steve Woods Service Manager Pulaski County Schools	Dale Penn Service Manager Franklin County Schools
James McGlone Jr. Head Technician Scott County Schools	Pete Jones Transportation Foreman Jefferson County Schools	Wayne Winters Transportation Director Crittenden County Schools
John Preston Shop Supervisor Fayette County Schools	Alan Blythe Vehicle Maintenance Manager Warren County Schools	Randy Smith Transportation Director Mayfield Ind. Schools

STATE SAFETY SPECIFICATION COMMITTEE MEMBERS

Marcus Dobbs, Meeting Mgr. Transportation Director Fayette County Schools	Chris Schadler Transportation Director Walton/Verona Ind Schools	Kenneth O'Quinn Driver Trainer Pike County Schools
Reda Reinhart Transportation Director Todd County Schools	Jeff Aulick Superintendent Hazard Ind. Schools	Kim Koontz Driver Trainer Coordinator Jefferson County Schools
Wes Alexander Transportation Director Henderson County	Kevin Whitt Transportation Director Henry County	John Hymore Driver Trainer Boone County Schools
Tim Adkins Driver Trainer Elliott County	Steve Burton Transportation Director Adair County Schools	

SECTION I PART 1
Type C, A, and D BUS CHASSIS

The specifications in this section apply to type "C" conventional school bus chassis with a rated pupil capacity of 34 through 75, and are general specifications for type "A" 16 and 22 passenger capacity and type "D" 66 through 84-passenger school buses unless listed as an exception in Section II, Part 1.

AIR CLEANER (GENERAL REQUIREMENTS)

A dry, element-type air cleaner shall be provided. The air cleaner and the element shall meet all appropriate SAE J726 tests per engine application. All air cleaners shall be single-stage and equipped with a latching restrictor gauge.

All air cleaner locations shall be designed for accessibility from the outside frontal area except for the Type D, Rear Engine. The air filter capacity shall be so designed to provide for a minimum of 50,000 miles use in a normal environment.

NOTE: Type "D" RE air shall be drawn from the upper corner of the body (window level or above) and ducted to the filter to provide the cleanest and coolest air possible to the engine.

AXLE (FRONT)

The front axle shall have a gross axle weight rating not less than the minimum rating shown in the following table:

Type	Chassis (Passenger Capacity)	Gross Axle Weight (Pounds)
"C"	34	7,500
"C"	52	7,500
"C"	66-75	10,000
"D" FC	70-78	13,200
"D" RE	66-84	13,200

Axles shall be equipped with oil bath bearings.

AXLE (REAR)

All rear axles shall be single speed, with the gear ratio determined when the order is placed. (The Pupil Transportation Branch and the chassis manufacturer will jointly determine the proper ratio for the duty cycle the vehicle is to operate.)

NOTE: In regard to the rear axle ratio design parameter, rear axle ratio shall be determined for each engine power combination to provide for maximum efficiency in a pickup delivery duty cycle 0 to 35 miles per hour attainable road speed at a minimum of 70 miles per hour within recommended rpm range.

The manufacturer shall provide a rear axle having an axle weight rating not less than the minimum rating shown in the following table:

Type	Chassis (Passenger Capacity)	Gross Axle Weight (Pounds)
"C"	34	15,000
"C"	52	17,500
"C"	66-72	19,000
"D" FC	70-78	19,000
"D" RE	66-84	23,000

NOTE: The chassis manufacturer shall reduce the noise level of the rear axle to acceptable limits if the rear axle is determined to be the cause of noise (sound pressure) radiated to the interior of a school bus measured at a reference point one inch from the ear of any seated person and exceeding 85 decibels.

BRAKES

GENERAL REQUIREMENTS

All brake lining shall be of asbestos-free material.

STRAIGHT AIR BRAKES

School bus chassis of 34 passenger capacity and larger shall be equipped with "s-cam type" straight air braking systems. All air brake equipped chassis shall be equipped with Bendix 4-Channel ABS, Wabco 4-Channel ABS, or Wabco 6-Channel ABS.

The antilock braking system shall be a full vehicle, wheel control, minimum 4-channel system. The antilock system shall contain an in-dash diagnostic capability. The ABS computer shall be part of the relay valve and frame rail mounted in a serviceable location or as a separate unit under the dash in a serviceable location.

NOTE: Wires passing through the frame rails shall be grommeted to prevent chafing.

AIR CHAMBER

Air brakes installed on Type "C" and "D" school bus chassis shall be equipped with the largest appropriate brake components (chambers and linings) based on the chassis configuration. All brake chambers shall be MGM Long Stroke. If the manufacturer anticipates that this requirement will result in any brake imbalance between axles, it shall be the responsibility of that manufacturer to adjust the chamber size to produce a balanced brake system.

NOTE: All linings shall be ground for optimum drum contact. All brake linings shall exhibit 85% to 100% lining to brake drum contact after FMVSS 121 by dynamometer testing as referenced from the mid-point of the shoe radius.

All linings for air brake systems shall be constructed of asbestos-free material and meet the following minimums:

Type	Passenger	Axle	Brake Lining
"C" FRONT	34	7,500 #	15 x 3.5 inches
"C" REAR	34	15,000 #	16.5 x 3.5 inches
"C" FRONT	52	7,500 #	15 x 3.5 inches
"C" REAR	52	17,500 #	16.5 x 7 inches
"C" FRONT	66-75	10,000 #	15 x 4 inches
"C" REAR	66-75	19,000 #	16.5 x 7 inches
"D-FC" FRONT	70-78	14,000 #	16.5 x 5 inches
"D-FC" REAR	70-78	19,000 #	16.5 x 7inches
"D-RE"FRONT	66-84	13,200 #	16.5 x 6 inches
"D-RE" REAR	66-84	23,000 #	16.5 x 8 inches

AIR TANKS (TYPE D)

The air tanks shall be similarly located and mounted as currently installed on the conventional air brake school bus chassis.

AIR COMPRESSOR

The air compressor shall be a minimum 13.2 cubic foot capacity. The air compressor shall be Bendix Corporation Tu-Flo 550, Wabco NW-250 15.2 cubic foot capacity.

NOTE: Air intake shall be filtered through the engine air filter on all diesel-powered chassis.

AIR DRYER

An air dryer shall be installed on all air brake systems. The air dryer shall be Bendix AD-9. Dryers shall be equipped with an internal heater, mounted on the left chassis frame rail or other approved location, and bracketed for easy serviceability. All the plumbing from the air compressor to the input of the air dryer shall be routed for direct entry into the air dryer, utilizing soft flow bends and eliminating all sumps in air lines. The supply line from the compressor to the air dryer shall be steel-braided Teflon.

NOTE: Installation of the air dryer and routing of the airlines shall require prior approval by the Pupil Transportation Branch and the air dryer manufacturer.

NOTE: If the steel braided teflon supply line is not extended to the air dryer on type D buses, the braided portion shall be of enough length to ensure that engine vibration is isolated from the air dryer.

GENERAL REQUIREMENTS

A manually operated "pet cock" valve shall be installed on all air tanks indexed for serviceability.

The chassis manufacturer shall provide an accessible accessory outlet for the air-operated stop arm, subject to the approval of the Pupil Transportation Branch.

BRAKES

The parking brake lever shall be clearly marked and located in convenient reach of the driver in a normal seated position. The Pupil Transportation Branch shall approve the location of the parking brake valve.

Bendix Intellipark Park Brake valve may be used in place of the air brake PP-1 valve.

BRAKE ACTUATORS

Brake actuators shall be designed for mounting on the forward side of the rear axle.

SLACK ADJUSTERS (AUTOMATIC)

Automatic slack adjusters shall be installed as original equipment on all air brake systems and have worm adjustment screws for continuous adjustment with external grease fittings. Automatic slack adjusters shall be Haldex Model No# AA1 or SABA, or Meritor. Grease fitting shall be indexed for serviceability.

NOTE: All air brake system component groups shall be of the same manufacturer for the total order. All drums shall be equipped with dust covers. The inspection sight slots shall be indexed to allow easy viewing of the friction material.

Spring brake air chambers shall have a means for manually caging springs.

BUMPER (FRONT – TYPE "C")

The front bumper shall be constructed of steel, a minimum 3/16 inch thick, one piece construction, a minimum of 8-inches in width, ends extending to outer edge of the fender and closed. The bumper shall be designed and formed to equate in strength in frontal and quarter loading to a strength that would allow it to support the weight of the vehicle during jacking at selected jacking points.

COLOR

All chassis components shall be painted with lead-free paint. The chassis manufacturer shall paint the Chassis, including the front bumper black. The front fenders and cowl areas are to be painted "National School Bus Chrome (Yellow)," in accordance with the colorimetric specification of Federal Standard 595A, Color 13432. (For the color of the hood and grille, refer to "Hood" section.)

COOLING SYSTEM

A coolant recovery system shall be provided. All coolant overflows, if applicable, shall be run outside of the engine compartment and extend below the frame rail. The coolant system shall be monitored by an audible and visual signal for over-temperature conditions and shall be in the driver compartment (refer to "Engine" section). Coolant shall be the manufacturers recommendation.

DRIVE SHAFT (PROPELLER SHAFT)

Either Meritor or Spicer drive shafts are acceptable. The drive shaft and drive shaft components shall be made and assembled in total by either Meritor or Spicer. All carrier bearings shall have an inner race so that failure of the bearings shall not damage the drive shaft. Each section of the drive shaft (propeller shaft) shall be protected by a heavy-duty guard or guards bolted to frame members to prevent it from whipping through the bus floor or dropping to the ground if broken.

NOTE: The chassis manufacturers shall be required to demonstrate their ability to ensure correct driveline angles, alignment and phasing prior to the bid award.

ELECTRICAL SYSTEM

The electrical system shall be 12 volt.

ALTERNATOR

The electric power source shall be a heavy-duty, bus-type alternator; a minimum of 185-ampere minimum output at 7,500 RPM rotor speed and a minimum of 74-ampere output at normal recommended engine idle speed; driven by a serpentine belt; designed and sized not to exceed the alternator bearing speed. The rotor shall be of a diameter that would not be destructive to belts being used. The alternator shall be pad mounted on the top side of the engine with the regulator indexed for easy service. The regulator shall be preset to 14 Volts. It shall not have a cold, continuous draw in excess of 10 milliamperes and shall be self- energized with a cut in speed less than low engine idle speed. The alternator shall be Leece-Neville, 4939 PAH, 4932 PAH, or AVI 160.

VOLTMETER

The chassis shall be equipped with a high-quality voltmeter, energized only when the ignition switch is on.

BATTERY

All chassis shall require installation of three low maintenance or maintenance-free "Group 31" batteries. The batteries shall be designed for heavy-duty deep cycling bus operation, constructed of thermal-rigid hard rubber or heavy plastic case and designed to resist damage from road shock and heat distortion. The battery shall be a minimum B.C.I group, size 31, 12 volts, 180-ampere-hour capacity cold-cranking current 625 amps with top post terminals.

All batteries shall be mounted in a sliding/roller tray accessible through body skirt. All battery cables shall be securely routed to the left frame rail location without crossing over the top of any frame member. Routing and clamping of conductors shall be pre-engineered to the point of termination outside the left frame rail. Both battery cables shall attach to the battery posts, or battery terminals, with a bolted connector. Manufacturers shall coordinate with KDE’s Pupil Transportation Branch for approval of location.

WIRING HARNESS

All conductors from the alternator to the battery shall be continuous in length and uninterrupted by fusible links or shunts. The conductors shall be sized to provide at least a 25% greater current-carrying capacity than the design output of the alternator (minimum 4-gauge wire).

The conductor between the alternator and the battery shall be routed in a manner that will provide the least distance between points of termination. A separate ground conductor from the alternator to the engine shall be provided (minimum 4-gauge wire). There may be a 200-amp mega-fuse installed between the alternator and the batteries to avoid electrical spiking provided this fuse is clearly visible, identified and serviceable.

POWER TERMINAL

Wiring from the power source in the wiring terminal shall have a continuous current-carrying capacity of 125-amperes (minimum 4-gauge wire).

The conductor shall be of continuous size, uninterrupted by fusible links, fuses or circuit breakers. The terminal shall be of the single post-type stud, minimum of 1/4 inches, located on the firewall above the toe board on the left-hand side, subject to the approval of the Pupil Transportation Branch.

LIGHT TERMINAL

The chassis manufacturer shall provide a wire terminal, adjacent to or in the under-dash area of the left side panel, accessible to the body company for the connection of the rear brake lights, taillights, turn signal lights and back-up lights. A terminal strip, consisting of individual terminals, with each terminal properly identified, shall be provided to meet this requirement. If a multiplex system is used the supplier shall furnish a five-year warranty on the controller and associated components. No terminal strip is necessary for a multiplex system.

FUSES

Unless field effect transistors are utilized, all fuses or circuit breakers shall be in the fuse block and properly identified for the component protected.

ENGINE

The chassis shall be equipped with one of the following diesel engines:

Engine	Minimum Horsepower	Chassis
Cummins L9	260	66-84 PASSENGER "RE"
Cummins B6.7	190	34-52 PASSENGER TYPE "C"
Cummins B6.7	210	66-75 PASSENGER TYPE "C"
Cummins B6.7	210	66-78 PASSENGER "FE"
Cummins B6.7	230	66-84 PASSENGER "RE"
Cummins B6.7	250	66-84 PASSENGER “RE”
Detroit DD5	220	66-75 PASSENGER TYPE "C"
Detroit DD5	240	66-75 PASSENGER TYPE "C"
Detroit DD8	260	66-84 PASSENGER “RE”
Detroit DD8	280	66-84 PASSENGER “RE”
Detroit DD8	300	66-84 PASSENGER “RE”

Listed below are engine components that shall be included:

1. The manufacturer’s standard deaeration tank and coolant recovery system with the overflow escape hose, if applicable, exiting the engine compartment below the frame rail.
2. An on/off Fan Clutch (electro-magnetic, or air).
3. For Diesel engine only, an engine heater with a minimum of 750 watts, 110 line voltage, with prior approved wire connection and location by KDE’s Pupil Transportation Branch. The heater receptacle shall be dust and water sealed and permanently located in a recessed area of the bumper, or prior approved location.

4. The oil filter shall be a minimum 2 quart capacity. (1.79-quart net capacity) The oil filter shall be accessible for service without the use of special tools.
5. Fuel system check valve shall be installed on the engine side of the fuel line exiting the fuel filter.
6. The engine shall be equipped with an electronic hand throttle. The throttle shall be marked "Throttle – High/Low" or “High Idle”. The hand throttle shall automatically return to idle when the service brake is depressed
7. Corrosion-resistant metal hose bibs (sized for one-inch ID heater hose), accessible to the body company for heater installation, shall be installed. Hose bibs, necessary plumbing, and indexing of plumbing shall require prior approval.
8. Engine coolant hoses, requiring clamp connection 1 inch and larger on the engine or associated components shall be equipped with a Breeze constant torque clamp.

   NOTE: All engines shall have the capability of providing a minimum free water flow of three gallons per minute at 1,000 engine rpm for bus heater operation.

9. The engine housing cover and/or school bus body frontal area shall be so designed to provide reasonable access to the engine area for inspection and maintenance needs for fluid levels, belt tension, hose, wiring and other requirements as necessary. Type D Front Engine buses shall provide a prop rod, hook and cable device, or be easily removed for technician maintenance. The engine cover shall be sealed to prevent air intrusion into the passenger area.
10. The radiator shall be of welded tube to header design. Modine Beta Weld or Behr high frequency welded aluminum or approved equal.
11. The engine shall be programed to de-rate when the oil pressure falls below the manufacturers recommended pressure.

EXHAUST SYSTEM

A total exhaust system, exhaust pipe, muffler and tailpipe shall be furnished by the chassis manufacturer, all routing to or through the bumper shall be manufactures standard for rear exhaust evacuation. A manual regeneration mode shall be included in the system. The control for the start of this system shall be designed or located to be accessible to a technician. The Control shall be ether a manual switch or a start switch in the first line diagnostic program provided by the vendor. This requires the ability to force regeneration on the vehicle diesel particulate filter when the sensors indicate it is required.

FENDERS (FRONT)

The total spread of the outer edges of the front fenders, measured at fender line, shall exceed the total spread of the front tires when the front wheels are in a straight-ahead position.

FRAME

The Type "C" school bus frame rating shall be a minimum 50,000 PSI. The frame side members shall be non-tapered and of one-piece construction. Extensions of the frame are permissible only when such alterations are behind the rear spring hanger and shall not be for the purpose of extending the wheelbase. Alterations shall be guaranteed by either the chassis or the body manufacturer whichever makes the extension. There shall be no welding to the frame side rails except by the chassis or body manufacturer and approved by the Pupil Transportation Branch. Frame rails shall be painted to avoid corrosion.

Type "D" FC school bus frames shall be a minimum 50,000 PSI rated, full straight channel aft of centerline of the front axle.

NOTE: No items installed on the chassis shall extend above the top of the frame rails. Any item installed close to the top of the frame rails shall be far enough below them to permit reasonable access for service of said item. Any item installed on the frame rails shall not extend closer to the ground than 18 inches unless positioned in a location to ensure that the break over angles relative to approach and departure will provide for equivalent ground clearance.

Type "D" re 66-84-passenger main frame shall be a continuous section from the front of the vehicle to aft of the rear suspension components with inner liners. The frame shall have a minimum RBM of 850,000 inch pounds. The "C" channel insert shall extend from the rear of the main frame to a point forward of the rear suspension mounting points.

FUEL TANK

Fuel tanks on 52 through 78-passenger chassis shall have, as standard, a minimum capacity of 60-gallons. The fuel tank on 34-passenger chassis shall have a minimum capacity of 30-gallons. The 30 and 60-gallon fuel tanks shall have a permanent non-corrosive inner lining. The tank shall be located on the chassis right frame rail for Type "C" school buses. All fuel tanks shall contain baffles to prevent excessive sloshing of fuel.

Type "C" and "D" school buses shall require the tank to be in the manufacturer's standard location, subject to the approval of the Pupil Transportation Branch. Type "D" RE shall provide a 100-gallon fuel tank. The section where the filler neck passes through the plane of the floor shall be constructed of a minimum 14-gauge sheet metal, shall meet 60% joint strength with mechanical fasteners and shall be sealed and shall have an anti-spill design to minimize spillage in the event of body and chassis separation, roll over, or the body shifting forward on the frame rails.

The engine supply line shall be taken from the top of the tank at a location toward the center of the tank. The fuel tank, fittings or lines shall not extend above the top of the chassis frame rail. The drain plug, at least ¼ inch diameter, shall be located in the bottom of the tank. Fuel tank vents shall be equipped with fuel resistant hoses, terminating and secured in an accessible location, subject to the approval of the Pupil Transportation Branch.

Fuel tanks shall be corrosion and rust resistant. They may be coated or sealed with a rust and corrosion resistant material. The entire fuel tank, to include under the straps, shall be covered.

FUEL SENDER

The chassis manufacturer shall provide the respective body company and the Pupil Transportation Branch with fuel tank drawings, showing the location of the top tank fuel-sending unit.

GROSS VEHICLE WEIGHT RATING

The chassis shall have a GROSS VEHICLE WEIGHT RATING of the following minimums:

Type	Chassis (Passenger Capacity)	Gross Axle Weight (Pounds)
"C"	34	21,000
"C"	52	25,500
"C"	66-75	27,000
"D" FC	70-78	30,000
"D" RE	66-84	35,000

HOOD

Conventional chassis, 34 through 75 passenger buses, shall be equipped with a forward tilting, fiberglass hood. The effort required to open the hood shall not exceed 25 pounds when measured by pulling the handle at an angle parallel to the frame rails. The hood shall be painted with school bus yellow paint. The grille color shall be of the manufacturer's standard. (Paint shall be lead-free.)

NOTE: Chassis manufacturers shall be required to demonstrate their ability to brace and maintain the hood and cowl fit from the time of the chassis manufacture through the installation of the body prior to the bid award.

HORNS

Each bus shall be equipped with dual electric horns. Each individual horn shall be installed to meet the performance requirement of SAE J377, independently. The horns shall be installed in a way that will minimize water intrusion.

INSTRUMENTS AND INSTRUMENT PANEL

The chassis instrument panel shall be equipped with the following:

1. Speedometer
2. Odometer
3. Voltmeter
4. Oil pressure gauge
5. Water temperature gauge
6. Water temperature light/buzzer
7. Fuel gauge
8. Upper beam headlight indicator
9. Turn signal indicator lights
10. Air gauge (chassis with straight air brakes)
11. Red light to indicate low air pressure
12. FMVSS 105 indicator lights
13. Tachometer (manufacturer's standard - located in the instrument panel)
14. Hour meter (located in the instrument panel and switched to operate only when engine is running)

The above mentioned instruments shall be mounted in the instrument panel in such a manner that each instrument is clearly visible for drivers ranging from the 50 percentile adult female to the 95 percentile adult male, sitting in the normal seating position, as defined by SAE. Instruments shall be accessible for maintenance and repair. Instruments and controls shall illuminate for night use, controlled by the headlight rheostat.

AUDIBLE ALARMS

The chassis manufacturer shall be responsible for providing audible alarms, significantly different tone or interval, for over temperature, low air pressure and low oil pressure

LIGHTS

The chassis shall be equipped with Halogen or LED headlights and a dimmer switch. The dimmer switch location shall require prior approval of the Pupil Transportation Branch School bus chassis of all pupil capacities shall be equipped with Class "A" turn signals (front). Type "C" school buses shall have industry standard turn signals. Daytime running light shall be standard.

OPENINGS

All openings in the floor, firewall or dash panel area shall be sealed.

REFLECTORS

Reflectors, meeting FMVSS 108, shall be installed on all front fenders.

SHOCK ABSORBERS

Chassis shall be equipped with front and rear, heavy-duty, double-acting shock absorbers.

SPRINGS (FRONT-REAR)

Each front and rear spring shall have a capacity, at the ground, of the minimums/maximums shown below:

Type	Chassis (Passenger Capacity)	Front Minimum (Pounds)	Rear Minimum (Pounds)	Rear Maximum (Pounds)
"C"	34	4,000	6,500	6,500
"C"	52	4,000	8,750	
"C"	66-75	4200	9,250	
"D" FC	70-78	7,000	9,250	
"D" RE	66-84	6,500	11,500	

NOTE: In no case shall the front spring suspension have a capacity at ground less than stated above. Componentry, causing use of higher weight rated axles, shall have the spring suspension adjusted accordingly (refer to "axles" section, pages 1-2).

SPRINGS (REAR)

Air spring suspension shall be installed on all 34 through 84-passenger chassis.

NOTE: Air spring suspension shall be equipped with a single height control valve. The trim height shall equate to the spring trim height when the airbag is inflated to the manufacturer's recommended inflation rate.

STEERING COLUMN (WHEEL)

All Type "C" and "D" buses shall be equipped with a tilt adjustable steering column.

STEERING MECHANISM

All school bus chassis, in all passenger capacities, shall be equipped with heavy-duty, truck-type, Ross integral, power steering gear. Power steering components shall be compatible with the GVW rating for each capacity.

NOTE: The design steering effort shall not exceed approximately 70-inch pounds as measured from the center line of the steering column.

TIRES AND RIMS

Tires supplied on all Kentucky school bus chassis shall be first-line, steel belted, low profile and tubeless with highway-type tread. The date code shall be one year old or less. They shall be supplied by one of the major tire manufacturers under its own brand name and furnished as original equipment as shown in the

chassis supplier's most recent data book and specifications literature on file with the Pupil Transportation Branch. The tires shall be of the same manufacture and tread design. The tires shall be Goodyear 295/75R22.5 LR G, 295/75R22.5 LR H, Continental/General 295/75R22.5, Michelin 275/80R22.5, Bridgestone/Firestone 295/75R22.5, Cooper WORK Series RHA 295/75R22.5, Hankook 295/75R22.5.

Tires other than those listed may be approved by the KDE if extenuating circumstance prevent the availability of approved tires for an OEM. This would require the OEM obtain written permission through KDE with prior approval in writing. The OEM shall provide KDE with chassis supplier's most recent data book and specifications literature. All tires must pass the required testing.

All tires, rims and wheels shall be balanced. Any tire not balance correctable, with less than 20 ounces of weight, shall be replaced. All tires shall be evaluated by the pre-delivery servicing dealer by means of road testing. Any tire found to be out of balance at the time of the testing shall be corrected 100% by the pre-delivery servicing dealer. All tires and rims shall meet or exceed the minimums in the following table, with the rim rating capable of exceeding the maximum tire inflation pressure.

CHASSIS CAPACITY	TIRE SIZE	LOAD RANGE	RIM SIZE
TYPE "C" 34-72-PASSENGER	275/80R22.5 295/75R22.5	G	8.25
TYPE "D" FC 70-78 PASSENGER	275/80R22.5 295/75R22.5	H	8.25
TYPE "D" RE 66-84 PASSENGER	275/80R22.5 295/75R22.5	H	8.25

NOTE: All tires on a given vehicle shall be of the same brand, size and load rating. Rims shall provide a rim bead seat compatible with low profile tires. The maximum tire inflation pressure shall not allow the tire rating to exceed the rim rating.

NOTE: A 34-passenger (shell size) flat floor special needs bus may have 245/70r/19.5, LR G tires on 7.5' rims or approved equal.

TRANSMISSION (AUTOMATIC)

Chassis, 34 through 84-passenger capacity, equipped with spring-loaded rear axle parking brakes, shall be equipped with an automatic transmission.

The automatic transmission shift quadrant shall be dash mounted and located to the right of the steering column, accessible to the driver and approved by the Pupil Transportation Branch. The gearshift quadrant shall be covered by a scabbard and lighted, with provision for a backup and neutral safety switch and a positive lock shift with the reverse position forward. Transmissions shall be equipped with an automatic backup light switch.

Buses shall utilize a touch pad shifting mechanism or manufacturer approved cable-controlled scabbard shift, or steering column mounted shifter "Stalk Shifter." The "Stalk Shifter" shall be mounted on the right side of the steering column. It shall display gear selection on the dash.

The transmission shall be Allison PTS2500, PTS3000. All Allison automatics shall be filled with TransSynd, TES 295 fluid.

The school bus manufacturer shall be responsible for matching the transmission ratios, with respective engines within design parameters of the school bus operation.

The following engines shall be equipped with the following automatic transmissions:

Engine	Horsepower	Capacity	Transmission	Standard/Option
Cummins B6.7	190	34-52	PTS2500	Standard
Cummins B6.7	210	66	PTS2500	Standard
Cummins B6.7	210	66	PTS3000	Option
Cummins B6.7	210	72-C	PTS3000	Standard
Cummins B6.7	210	72-C	PTS2500	Option
Cummins B6.7	210	70-78 FC	PTS3000	Standard
Cummins B6.7	230-250	66-84 RE	PTS3000	Standard
Detroit DD5	220	66-72	PTS2500	Standard
Detroit DD5	220	66-72	PTS3000	Option
Detroit DD5	240	66-72	PTS2500	Standard
Detroit DD5	240	66-72	PTS3000	Option
Detroit DD8	260	66-84	PTS2500	Standard
Detroit DD8	260	66-84	PTS3000	Option
Detroit DD8	280	66-84	PTS3000	Standard
Detroit DD8	300	66-84	PTS3000	Standard
Ford 6.8l V-10 Propane	320	66-75 C	Ford 6R140	Standard
Ford 6.8l V-10 Propane	320	70-78 FC	Ford 6R140	Standard
Ford 7.3l V-8 Propane	350	66-75 C	Ford 6R140	Standard
GM 8.0L V-8 Propane	339	66-75 C	PTS2500	Standard
GM 8.0L V-8 Propane	339	70-78 FC	PTS2500	Standard
Agility 488CI Propane	339	66-75 C	PTS2350	Standard
PSI 8.8L NA V-8 Propane	270	66-75 C	PTS2500	Standard
PSI 8.8L NA V-8 Propane	270	70-78 FC	PTS2500	Standard

WHEELS

Dual wheels shall be provided on the rear axle. Wheels shall be disk-type. The spacing for dual wheels shall be the manufacturer's recommendation for snow chain usage. The wheel hub drum system shall be hub-piloted, single nut, 10 bolt, ISO system and shall have outboard mounted drums for all thirty- four 34 through 84-passenger school bus chassis. All wheels shall be black.

WHEEL ALIGNMENT

All steering axles shall have a toe-in set to provide for maneuverability and longevity under a normally loaded school bus axle in a normal driving mode.

SECTION 1 PART 2
Type C, A, and D BUS BODY

The specifications in this section apply to type "C" conventional school bus bodies with a rated pupil capacity of 34 through 75 and are general specifications for type “A” 16 and 22-passenger and type “D” 66 through 84-passenger school buses.

ACCESSORY COMPARTMENT (DRIVER)

The school bus body manufacturers shall equip all bus bodies with a driver accessory compartment enclosure, which has a cover for containment of articles. The cover shall be securely closed by a positive action latch designed to avoid injury if impacted. The location of the accessory compartment shall be subject to the approval of the Pupil Transportation Branch. The compartment size shall provide a minimum 660 cubic inches and be designed to hold a 10 by 12 by 2-inch, three-ring binder.

BACK-UP ALARM

A back-up alarm shall be installed on all school buses. The back-up alarm shall meet SAE Standard J994, Type B 107 db. The back-up alarm shall be securely fastened to the bus with the location determined by the Pupil Transportation Branch at the pilot inspection and shall have an individual ground wire as close as possible to the component. The back-up alarm shall be switched on automatically through the chassis back-up light switch. All wiring shall meet SAE Standards and exceed capacity rating by 25%, protected by a fuse with routing and connections and consistent with recognized automotive wiring practices. Back-up alarms shall be rearward of the engine on Type "D" rear engine buses.

ANTIFREEZE

The bus body company shall replenish the cooling system and fill the body heater system with the manufacturers recommended antifreeze. Antifreeze type and additives shall meet the requirements of the respective engine manufacturers and radiator suppliers.

NOTE: An antifreeze decal shall be applied in the vicinity of the radiator fill neck and overflow bottle fill and shall state the type of antifreeze to be utilized.

BATTERY

All batteries shall be installed in a battery box or sliding tray with a non-locking door latch. A battery hold down bracket shall be designed for clamping action around all four sides of the battery. All chassis will be equipped with three batteries. The battery box shall be labeled with 1-inch letters. The bracket shall be designed for three "Group 31" batteries and secured to the sliding tray with a minimum of two tie-down bolts. Battery conductors entering the battery compartment shall be securely clamped to eliminate cable abrasion. (Brackets not allowing forward or lateral movement of the battery tray will not be acceptable.)

NOTE: Battery box shall be limited to battery, cables and associated wiring. Body companies shall not install relays, breakers or solenoids inside the battery box.

BODY FLUID CLEAN-UP KIT

Each bus shall be equipped with a body fluid clean-up kit, containing a minimum of:

- Nitrel rubber gloves;
- An eye shield and face mask;
- A germicidal towel effective against TB and HIV;
- A germicidal, disposable cloth;
- Chlorinated absorbent beads;
- A disposable gown, and
- A biohazard disposal bag.

The body fluid clean-up kit components shall be packaged in a metal or Poly, dust-proof container. It shall be in the OEM's common location and shall be designed to minimize the risk of snagging clothing. If stored overhead, the location shall be labeled in one-inch block letters.

BUMPER (FRONT)

Type "C" and "D" front bumpers shall be equivalent in strength and durability to pressed steel channel at least 3/16 inches thick and not less than 8-inches wide (high), shall be one piece, frame mounted with a 90% flange top and bottom. The front bumper shall be of enough strength to permit being pushed by another vehicle on a smooth surface with a five-degree, (8.7%) grade without permanent distortion. The bumper shall be painted black. The front bumper shall be designed and installed so that it will be capable of supporting the weight of the front of the vehicle during towing or when being lifted by a jack.

NOTE: Type "D" (FC, RE) buses shall be equipped with a skid plate, designed to protect the stepwell from frontal impact as would be experienced when going over a curb or dropping the right front wheel off the pavement.

BUMPER (REAR)

Type "C" and Type "D" rear bumpers shall be steel channel, a minimum of 9½ inches wide, constructed to wrap around rear corners, extending forward a minimum of 12 inches.

Bumper construction and attachments shall be designed to protect from corner or side impact, mounted for ease of removal and positioned to close openings between the bumper and body. Type "D" RE 78 through 84-passenger school buses shall be equipped with front and rear tow hooks.

All bumper end caps shall be fully enclosed. Any bumper to body opening shall be closed with trim material. The bumper shall extend at least 1 inch beyond the rearmost part of the body surface, measured at floor line. The bumper shall be painted black.

COLOR

The outside of the school bus body, excluding those components painted by the chassis manufacturer, shall be painted with lead-free primer and polyurethane surface coat. The surface coat shall be "National School Bus Chrome (yellow) " in accordance with the colorimetric specifications of Federal Standard 595A, Color 13432. The roof of the school bus shall be painted with lead-free primer and white polyurethane surface coat. White paint shall be the manufacturer's standard design except that the front and rear roof caps shall remain National School Bus Yellow.

The interior of the school bus body shall be painted the manufactures standard color (white, off white, light gray) with a lead-free primer and surface coat.

EXCEPTION: The lower interior body panels (below the window areas) may be the manufacturer's standard clear coat or bright coat aluminized steel). The manufacturer shall be required to furnish test data equating any side panel finish to the paint finish (prior to installation) in terms of durability and corrosion protection.

CONSTRUCTION

Bus body construction shall be of prime-commercial quality mill-applied galvanized steel, galvalume or a type of metal or material equal in strength and non-rust qualities to mill-applied galvanized steel. All such construction materials shall be fire-resistant. If roof caps are constructed of fiberglass, the fiberglass must be backed with a steel inner liner to protect the passenger compartment.

Any plywood utilized shall be marine grade or treated.

The floor shall be of prime commercial quality mill-applied, galvanized steel or galvalume of at least 14 gauge.

ROOF STRAINERS

2 or more roof strainers, or longitudinal members, shall connect roof bows, space roof bows and reinforce roof skin. The strainers shall extend from the windshield header to the rear header.

SIDE STRAINERS

There shall be one or more side strainers, or longitudinal members, connecting vertical structural members to prevent impact and resist penetration in the event of contact with other vehicles or objects. The strainer(s) shall be formed from metal minimum 16 gauge and shall be installed in the area between the bottom of the window and the bottom of the seat frame, extending completely around the bus body except for the door openings and the body cowl panel. The strainer(s) shall be fastened to each vertical structural member.

REAR CORNER REINFORCEMENTS

Rear corner framing of the bus body between the floor and window sill and between the emergency door posts and last side posts shall consist of at least three structural members, applied horizontally or vertically or in another combination, to provide additional impact and resist penetration equal to that provided by the frame members in the areas of the sides of the body. Such structural members shall be securely attached at each end.

FLOOR SILLS

All floor sills shall be of prime commercial quality, mill-applied galvanized or galvalume steel. Body sills shall be provided on approximately 10-inch centers. All sills shall be of equal height not to exceed 3 inches. All sills shall extend the width of the body floor except where structural members or features restrict the area. All the body sills shall be equivalent to or greater than 14 gauge.

All sills shall be permanently attached to the floor. Connection between the sides and the floor system shall be capable of distributing loads from vertical posts to all floor sills.

INTERIOR PANELS

All interior panels shall be designed so that the rear panels are lapping over the front panels. All exposed edges of the interior panels, including the shoulder rails and light bars, shall be hemmed; the design of light bars shall be provided so that there will be no separation of a lapped panel joint from a side impact.

The intrusion test shall be performed on each design of school bus and certification provided to the KDE. Intrusion tests performed, under protocol established in the Kentucky minimum specifications for school buses, revised 1991, and certification thereof, shall meet the requirements for certification under this standard unless significant changes to the body construction have occurred.

ROOF CONSTRUCTION

Mechanical fasteners shall be used in all roof panel joints to achieve 60% joint strength. Construction adhesive will not be permitted to meet the joint strength requirements (60% joint strength with fasteners only). All roof sheets shall be sealed with Ruvan or approved equal. The product supplier shall certify that recommended practice is being followed.

Manufacturers may utilize structural adhesives along with mechanical fasteners (hybrid joints) to achieve compliance with FMVSS 221. Manufacturers using adhesive for joint strength shall be capable of demonstrating to the KDE that the design of the hybrid joint in conjunction with the adhesive and mechanical fasteners used is capable of 150% of FMVSS 221 strength test.

RACK TESTING

A diagonal (racking) load test shall be performed on Type A, B, C and D school buses to assure adequate shear stiffness and strength of the bus body. Details of the test are provided in the testing portion of this manual.

SIDE CONSTRUCTION INTEGRITY

School bus body sides shall be so constructed that there will be no separation of construction joints or a lapped panel separation from a side impact. The impact test for the body shall be complete in structure with seats installed on the impact side. Body companies performing an intrusion test as part of the certification document shall include the amount of force required for penetration relative to the compliance standard. Details of the test are provided in the testing portion of this manual.

OPENINGS

The body manufacturer shall seal all openings between the chassis and passenger-carrying compartment.

DOORS

SERVICE DOOR (FRONT ENTRANCE DOOR)

Service doors for Type "A", Type "C" and Type "D" school buses shall be outward opening. All buses equipped with air brakes shall have air-operated or electric doors. Door operation and construction integrity shall require approval of the Pupil Transportation Branch. The service door shall be located on the right side of the bus, opposite the driver within his/her direct view. This door shall be operated under the control of the driver. It shall be so designed as to afford easy release and to prevent accidental

opening. All door parts, with reference to closing edges, shall be designed to minimize the possibility of crushing or shearing the body and/or hand extremities.

CRITICAL DIMENSIONS

The service door shall have a minimum horizontal opening of 24 inches and a minimum vertical opening of 68 inches. The bottom of the lower glass panel shall not be more than 35 inches from the ground when the bus is unloaded. The top of the upper glass panel shall not be more than 6 inches from the top of the door. The vertical closing edges shall be equipped with a flexible material to protect children's fingers.

DOOR OPERATOR (MANUAL)

The door opening and closing mechanism shall be a pivot device such as Cleveland 2321-A or an approved equal. This device shall have enough hand leverage to open and close the door with ease. Door operators shall be equipped with a positive latch device to retain the door in a closed position. The latch shall be so designed to provide ease of release by the bus driver through one hand operation while opening the door. It shall also be equipped with a pressure switch to operate the step well light. The entrance door operator and control rods shall be plated or otherwise treated to prevent rusting and corrosion.

DOOR OPERATOR (AIR or ELECTRIC)

The air-operated door shall meet all of the requirements of the manual-operated door with regard to the door type and folding design. This door shall be capable of being operated by a single three (3) position sequential switch, located to the left of the driver in a convenient and accessible spot, subject to the approval of the Pupil Transportation Branch. The first position shall activate the red flashing lights and the stop arm with the door closed; the second position shall open the door; returning the switch to the off position shall close the door and cancel the stop arm and red lights. The amber lights shall be controlled by a manual button located on the control panel to the left of the driver. Controls shall be a sequential operating system. If electrically operated, the system shall be designed to de-mesh the gears when de- energized.

PROTECTION

An air pressure valve shall be required for the protection of the air brake system in which air shall be drawn from the supply tank, in accordance with FMVSS 121 a means to control the door closure and opening speed shall be provided. The force required to achieve the door closure shall be a maximum of 65 pounds prior to and through the door achieving the closing plane. The door closure force shall be so constructed to minimize the occurrence of injury to persons caught in the area while in a door closing mode. The door shall be so designed to provide for manual opening in the absence of air pressure or electrical current for energizing without further action by the driver, such as manually off-loading the cylinder or de-meshing the gears.

Type "C" school buses equipped with air brakes systems shall be equipped with air-operated doors as standard equipment. Type "D" school buses shall be equipped with a power operator door as standard equipment.

HEAD BUMPER PAD (ENTRANCE DOOR, EMERGENCY DOOR SIDE AND REAR)

There shall be a head bumper pad installed on the inside door header. This bumper pad shall be approximately 3 inches in width and shall extend across the entire width of the entrance door opening. The

head bumper shall be padded a minimum of 1/2-inch foam, covered with the same upholstery material as covering the seats. The upholstery shall enclose all sides and ends. Exposed screws shall be installed with counter sunk finish washers or other means to protect the riders from impacts.

When the head bumper pad mount is used to enclose door retention hardware the cover over the hardware shall be capable of supporting a 120-pound weight when dropped from a height of 4 feet. The weight shall be attached to the cover at a single point. Self-skinning foam header pads meeting all other requirements are permitted.

EMERGENCY DOOR (REAR)

The upper portion of the emergency door shall be equipped with approved safety glass. The exposed area shall not be less than 400 square inches. The lower portion of the emergency door shall be equipped with approved ASA laminated safety glass. The exposed area shall be approximately 350 square inches.

The words "EMERGENCY DOOR," both inside and out, in letters at least 2 inches high, shall be installed. The lettering shall be a premium quality six mill fleet grade reflective film with a minimum of six year outdoor durability (Reflexite or 3M). The decal shall have a film background, "National School Bus Chrome (yellow)" in color, and light reflective with black lettering. The decal shall meet the performance requirements and reflectance measurements no less than those set forth in Federal Specification L-S300C. The decal shall be placed directly above the emergency door, on the door in the metal panel above the top glass area.

The emergency door shall be designed so as to open from inside and outside the bus and shall be equipped with a fastening device that may be quickly released but designed to offer protection against accidental release. Control from the driver's seat shall not be permitted. The provision for opening from the outside shall consist of a non-detachable device so designed to prevent the capability of hitching to but to permit opening when necessary. The emergency door hinge pins shall be made of brass or approved equal. All hinges shall be equipped with threaded grease fittings.

The emergency door opening at floor level shall be constructed to provide a recessed seal. No seal extending above the floor line will be acceptable. The emergency door shall be held open in accordance with FMVSS 217, and shall be subject to the approval of the Pupil Transportation Branch at the pilot inspection. In addition, the door's maximum swing shall be limited to 130 degrees using welting or strapping fastened to the door frame and the door. Door hinges shall have threaded grease fittings, or an enclosed hinge designed to resist corrosion.

EMERGENCY DOOR LATCH

The emergency door shall be equipped with a slide-bar, cam-operated lock. The slide bar shall have a minimum stroke of 1 inch. The emergency door lock shall be equipped with a suitable electric plunger-type switch, connected with a buzzer located in the driver's compartment. The switch shall be so installed that the plunger, contacts the outer edge of the slide bar in such a manner that any movement of the slide bar will immediately close circuit on the switch and activate the buzzer. The switch shall be properly located and adequately protected from damage when securing the door latch. The door lock shall be equipped with an interior handle that extends approximately to the center of the emergency door. It shall lift to release the lock. The handle of this latching device shall be of enough length to permit a small child to open the emergency door and shall be painted red.

The latch handle shall be protected by a steel shield of adequate width to prevent the handle from being actuated by a child falling against the emergency door. This guard shield shall have enough clearance

above the latch handle to permit easy grasp of the handle. If the handle is not easy to grasp a door pull shall be installed that will allow the full hand to be used for pulling the door closed.

Operating instructions detailing the emergency door shall be applied on the inside of the emergency door.

If the latch handle on the outside of the emergency door is not located on the extreme left-hand side of the emergency door, a door pull, open at the bottom end to prevent hitching onto, shall be affixed in the extreme left-hand location. This emergency door pull shall be constructed of heavy metal and shall be free from any sharp edges like to cause injury.

NOTE: Type "D" re shall utilize a rear emergency window to meet the above requirement.

EMERGENCY DOOR (LEFT SIDE)

School bus body shells, of 60-passenger capacity and larger, shall be equipped with a left side emergency door, installed approximately mid-ship between the last row of seats and the restrain barrier behind the driver's seat.

AISLE AND STAGING AREA

The school bus body manufacturer shall provide a minimum 12-inch wide aisle from the center aisle of the school bus to the left side emergency door and shall provide a 24-inch wide staging area in front of the left side emergency door, pursuant to the requirements set forth in the FMVSS for the rear emergency door. Flip-up seats will not be accepted.

OCCUPANT PROTECTION

The school bus body manufacturer shall provide for occupant protection as required by FMVSS 222 for all passenger's fore, aft and adjacent to the emergency door location.

FLOOR PLAN

The school bus body manufacturer shall submit floor plans at the time bid quotations are submitted showing the:

1. Location of the left side emergency door;
2. Aisle and staging area; and the
3. Seating plan depicting the load for each body shell size in which a left side door is installed.

CERTIFICATION

The body company manufacturers shall certify that all school bus bodies having a left side emergency door installed meet the requirements of the intrusion tests provided in the testing section of the manual by:

1. Performing intrusion tests, as referenced, with regard to the cylinder size and location;
2. Performing intrusion tests by placing the center point of the test cylinder so that, in a horizontal position, it aligns with the vertical centerline of the emergency door and the ends of the test cylinder span the emergency doorpost. When the intrusion test is being performed on a school bus body side, the school bus body shall be complete with passenger seats and restraint barriers properly positioned;

3. Applying a uniform force of five thousand two hundred and eighty (5,280) pounds to the left side emergency door retention hardware both before and after the side intrusion testing (certification shall require that the door retention hardware does not release or deform when the test is applied).
   NOTE: This standard is in addition to the side construction standard performed on the right side as explained previously.

EMERGENCY ROOF EXITS/VENTS

The 16 through 84-passenger school bus bodies shall be equipped with emergency roof exits/vents.

The 16 through 52-passenger school bus bodies shall be equipped with one emergency roof exit/vent as near as practical to the midpoint of the passenger compartment, on the approximate centerline of the school bus roof. The 66 through 84-passenger school bus bodies shall be equipped with two emergency roof exits/vents, one located as near as practical to a point equal distant between the midpoint of the passenger compartment and the foremost limit of the, first and last row of seats. Installation shall require the approximate location on the centerline at a midpoint between the middle and front row of seats and the middle and last rows of seats. Roof hatch openings shall be boxed on three sides by bow stringers or other stiffeners in addition to the roof sheet.

NOTE: Should the body construction not allow for the placement of the exits/vents as mentioned, an alternate location shall require written approval of the Pupil Transportation Branch.

The installation of the emergency roof exits/vents shall be performed in such a manner that will not cause removal or cutting of any roof structural component. The roof exits/vents shall be equipped with an outside release and alarm switch. This alarm switch shall be wired to an audible signal located in the driver compartment. Emergency roof exits/vents shall meet FMVSS 217.

Roof hatches shall have 1-inch National School Bus Yellow reflective tape applied around the perimeter not more than 6 inches from the mounting base applied to the roof sheets.

ELECTRICAL SYSTEM

WIRING

All ground studs shall meet three wire standard ASE J1908-9.3 ground stud criteria, coded for identification, with amperage rating of 25% greater than the designed load. The body company shall provide and clearly identify two positive leads and two grounding points for the connection of two-way radios and video cameras. These circuits shall always operate when the key is in the on position.

Each individual body circuit shall have overload protection that may be accomplished by fuses, circuit breakers or field effect transistors. If fuses are used, they must be labeled. Fuse blocks, fuses, and circuit breakers shall require prior approval of the Pupil Transportation Branch. All circuit wiring shall be covered by a convoluted loom, through a raceway and be protected by grommets when passing through body members.

All wiring harnesses shall be securely fastened at close intervals. All wiring splices shall be soldered and joint-insulated or machine crimped.

WIRING DIAGRAM

A wiring diagram, illustrating all body wiring circuitry, shall be provided with each school bus body. This wiring diagram shall be specific to the wiring on a Kentucky specified bus and shall be included in the repair manual.

All body electrical loads, controlled by the accessory side of the headlight switch, shall be through a relay. All body electrical loads on the headlight side of the switch causing a switch load of 75% percent or greater than the switch design shall be through a relay.

This wiring is to be arranged in at least these circuits:

1. Step well, clearance and identification lamps, stop lamps, combination stop and tail lamps through a relay controlled by the headlight switch
2. Dome lamps
3. Audible alarms on the emergency door, push-out windows and roof hatches (Body companies shall be required to provide audible alarms significantly tone different than those audible alarms provided as original equipment on chassis component systems.)
4. Turn signal lamps.
5. Flashing red warning lamp, to be combined with #7
6. Stop arm-flashing lamps, to be combined with #6 crossing gate
7. Emergency override switch to red flashing lamps and stop arm
8. Heaters and defrosters
9. Auxiliary fans.
10. Electrical windshield wipers
11. Electric windshield washers
12. Ignition circuit to the body solenoid shall be fused
13. Noise suppression solenoid

SOLENOID SWITCH

The bus body electrical system shall be equipped with a continuous-duty solenoid switch or heavy-duty relays of adequate capacity to handle the body electrical load. This solenoid switch shall be energized by the ignition switch in either the accessory or run position and shall cut off the electrical power from all bus body circuits when the ignition switch is in the "OFF" position, except to those body circuits that are energized by a chassis switch provided by the chassis supplier. This solenoid switch is to be a 100-AMP continuous-duty. The body feed wire shall be connected to the chassis terminal post and shall have a minimum current carrying capacity of 125-amperes, continuous (four-gauge minimum).

NOISE SUPPRESSION SWITCH

All Kentucky school buses shall include a “Noise Suppression Switch” within easy access of the driver. The switch shall turn off noise producing accessories to include heater blowers, defroster fans, auxiliary fans and AM/FM radios if so equipped. The system shall include a switch and solenoid or heavy-duty relays. The label may be abbreviated “Noise Supp”.

FOUR-WAY FLASHER SWITCH

A separate four-way flasher switch shall be located adjacent to the noise suppression switch to allow a driver to activate/de-activate both switches simultaneously or individually. The switch shall be labeled “Four-way Flasher.”

ELECTRICAL ACCESSORY CONTROL PANEL AND DASH PANEL

An enclosed electrical accessory panel or panels shall be installed to the left of the driver's seat. The required accessory switches shall be located on this panel or panels. The accessory control or switch panel shall have an adequate means for lighting all the switches and the accessory controls. On Type "D" school buses which have the dash panel installed by the body manufacturer, switches, gauges, and lights shall be designed and positioned to be readily accessible from the driver seat and provide for reasonable accessibility for maintenance. Proposed instrument panel shall be submitted at the Pre-bid Award Conference. Some variance from this standard is expected. We expect the following rules to be applied.

All passenger-loading controls shall be located within the span of an average drivers hand defined as a circle having a radius of 4 inches. These controls shall include momentary switch, door control switch, noise suppression switch, crossing gate override, and eight-way override. All passenger comfort switches shall be located as close as practical to each other. This group shall include heaters, defrosters, auxiliary fans and strobe light. Defrosters shall be located closest to the dash. Heaters shall be located according to their position in the bus. (I.E. driver's heater before mid-ship before rear heater) Infrequently used controls such as mirrors shall constitute a separate group.

If the total load on the taillight switch exceeds 10 amps, a relay shall be installed. If the electrical load of the accessory side of the headlight switch exceeds 75% of the continuous duty capacity of the accessory side of the headlight switch, those circuits shall be switched by means of a relay energized by the headlight switch.

ELECTRONIC STABILITY CONTROL SYSTEM

Electronic Stability Control (ESC) shall be added.

ENGINE HOUSING COVER (TYPE "D" FC SCHOOL BUSES)

The interior engine housing cover shall be easily removable without the use of special tools to the proximity of the floor and shall provide access to the engine components. This cover may be made in two (2) parts, can be removed in sections for maintenance and be contoured as necessary to provide for ease of entrance and egress. The cover shall have enough strength to allow a driver to stand on it without damage. The cover shall have a prop rod, cable devise, or be easily removed for technician maintenance.

The engine compartment on the Type "D" RE shall be insulated with a thermal sound barrier sandwiched between panels. This insulation shall provide protection from heat and noise generated by the engine.

FANS (AUXILIARY)

A body header mounted squirrel cage type fan, or approved equal, shall be installed on 34 through 84-passenger buses. This system shall be equipped with automotive type louvers that can be directed toward the driver. Auxiliary fans shall be added to the left and right sides of the windshield located to provide maximum windshield coverage. This auxiliary fan shall be a heavy-duty type, 6-inch blades and caged with a small mesh corrosion-resistant metal guard.

NOTE: If the bus is equipped with bulkhead air conditioning, the header mount squirrel cage fan shall be deleted and the air conditioner shall have a portion of its output directed toward the windshield.

FIRE EXTINGUISHER

The fire extinguisher shall be a minimum of six pounds capacity, utilizing ABC Dry Chemical (3A:40B:C), and the bracket shall be provided by the extinguisher manufacturer. It shall be designed for school bus use, provide for easy removal and have retention capabilities to withstand substantial impact (3,000-pound sled impacted into body at any angle at 30 miles per hour). Retention clamps and straps shall be designed and tested to perform without loosening clamping capabilities 200 applications. A fire extinguisher label shall be applied in compliance with 45 CFR Part 1310, Head Start Transportation.

Fire extinguisher shall be in a position that minimizes the chance of clothing getting snagged or shall be covered with a durable shroud.

FIRST AID KIT

The first-aid kit shall, at a minimum, comply with the NCST specifications, be packaged in a metal or poly dust-proof container, be in the OEM's common location, and in a position that minimizes the chance of clothing becoming entangled. The assembly shall be designed to minimize the risk of snagging clothing. If stored overhead, the location shall be labeled in one-inch block letters. The first-aid kit shall have a label in compliance with 45 CFR Part 1310, Head Start Transportation.

FLOOR

The floor and floor covering material shall have an opening cut over the fuel tank, in the area of the fuel-sending unit, to allow the removal of the fuel-sending unit (diesel buses only). This opening shall be sealed and covered by a metal plate that is attached to the flooring with metal screws. This plate shall not be installed under flooring material.

FLOOR COVERING

The floor covering material, excluding wheel well covers and the entrance step well, shall be fire-retardant material. School bus body manufacturers shall have tested and certified that the floor covering materials will not ignite, in either a horizontal or vertical plane by utilizing the Boston Bag Burn Test by the date of the Pre-Bid Award Conference. The test shall be conducted in a draft-free, three-sided, top-covered enclosure, with the Boston Burn Bag Burn Test applied to 2-foot wide by 3-foot tall vertical sample and a 2-foot wide by 2-foot long horizontal sample. Samples shall be tested in an L- shaped configuration, with the Boston Bag placed on the horizontal sample having the back resting against the vertical sample center. Scorching of material will be permissible, provided the material does not ignite.

The floor of the school bus body, driver's compartment and toe board area shall be covered, with a 1/8-inch minimum thickness, smooth finish floor covering material. This material shall be a top quality, fire-resistant elastomer floor covering. It shall be black and bonded with a water-resistant adhesive.

The aisle and entrance area shall be covered with material that has a corrugated or ribbed surface Elastomer base floor covering for the aisle shall be 3/16-inches thick. The depth of the corrugations or ribs shall be enough to allow dirt and abrasive material to lie below foot level.

All floor seams shall be covered with a rust-resistant strip, adequately anchored to the floor. Any floor covering seam or joint not covered by this trim material shall be properly mated and secured to the deck with a water-resistant adhesive.

The landing area shall be covered with the same material used to cover the aisle. It shall have a nosing of the same color contrast as the step covering material and extend back along the floor toward the aisle as far as practicable to meet the aisle covering material and make a trip-proof joint away from the top of the step. A metal seam cover at the step edge of the landing area will not be permitted. Floor covering material in the driver's area and body floor frontal area shall be secured to the deck with a water-resistant adhesive. The adhesive-applied material shall run forward to the point of transition from the body floor to the chassis toe board, unless restricted by certain design limitations. Exceptions will require prior approval of the Pupil Transportation Branch.

STEP COVERING

Steps shall be covered with first quality, specially processed step covering material and black in color. Koroseal pebble top or SMI Studded Step flooring may be used. Step covering material shall have non-skid characteristics. The step covering shall have a contrasting yellow, turndown nosing. The lip of the turndown shall be molded in an approximate 90-degree shape and shall be an integral part of the tread. Pebble pattern shall extend to the leading edge of the nosing on all but the top step and shall have corrosion and impact resistant polymeric or galvanized metal backing.

The 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. All floor covering seams, joints and termination edges shall be sealed.

NOTE: Body companies may coat the step well, closeout panels and associated trim with "Proflex", "Rhino Liner" or similar material provided the pebble pattern is maintained on the tread and the white nosing is maintained as an added component. This material may be black in color. All surfaces, inside and out, shall be coated. The material used shall meet wear resistance ASTMD5963, ASTMD4060 and slip resistance ASTM D2047.

FLOOR PLAN

BUFFER ZONE

The floor plan, except as otherwise provided in these specifications, shall provide for a minimum 12-inch buffer zone behind the rear seat, between the rear interior wall, to be the full width of the seat as measured at the rear most portion of seat cushion frame.

NOTE: Type "D" RE buses do not require a rear buffer zone.

CRITICAL DIMENSIONS - WHEELBASE, PASSENGER CAPACITY, REAR AXLE OVERHANG

School bus body shells shall be mounted on the following school bus chassis and shall meet the following performance specification:

	Minimum Wheelbase	Passenger Capacity	Maximum Rear Axle Overhang
Type "C"	167 inches	34	10 feet, 6 inches
	215 inches	52	11 feet
	273 inches	66	12 feet, 9 inches
	280 inches	75	14 feet, 6 inches
Type "D" FC	228 inches	70	11 feet
		74	12 feet, 9 inches
		78	13 feet, 4 inches
Type "D" RE	Shall be manufacturer's standard		

FUEL FILL COVER

The fuel fill opening in the body skirt shall be equipped with a spring loaded hinged cover held closed by a driver positioned latch. This latch shall be metal and shall require prior approval.

"DIESEL" OR" DIESEL ONLY" shall be painted or decaled on or adjacent to the fuel fill access cover in approximately 1-inch black lettering.

GLASS

Openings in the school bus body that require glass must be closed with quality glazed ASA safety glass. The windshield shall be laminated safety glass ASA-1 with a minimum distortion. The bottom portion of the rear emergency door shall be ASA laminated safety glass.

HEATERS

School bus heating systems shall meet the following performance standards:

A. Provide evenly distributed heat throughout the bus body.
B. Provide defrosting for the windshield and entrance door.
C. Have capabilities of providing evenly distributed heat, creating a temperature rise to 50 degrees Fahrenheit inside the body shell when soaked in an ambient temperature of 0 degrees Fahrenheit for 15 hours.
D. The heater water flow shall be controlled by the installation of bulkhead mounted water shutoff valves or be in line. (Water shutoff valves and bulkhead mounts shall require approval from the Pupil Transportation Branch.)
E. Valves shall be 1/4 turn, ball-type, and have a minimum nominal 3/4-inch internal port.
F. The heater hose entrance through the firewall or floor shall be through prior approved bulkhead fittings.
G. Type C – FC buses shall have all drivers' heaters air duct extended beyond the driver's side modesty panel into the passenger's area.
H. Switching for heaters shall provide independent switches for each motor.

I. Type C and type D bus heaters shall have easily removable air filters.

J. Type D buses shall have a 12,000 BTU floor mounted heater mounted in the driver's area and controlled by a separate switch. Alternately, a means to direct heat to the driver's feet shall be provided.

NOTE: All type C and D buses require a step well heater of a minimum 50,000 BTU output as a part of their total heater system. This heater system shall have a duct louvered to blow directly against the entrance door glass at the lowest practical point. These louvers shall be fixed to ensure the clearance of moisture from the lower glass.

HEATER HOSE AND CLAMPS

The heater hose shall be 1-inch inside diameter. The heater hose shall be Goodyear Hi-Miler, Gates Blue Stripe, or Purosil EPDM. All heater hose clamps shall be constant torque clamps. (Refer to the "NOTE" in the "CHASSIS" section). Clamps shall be torqued to the manufacturer's recommendation. The hose between heaters shall be protected by a metal raceway or conduit.

NOTE: Heater hoses of any diameter other than 1-inch inside the diameter necessary to provide for proper flow distribution shall require prior approval of the Pupil Transportation Branch.

The engine manufacturer shall be responsible for the installation of hose bibs, 1-inch in diameter, accessible to the body company for the attachment by the body company.

HEATER PERFORMANCE SHALL BE MEASURED BY THE FOLLOWING:

A temperature measurement that is taken 39 inches inward from side walls, 39 inches inward from windshield and rear door, and 36 inches above the floor. It shall include measurements from the front, middle and rear of the bus. The heat shall be evenly distributed through the aisle area.

The bus will be soaked at an ambient temperature of zero degrees Fahrenheit for 15 hours. The temperature must rise to 50 degrees Fahrenheit inside in 20 minutes when 170 degree water is applied at a rate of 3 gallons per minute at a maximum of 6 PSI pressure.

Heater cores installed in Kentucky school buses shall meet the following test standard:

STATIC PRESSURE TEST	150 PSI
CYCLE TEST	20-50 PSI hydraulic surge pressure 450,000 cycles minimum

Total heater system flow restriction shall be measured at a flow rate of three (3) gallons per minute at a maximum of six (6) PSI pressure when measuring heater performance.

A bleeder valve shall be installed in the highest point in the return line.

HEATER DEFROSTER

Defrosters shall be included in the total electrical load for heaters and meet the following criteria:

A. Capable of defrosting the total windshield area in a reasonable period under all normal driving conditions.
B. Shall provide means of defrosting service door glass independent of the windshield.
C. Capable of mixing a minimum 50% outside fresh air with defrosting air.
D. System shall exceed the SAE standard J381 performance requirement without the use of an auxiliary fan and with three 3 gallons per minute 170 degree water applied.

NOTE: All manufacturers shall demonstrate the capabilities of their heating and defrosting system prior to the bid award. Coolant used for heater systems shall meet engine OEM specifications.

INSIDE HEIGHT

The minimum inside body height shall be 72 inches to 78 inches maximum, measured at any point of the longitudinal centerline from the front vertical bow to the rear vertical bow.

The interior of the bus body shall be free of all unnecessary projections likely to cause injury. This standard requires an inner lining on the ceiling and walls. Ceiling panels may be perforated.

INSULATION

The ceiling and all walls shall be insulated with fire resistant, fiberglass insulation or prior approved material having an "R" valve not less than six, a minimum thickness of 1½ inches. All voids, including those caused by roof bows and header caps shall be insulated. Type “D” school buses shall require the frontal area to be insulated.

INTERIOR

The entire length of the joint between the floor covering and the wall of the school bus body shall be covered with a curved, fitted, metal molding, making a tight seal between the floor covering and the wall. All interior seams shall be sealed.

LAMPS AND SIGNALS

All lamps, lights, and signals shall be white L.E. D’s, unless otherwise specified, and comply with the appropriate FMVSS requirements.

CLEARANCE LAMPS

The body shall be equipped with armored (unless flush mounted) clearance and mid-body lamps.

IDENTIFICATION LAMPS

Identification lamps shall be individually mounted, connected to the chassis headlight circuit and be activated by the chassis headlight switch relay.

BACK-UP LAMPS

The school bus body manufacturer shall install two back-up lamps. These back-up lights shall be white LED lights. In addition to these lights there shall be an additional lighting system behind the rear axle. The system shall be white, L.E.D light wired to the backup light circuit. The system shall be skirt mounted and illuminate a rectangular area on both sides of the vehicle beginning 29 inches aft of the center point of the rear axle. This area shall extend outward from the vehicle sides 24 inches and rearward 30 inches with no point within this area having illumination of less than 3 foot candles as tested on a bare concrete surface.

COMBINATION STOP AND TAIL LAMPS

The bus shall be equipped with two combination stop and tail lamps, a diameter of not less than 7 inches, with plain red lens emitting red light plainly visible from a distance of 500 feet to the rear. These lamps shall be as high as practicable but below the window line and spaced as far apart as practicable but not less than 3 feet. Measurements shall be taken from the lamp centers. The stoplights are to be activated by the brake switch. If these lamps are not round they must have a minimum of 38-square inches surface area.

FOUR-INCH STOP AND TAIL LAMPS

Each bus shall be equipped with two, 4-inch combination stop and tail lamps. These lamps shall be connected to the brake-operated stop lamp circuit.

LICENSE PLATE ILLUMINATOR

The license plate shall be illuminated in combination with the 4-inch LED stop and tail lamps located on the left rear or by a separate license plate illuminator provided that the illuminator is the body manufacturer's standard LED Lamp.

INTERIOR LAMPS

Interior lamps to adequately illuminate the aisles and step well and shall be approved as follows: two lamps for each group of three seat rows. These lights are to be located on both sides of the aisle and shall be no closer to the center ceiling line than 12 inches. The interior lamps are to be mounted in a substantial lamp house, which shall be flange or screw-mounted to the body ceiling. The lens of this lamp shall be held in by a flange. Screws or other substantial means not easily removed or operated by the pupils shall be used to secure this light.

> NOTE: Lamps on special needs buses shall be evenly distributed throughout the bus in every other roof section, starting with the light in the rear most panel.

STEP-WELL LIGHT

The step-well is to be equipped with an adequately protected automatic step-well light. This light shall be activated by a switch in conjunction with the entrance door opening mechanism and wired so that the light comes on when the entrance door is opened and the headlights are on.

OUTSIDE LANDING LIGHT

All school buses shall be equipped with a skirt-mounted exterior landing area light. The upper portion of this light shall be shielded to cast light downward only. This light shall be wired through the headlight circuit.

EIGHT-LIGHT WARNING SYSTEM

The school bus body shall be equipped with a system of four red LED signal lamps and four amber LED signal lamps. Each amber signal lamp shall be located near each red signal lamp, at the same level, but closer to the vertical centerline of the bus. The system of the red and amber, strobe LED signal lamps shall be wired so that the amber lamps are energized manually, and the red lamps are automatically energized (with the amber lamps being automatically de-energized) when the bus service door is open.

The flasher device shall be Weldon 7000 with a flash rate of 70 to seventy-five 75 c/p/m. All eight-way lights shall be easily replaceable using mechanical fasteners.

OPERATION OF WARNING LIGHT-STOP ARM SYSTEM

The location of the momentary switch is subject to the approval of the Pupil Transportation Branch. The momentary switch shall be a yellow momentary rocker switch. The momentary switch and its operation shall be identified by decal or lettering and should function as follows:

1. By depressing the manual push button, the amber pilot light and amber warning lights shall flash.
2. When the entrance door is moved toward the open position, the amber pilot and warning lights shall go off; the red pilot and warning lights shall flash.
3. The stop arm is automatically extended and the lights on the stop arm flash.
4. In closing the entrance door, all lights will go out and the stop arm retracts automatically.
5. By opening the entrance door without depressing the manual push button, no lights flash, and the stop arm does not extend.
6. With the entrance door open, depressing the manual push button, the red pilot and warning lights flash.
7. The stop arm is automatically extended and the lights on the stop arm flash.

Both the amber pilot light lens and the red pilot lens shall be approximately 1/2 inches in diameter if not included in the instrument cluster. Both manual and air-operated door systems shall meet the requirement listed above (one through seven). These pilot lights shall be installed in a position to be approved the Pupil Transportation Branch.

NOTE: The entrance door switch that activates the red lights in the eight-light system shall be located in a position, or shall be protected by a cover or guard, that will prevent the likelihood of this switch being activated or deactivated by pupils boarding or departing the bus. The door switches shall be mounted to the left of the driver.

The emergency system for extending the stop arm and flashing the red warning lights on the bus body and the stop arm shall be installed on each bus body.

NOTE: An emergency override switch shall be installed in the bus body electrical accessory panel in an area isolated from the other switches, where possible. This switch shall be installed by a standard switch identification or decal with the words “warning lights,” “emergency warning lights,” or “red override.” This switch shall be separately fused.

INSTALLATION REQUIREMENTS

Each flashing signal lamp shall be mounted with its axis substantially parallel to the longitudinal axis of the vehicle. The front and rear alternately flashing signal lamps shall be spaced as far to the left and right of header as practicable, fore and aft facing and grouped in a way to provide for the amber lights spaced as far apart on the header as possible.

Vertical and lateral vision of the front and rear alternately flashing warning lights shall not be obstructed by any part of the body or lamp house.

NOTE: Lamp hoods will not be accepted.

A square or rectangular area around the lens of each alternate flashing signal light and extending outward at least 3 inches shall be painted black. In installations where there is no flat vertical portion of the body immediately surrounding the entire lens of the lamp, a square or rectangular band of black (at least 3 inches wide) immediately below and to both sides of the lens, shall be painted on the body or roof area against which signal light is seen from a distance of 500 feet along the axis of the vehicle.

TURN SIGNALS (FRONT AND REAR)

Type "D" school buses shall be equipped with the manufacturer's standard front turn signals with amber lens.

The above-mentioned lamps shall require prior approval for the Pupil Transportation Branch. All school bus bodies shall be equipped with two, 7-inch rear turn LED signal lamps. The lens of these lamps shall show an amber arrow, with the arrow on the right lamp pointing right and the arrow on the left pointing left. Rear turn signal lamps shall be mounted as near the outer edge of the bus body as possible.

STOP SIGNAL ARM

Each school bus body shall be equipped with a stop arm meeting SAE Standard J1133. The location of the stop arm requires prior approval from the Pupil Transportation Branch and shall be:

1. Air-operated, SMC 2980 series with wind guard and high intensity school decal or approved equal, or
2. Electric operated Transpec Model 6100 series with wind guard and high intensity school decal or approved equal.

The lights on these stop arms shall be strobing LED.

Air-operated stop arms shall be installed on all chassis equipped with air brakes. An air-operated or electric-operated stop arm may be installed on all school bus chassis with hydraulic brakes.

AIR-OPERATED STOP ARM

A pressure protection valve shall be installed by the bus manufacturer.

ELECTRIC-OPERATED STOP ARM

Electric-operated stop arm installation requires the body manufacturer to install stop arm circuit protection in the body's fuse panel. All wiring shall be coded and sized to a minimum of 125% amperage rating and protected through all metal openings.

STOP ARM ACTIVATION

All stop arms and stop arm flashing lights are to be electro-mechanically activated when the red lights of the eight-light warning system are on. This activation is to occur when the entrance door is moved toward an open position.

CROSSING CONTROL ARM

1. Buses shall be equipped with a crossing control arm mounted on the right side of the front bumper, which shall not open more than 90 degrees. All air brake equipped chassis shall be equipped with air operated bladder-controlled crossing arms.
2. All components of the crossing control arm and all connections shall be weather proofed.
3. The crossing control arm shall incorporate system connectors (electrical, or air) at the gate and shall be easily removable to allow for towing of the bus.
4. The crossing control arm shall be constructed of non-corrosive or nonferrous material.
5. There shall be no sharp edges or projections that could cause hazard or injury to students.
6. The crossing control arm shall extend approximately seventy inches from the front bumper when in the extended position.
7. The crossing control arm shall extend simultaneously with the stop arm(s) by means of the stop arm controls.
8. The tip of the arm shall be equipped with electro-magnetic catch and or bracket unless integrated into the bumper and so constructed as to be firmly held when in the closed mode.
9. The system shall include a momentary cancel switch to prevent the arm from being deployed in tight quarters.
10. Crossing control arm shall be Specialty Manufacturing Company, 6 series solid state or prior approved equal for hydraulic brake buses.
11. If an air operated system is employed it shall require a dedicated solenoid valve and regulator (Specialty 2800 series air operated for all air brake chassis).

DISABLED WARNING DEVICES

Three triangular warning devices, housed in approved containers and secured in an approved location, shall be provided. These devices shall meet the ICC and FMVSS requirement and shall be located, in the drivers outside toolbox. The box shall be labeled "Triangle Reflectors Inside" secured to the toolbox.

NOTE: When the bus is equipped with a full complement of luggage boxes, the toolbox shall be deleted and the disabled warning devices shall be mounted in the right forward luggage box with a decal stating, "triangle reflectors inside."

STATIONARY REFLECTORS

The school bus body shall be equipped with at least six stationary reflectors. Two red reflectors shall be located on the rear of the bus body; one amber reflector shall be located on each side of the body near the rear. Other reflectors required by the FMVSS shall be of the same quality as the reflectors required for the other locations. Body companies may use 3M or Reflexite film to meet FMVSS instead of the standard reflector.

LETTERING

The bodies of all school buses, both district-owned and those leased to the board by private owners, shall be lettered and numbered in the same manner. These bodies shall be numbered and lettered as follows:

SCHOOL BUS SIGNS

Each school bus body shall be equipped with a reflective sign, both front and rear. This sign shall be in the upper header section and shall show the words "SCHOOL BUS" in black letters, 8 inches high with one-inch stroke, against a yellow background. Reflexite, 3M or approved film shall be used.

TRAFFIC WARNING SIGNS

Each school bus body shall be equipped with a sign on the left side of the rear bumper that says, "WE STOP AT RAILROAD CROSSINGS". The Railroad crossing portion of this signage shall be the universal railroad crossing sign RXR, round in shape, national school bus yellow and black in color. The letters RR on this sign shall be 4 inches in height, the words "WE STOP AT" shall be 4-inch cut letters 1/2 inch stroke, all capital letters. All lettering and signage shall be reflective material, Reflexite, 3M or approved equal.

Each school bus body shall be equipped with a sign in the center of the rear emergency door or below the rear emergency push out window on a rear engine bus. This sign shall say "STOP WHEN RED LIGHTS FLASH." The STOP portion of this signage shall be the universal stop sign, octagonal in shape, a red background, with white letters and border. The letters on the stop sign shall be 4 inches in height. The words "WHEN RED LIGHTS FLASH" shall be black, 4-inch cut letters. The size of the letters and the stop sign may be adjusted at the pilot inspection to achieve a balanced appearance.

An Interactive Motorist Alert Sign may replace the stop sign on the rear emergency door. It shall illuminate and flash a message with a minimum of three inputs.

(a) When the amber eight-way warning lights are activated, illuminate and flash an amber caution alert message. (b) When the red eight-way warning lights are activated, illuminate and flash a red warning message to motorist. Assembly must be of sealed weather tight construction approximately 23 1/2-inch X 8 3/4 inch X 1 3/8 inch.

The minimum viewing angle from the rear of the bus shall be 30 degrees (15 degrees on each side of perpendicular axis).

Eight-way amber light display message shall be alternating amber "CAUTION" then "STOPPING"; eight-way red light display message shall be alternating red "STOP" (within an octagon outline) then "DO NOT PASS". Frequency of standard alternating message flash and or alternating different message flash may be controlled by eight-way flashers. Illumination intensity and quantity of LED lights shall be enough to result in a clearly legible message.

Mounting: On front engine buses device shall be \ in the most attainable vertical center of rear emergency door, between upper and lower windows in the lowest possible mounting position.

On rear engine buses device shall be vertically centered and horizontally adjacent to the left and right upper brake lights.

Each school bus body shall be equipped with a sign on the right side of the rear bumper that states "RIGHT TURN ON RED PROHIBITED." Lettering shall be 2 1/2- inch black, Highway Gothic B, 3/8-inch stroke on a white reflective background. This sign shall contain two lines, "RIGHT TURN ON," constituting the first line and "RED PROHIBITED," constituting the second line.

DISTRICT NAME

"COUNTY" or "INDEPENDENT SCHOOLS" is to be placed on each side of the bus body on a black belt, approximately 8 inches in width, below the window line in the belt area. The letters shall be approximately 6 inches high with a 1-inch stroke using Reflexite or 3M film. The district's name shall be proportionately spaced and outlined in order to obtain a balanced appearance. Abbreviations shall require the prior approval of the Pupil Transportation Branch.

Each school bus body shall be numbered at these locations with numbers at least 6 inches high. The number(s) shall be assigned to the vehicle by the purchasing school district and shall be placed on each side of the body following the school district name.

EXAMPLE: ADAIR COUNTY SCHOOLS NO. 9201

The number(s) shall be placed on the rear end of the body in the right license-plate area. This number shall be black and placed on the front of the body on both sides. The number on each side shall be placed on the body cowl area. The numbers shall be approximately 6 inches high with a one-inch stroke using vinyl decals.

EXCEPTION: Four-digit numbers on the body cowl shall be 4 inches high, approximately 3/4-inch stroke.

NOTE: Individual letter decals may be installed on Kentucky school buses. Decals shall be vinyl. The installers shall be required to demonstrate their ability of providing quality installation of vinyl decals, adhesion capabilities and reliable information relative to longevity.

NAME OF PRIVATE OWNER

On the bodies of those school buses leased to the board by private owners, the name of the owner and the word "OWNER" shall be painted or decaled in 2-inch black letters just back of the entrance door.

EXAMPLE:
OWNER
JOHN Q. ADAMS

LOCAL DISTRICT LETTERING ADDITIONS

Local districts may add riding rules on the bulkhead to the right of the driver's interior mirror. These rules shall be affixed such that they can be clearly viewed by the passengers. The riding rules shall be printed on high quality adhesive back film no larger than 8 1/2 by 11 inches.

Local districts may install a service sticker on the bulkhead no larger than 3 by 5 inches. These decals shall be located to the left side of the driver's mirror.

Local Districts may install the bus insurance card and registration above the driver's left side window or inside the driver's overhead accessory box if the bus is so equipped. These are to be adhered on three edges to allow the items to be pushed in from the top. Local districts may upgrade existing buses to any of the standard text in the lettering section of this specification. This restriction does not apply to manufactures-installed logos, signs or decals which are not expressly prohibited elsewhere within the specification.

No other wording, symbols or signs may be placed on any Kentucky school bus, inside or out, other than what is listed in the Kentucky Minimum Specifications for School Buses. Any wording that a school district wishes to add, or has added, to a Kentucky school bus, regardless of model year, must be approved in writing, before their placement, by the KDE.

MIRRORS

INTERIOR

The school bus body shall be equipped with an interior rear vision mirror 10 inches by 30 inches or the largest that can be accommodated within the designed space. This mirror shall have a metal back of at least 20-gauge steel attached such that it reinforces the metal backing and provides stable mounting points located not less than 9 inches from the ends of the mirror. The mirror glass shall be clear view laminated glass or clear view glass, a minimum of 1/8-inch, bonded to a backing which retains the glass in the event of breakage. The glass and backing shall be set in U-shaped vinyl glazing, surrounding the mirror. The corners of the mirror shall be rounded. The interior mirrors shall be designed for driver adjustment, mounted vibration-free, in the center of the driver's area and require approval of the Pupil Transportation Branch at the pilot inspection.

REAR VISION (OUTSIDE)

The mirror system shall be capable of providing the driver with a view along the left and right sides of the vehicle as required by FMVSS 111. These mirrors shall be heated and remotely adjustable. The heating element shall be equipped with a timer. The mirrors shall be mounted to prevent vertical and horizontal vibration. This standard shall be met using Rosco Open View ES, Rosco Eurostyle, or AccuStyle. These mirrors shall be mounted on an approved manufacturer bracket. The driver mirror may be mounted on a breakaway arm and breakaway brace if available.

FRONT VIEW – LEFT AND RIGHT-SIDE VIEW (TYPE "C") CROSSVIEW MIRROR SYSTEM

The cross view mirror system shall provide the driver with indirect vision of an area as required by FMVSS 111.

The cross view mirror system shall meet the requirements of FMVSS 111. The mirror used to meet this requirement shall be Rosco, Hawkeye, Eye-Max LP or approved equal. The mounting of these mirrors shall be on solid stanchions. The stanchions shall be braced for maximum strength and minimum vibration. All mirror mounting brackets shall be bolted with backing plate installed on the underside of the fenders. Stanchions and brackets mounted on fiberglass shall have rubber bushings between the stanchions, brackets and fenders.

FRONT VIEW – LEFT AND RIGHT-SIDE VIEW (TYPE "D")

Left and right side mirrors shall meet all the performance requirements named above for Type "C" school buses.

NOTE: All mirrors and mountings (interior, outside rear vision and convex) shall require prior approval by the Pupil Transportation Branch. Mirrors and mountings exceeding more than 54 inches from the bus centerline to provide for adequate vision shall not be approved.

MODIFICATIONS (MADE BY BODY MANUFACTURERS)

Any modifications made to the chassis by the body manufacturers shall be done in accordance with the chassis manufacturer's recommendations.

MOUNTING

Body manufacturers, when installing the body on the frame, shall insert insulators at every point of contact between the body and frame. No body cross member shall be unsupported by the chassis frame.

NOTE: Measurements shall be taken on the first sill to the rear of the driver's pan and the last sill before the end cap to determine body squareness. The variance shall not exceed 1/4-inches per 10 feet of body length.

The body shall be centered and mounted parallel to the frame rail in such a manner so that there will be no visible appearance of misalignment. Clips, J-bolts and U-bolts shall be installed in a manner which will minimize distortion of the floor cross members.

OPERATING MECHANISMS (IDENTIFICATION)

All operating mechanisms or controls installed by the bus supplier shall be identified by the decal or lettering as to its function and operation. These would include such items as electrical switches, levers, the stop arm control valve, the driver's foot warmer vent, the heater fresh air intake, etc.

PASSENGER ADVISORY SYSTEM

All Kentucky school buses shall be equipped with a passenger advisory system. This system shall be armed by the operation of the eight-way light system. When the key is placed in the off position the dome lights shall be activated. The driver will have 60 seconds to walk to the rear of the bus and deactivate the system by ether raising the rear emergency door handle or pressing a button on the rear bulkhead. The system will confirm the system deactivation by turning off or flashing the dome lights. If the driver fails to deactivate the system, the head lights will flash, and the horn will sound.

REFLECTIVE MATERIAL

The rear of the bus body shall be marked with strips of reflective National School Bus Yellow material to outline the perimeter of the back of the bus using material which conforms to the requirements of FMVSS 131, Table 1. The perimeter marking or rear emergency exits per FMVSS 217 and/or the use of reflective "SCHOOL BUS" signs partially accomplish the objective of this requirement. To complete the perimeter marking of the back of the bus, strips of at least 1-inch wide reflective National School Bus Yellow material shall be applied horizontally above the rear windows and above the rear bumper extending from the rear emergency exit perimeter marking outward to the left and right rear corners of the bus; and vertical strips shall be applied at the corners connecting these horizontal strips.

Sides of the bus body shall be marked with reflective National School Bus Yellow material at least one and 1 3/4 inches in width extending the length of the bus passenger compartment and located between the floor line and the beltline.

RUB RAILS

Bus bodies shall be equipped with four (4) rub rails. There shall be one rub rail located on each side of the bus body, approximately seat level. The left side rub rail shall extend from the body post rear of the driver's window at the front all the way to the emergency doorpost. The right-side rub rail shall extend from the entrance door all the way to the emergency doorpost. The rear end of both the left side and right-side rub rail shall be fastened securely to the emergency doorpost.

There shall be one rub rail located approximately at the floor line which shall cover the same longitudinal area as the upper rub rail, except at the wheel housings, and shall extend only to the radii of the right and left rear corners.

There shall be one rub rail located on each side at the bottom of the side skirt. The top two rub rails shall be attached at each body post and all other upright structural members.

All rub rails shall be 4 inches or more in width, shall be a minimum of 16-gauge steel and shall be constructed in a corrugated or ribbed fashion. All rub rails shall be applied outside the body or outside the body posts with the top two rub rails painted yellow and the bottom two rub rails painted black. The rub rail endcaps may be painted yellow or black.

NOTE: It is the intent of this specification that a black beltline, 8-inches in width, for the school district name to be maintained. Any rub rails that would increase the width of this belt shall be painted school bus yellow rather than black.

SEATS (PUPIL)

All pupil seats shall meet the same padding requirement and be made of the same material. Pupil seats shall be padded and covered with flame retardant materials. The covering for cushions and backs shall be heavy grade, high quality, and coated fabric material, and a minimum of 35 ounces per square yard finished weight. Vinyl and backing material must meet a minimum of 10 pounds of adhesion, when tested per ASTM D-751-79. A sample of the material to be used shall be tested for adhesion just prior to the construction of the buses. Lap/shoulder belt ready seats are required.

All exposed seating material shall have a vertical burn rate of zero, as measured by the requirements of FAR-25-853B, and modified as follows:

1. Material burned in the apparatus, as described in the standard, shall be considered to have a zero burn rate, provided that the upholstery backing does not have a burn length greater than one quarter of an inch and the vinyl coating does not have evidence of damage due to flame impingement, as measured from the original edge of the specimen, greater than 4 inches in length.
2. Flame time, temperature and the position of the sample and flame shall be as described in the standard.
3. All materials shall self-extinguish within the time frame described in the standard.
4. FAR #25.853B establishes the burn chamber and other parameters for testing.
5. Any other material proposed as seat covering material shall be documented to the Pupil Transportation Branch as being equal to the above-mentioned materials and requires prior approval for use.

6. Any other test proposed for the measurement of the flammability of the material shall require adequate documentation as being equal by the provider and shall require written approval of the Pupil Transportation Branch prior to the bid quotation.
7. All seat covering material shall be Kevlar blue, Dura-Seat Fire Block, Athol style, #6926FR-EDO grain or BESI AK 1058 or BESI AK 072 Blue, and require prior approval of the Pupil Transportation Branch.
8. As evidence of its durability, the vendor shall certify in writing that the following ASTM tests have been conducted by an independent laboratory and have the following minimum characteristics:

ASTM D 751-79	GRAB TENSILE	150 LBS
ASTM D 1117-80	TRAPEZOID TEAR	45 LBS
ASTM D 751-79	SEAM STRENGTH	70 LBS

9. Seat cushions shall be constructed not to depress more than 80% when pupil weight equal to 360 pounds is applied to the total seat area. Cushions shall be constructed for a mid-cushion height of approximately 4 inches bonded in a manner to provide seating stability and minimize breakage. All seat backs shall have a minimum height of 24 inches above seat reference point.
10. All seat cushions shall have a base material on 1/2 inches exterior grade plywood, OSB (oriented strand board), or alternately, seat cushion foam must be supported utilizing an approved wire mesh spring suspension. Seat cushions shall have means of positive retention to seat frames. All bottoms shall be covered with the same material as the rest of the seat.
11. Body manufacturers shall provide a five-year warranty, 100% parts and labor, against the breakdown of the foam backing. Wooden seat backs shall not be acceptable.
12. Pupil seats shall be secured to the floor and chair rail by means of bolts, lock washers and nuts or lock nuts.
13. All conventional school bus pupil seating, 34 through 52-passengers, shall be a three to three plan with the exception of the row of seats to the left and right of the rear emergency door. These seats shall be sized for two passengers each with a minimum seating room of 13 inches and a maximum width that would allow for a center aisle to be 30 inches wide as measured from the centerline of the emergency door.
14. School bus body shells, 66 through 78-passengers, having a left side emergency door installed and requiring the last two rows of seats to be 39 inches wide to attain specification seating capacity, may reduce the rear seat buffer zone to 8 inches on the right side rear seat. The left side rear seat must maintain a buffer of 12 inches measured at the rear most portion of the seat bottom frame.
15. A staging area of 24 inches by 12 inches must be maintained. Seat depth shall be a minimum of 15 inches; seat spacing shall have a minimum of 24 to 25-inch knee room measured on the centerline of the seat at cushion height. Seating is not permitted within the plane of the front edge or rear edge of the left side emergency door.

SEAT NUMBERING

All seats shall be numbered. Seats on the service door side shall have odd numbers (1, 3, 5, 7…). Seats on the driver's side shall have even numbers. Each seat number shall be installed on the wiring race above the window line or on the ceiling panel immediately above the wiring race.

CRASH BARRIERS

All crash barriers shall be closed to the floor level.

SEATS (DRIVER)

The driver's seat shall be of a high-back air suspension type with a double acting shock to inhibit excessive oscillation. The seat shall have a minimum seat back adjustment of 15 degrees and a head restraint accommodating sizes through 95th percentile adult male (as defined in FMVSS 208). The driver's seat shall be covered with the fabric upholstery material on the bottom and seat back. Vinyl, meeting the requirements for pupil seats, to include color, shall be used in conjunction with the fabric upholstery on the sides and radii areas of the seat and back. The driver's seat shall have minimum distance between the steering wheel and the seat back not less than 11 inches, with a minimum aft adjustment of 6 inches. The driver's seat shall provide for fore-and-aft and up and down adjustment and shall be contoured with adequate padding support on the sides. The seat shall be designed to provide lumbar support and positioned on the centerline of the steering wheel.

A pouch shall be added to the back of the driver's seat, dimensions to be as wide as the width of the seat, not more than 18 inches in height. The pouch opening shall be elastic.

NOTE: The driver's seat shall be equipped with a seat belt retainer attached to the right side of the driver's seat designed to cause the seat belt to track fore and aft as the seat moves through its full extension.

SEAT BELT (DRIVER)

The driver's seat shall be equipped with the seat belt anchored to the floor and housed in a scabbard, equipped with an emergency locking retractor (one side only). The driver's seat shall be equipped with Type II occupant protection (lap and shoulder belt). The shoulder harness anchor point shall be adjustable, meet the requirements of FMVSS 209 and 210 and shall require prior approval of the Pupil Transportation Branch. This adjustment shall accommodate drivers ranging in size from the 50th percentile adult female to the 95th percentile adult male. The seat belt shall be orange in color.

SOUND PRESSURE LEVEL

The school bus shall be so designed to ensure that the inside sound pressure does not exceed 85 decibels as measured 1-inch from the ear of any seated person. Type "D" RE rear engine compartment shelf shall be covered with insulation and sound proofing material from the top of the shelf to under the rear seats.

STEPS

The first step shall be not less than 12 inches and not more than 16 inches from the ground. All risers shall be equal in height. The riser height shall not exceed approximately 9 inches.

The step well shall be fully enclosed and shall not protrude beyond the body sideline.

STEP AREA GRAB HANDLE

A suitable device shall be provided to assist passengers during entry or egress. This device shall allow for easy grasping or holding and shall have no openings or pinch points which might entangle clothing, accessories or limbs. The grab handle shall be painted yellow.

STIRRUP STEPS

A folding stirrup step and grab handle shall be affixed to each side of the school bus body and positioned in a manner to facilitate the driver's use when cleaning the windshield.

EXCEPTION: Type "D" school buses that have foot holes or stirrup steps placed in the bumper to perform a function relative to stirrup steps shall be approved as meeting the requirement of stirrup steps subject to the approval of the Pupil Transportation Branch.

STORAGE COMPARTMENT

A storage compartment, located on the right side of the body, shall be installed on all school buses. The location, when practical, shall aft of the rear wheels, subject to the approval of the Pupil Transportation Branch. The storage compartment shall be approximately 13 inches high, 15 inches deep, and 25 inches wide and be located under the floor in the body skirt. The door and box shall be sealed to minimize water and dust leakage. All storage compartment doors shall be equipped with key locks.

STROBE LIGHTS

All Kentucky school buses, Types "A", "C", "D", and special needs, shall be equipped with a roof-mounted low-profile white strobe light~~s~~, located on the roof centerlines in the center of the third window from the rear. The strobe light shall have a metal housing, be Class 2 and must meet SAE J845. The power supply may be in the light base. If the power supply is remotely located, the power supply shall be securely mounted in the school bus rear header. The light shall be individually switched with the switch located in the switch console accessible to the driver and lit with a pilot light. All wiring shall meet SAE standards. The wiring shall run to the rear header and designated roof panel through the wiring molding provided for other body wiring. It shall be protected through openings in the body and strapped to the main body harness.

SUNSHIELD

An adjustable sunshield of tinted transparent plastic, approximately 6 by 30 inches, shall be provided in the driver view area. An additional adjustable sunshield of tinted transparent plastic shall be provided to the left of the driver’s seated position. This sunshield shall be a minimum of 6 by 18 inches.

SUPPORT EQUIPMENT

BELT CUTTER

All school bus bodies shall be equipped with a belt cutter installed in a location accessible and within view of the seated driver. This belt cutter shall be a full handgrip type subject to approval of the Pupil Transportation Branch. The lid of the compartment (outside) shall readily identify the belt cutter located within.

> NOTE: Any location shall require approval of the Pupil Transportation Branch at the pilot inspection.

UNDERCOATING

The entire underside of the school bus body, including metal chassis fenders, floor members, seat mounting bolts and side panels below floor level, shall be undercoated with a commercial grade asphalt material (asbestos-free). Bus manufacturers may use other products to achieve 10-year rust through protection with the approval of KDE.

VENTILATION

A static-type roof ventilator shall be installed at the front of the body.

WHEELHOUSINGS

Wheel housings shall be full open type, not extend more than 10 inches above the inside floor and attached to the floor in a manner to prevent the entrance of water or dust. Wheel-housings shall have the inside fully covered with flooring material or ABS plastic and shall provide clearance for snow chain usage.

WHEELHOUSING SPLASH GUARDS

All Type C buses shall be equipped with splashguards (mud flaps) on the front of all front fenders. The splashguards shall be made of durable rubber composition, bolted to the front extension of the front fender and extending within approximately 8 inches of the ground. Material shall be anti-sail. Mounting shall include a metal backing strip.

Type "D" RE buses shall have mud flaps and rubber fender extensions installed on all four wheel-housings.

Standard seat side windows shall be the aluminum split-sash type with an unobstructed emergency opening a minimum of 9 by 22 inches. Window glass shall be installed with welting or rubber gasket material around the perimeter of the glass inside the frame.

EXCEPTION: Should the left side emergency door placement cause the need for windows of a width less than 22 inches in a passenger seated area; those windows shall be split-sash type and shall require prior approval of the Pupil Transportation Branch. The driver side window shall have fore and aft opening adjustment.

NOTE: Glass shall begin at entrance door post as to not obscure vision. All push-out windows shall meet the requirements of FMVSS 217.

PUSH-OUT WINDOWS

Type "A", "C", and "D" school buses shall be equipped with push-out windows. The windows shall meet the requirements of FMVSS 217. The windows may be horizontally or vertically hinged provided the same type is used for the entire order. The windows shall be identified for emergency egress with decals on the inside and outside. Decals shall be of the same manufacturer and type as used on the emergency door (refer to "EMERGENCY DOOR"). Decals may be placed on the lower glass area near the release handle subject to the approval of the Pupil Transportation Branch. Decals shall be applied on the outside of the glass so the student cannot peel the decal off. (Requires reverse print decal).

Windows shall be outlined on the outside of the bus with 3/4 inches red reflective tape in compliance with FMVSS 217, meeting the requirements for reflectance measurements in Federal Specification L-S-300C. The horizontal tape shall be yellow, and the vertical tape shall be red.

Windows shall be equipped with a properly grounded audible alarm, noting the disengagement of the release mechanism. A double-sided decal, identifying emergency exit windows, shall be applied to the outside of the glazing.

The 16 through 34-passenger, Type "A" and Type "C" school bus bodies shall be equipped with two push-out windows. One window shall be located on each side of the body, approximately mid-ship as referenced from the entrance door rear post and the rear corner post area.

The 52 through 84-passenger, Type "C" and Type "D" school bus bodies shall be equipped with four push-out windows. Two windows shall be located on each side of the bus body, equally spaced between the entrance door, rear post, and the rear corner post area.

School bus bodies that have left side emergency doors installed shall be permitted the relocation of push-out windows on the emergency door side, requiring the approval of the Pupil Transportation Branch.

NOTE: The alarm switch shall be wired through the body cutoff solenoid switch and to an audible alarm located in the driver area.

WINDSHIELD

The windshield shall be large enough and have enough sweepback to permit the driver to see the road clearly. It shall be slanted to reduce glare and shall be installed between the front corner posts so designed and placed as to afford the minimum obstruction to the driver’s view.

WINDSHIELD WASHERS

The bus body shall be equipped with an electric-operated windshield washer, 3 quarts minimum capacity, with the operating switch identified and located for the driver’s use. The washed area shall comply with the SAE J942b performance requirement. Windshield washer fill doors, if so equipped, shall have a positive locking device.

WINDSHIELD WIPERS

The Type "C" and the Type "D" school bus bodies shall be equipped with 2 windshield wiper motors controlled by a single switch. One motor per wiper, two speed and with intermittent feature.

The design of the wiper shall be such to afford the maximum wiped area and good driver view. Type "D" school bus windshield wipers shall be of parallelogram design. Wet arms are required. Windshield wiper access doors shall be equipped with latches that do not require a tool to open. If a single motor is used, the system shall meet the durability requirements of SAE J198.

SECTION II PART 1
TYPE A CHASSIS

The specifications in this section apply to type "A -1" school bus chassis with a rated pupil capacity of 16 and 22-passengers and 16 and 24-passenger special needs shells. Type "A" school buses shall meet all the specifications of Section I, Parts 1 and 2, unless listed as exceptions under this part. Kentucky Minimum Specifications for School Buses, under this section apply specifically to 16 and 22-passengers chopped van conversions.

Chassis shall not be more than 12 months old at time of delivery to end user.

AXLE (FRONT)

Sixteen passengers shall have a minimum 4000-pound capacity front axle. Twenty-two passengers shall have a minimum 4100-pound capacity front axle.

AXLE (REAR)

Sixteen passengers shall have a minimum 6000-pound rear axle. Twenty-two passengers shall have a minimum 7200-pound rear axle. Rear axle shall have dual wheels.

AXLE (RATIO)

The rear axle gear ratio for Type "A" buses shall be approximately 4.10 to 1 for 16 and 22 passenger chopped van conversions.

BATTERY

The two batteries shall be the chassis manufacturer's maintenance-free, 12-volt standard. Battery installation shall comply with the requirement of Section 1, Part 2.

NOTE: Both batteries shall be installed in the battery box.

BRAKES

The parking and service brakes shall be the manufacturer’s standard for school bus package, meeting FMVSS 105. Type "A" school buses shall be equipped with the manufacturer’s standard anti-lock brake system.

BUMPER (FRONT)

Sixteen and 22 passenger van conversions shall be the manufacturer’s standard and black.

DRIVESHAFT GUARDS

Drive shaft guards shall be provided.

ELECTRICAL SYSTEM

ALTERNATOR

The alternator for 16 and 22-passenger shells shall be a minimum 100-AMP solid state regulator, pre-set to a minimum of 14 volts and a single belt drive.

GAUGES

Gauges, in lieu of lights (when available from the chassis manufacturer), shall be furnished for oil, water, temperature, and battery charge.

ENGINE

Engines for Type "A" school buses shall be a minimum 2.0 L diesel engine or OEM approved propane engine.

EXHAUST SYSTEM

Exhaust System routing and tubing shall be the manufacturer's standard. An exhaust shield shall be provided between the exhaust line and fuel tank.

FUEL TANK

The fuel tank shall be the chassis manufacturer's standard, certified to meet FMVSS 301 and SBMTC Design Objectives, and shall have a minimum 25-gallon tank capacity.

FUEL FILTER

The fuel filter shall be the manufacturer's standard.

GROSS VEHICLE WEIGHT RATING

Twenty-two passenger chop van conversions shall have a minimum of 10,360 pound GVWR and shall in all cases meet FMVSS standard applicable to buses over ten- thousand (10,000) GVWR, including barriers, except that seating shall comply with FMVSS 222 for school buses having a GVWR of 10,000 pounds. It shall include passenger lap/shoulder belts.

Sixteen passenger buses shall have a minimum GVWR of 9,600 pounds.

HORNS

Dual horns shall be provided.

MOUNTING

Body to frame mounting shall be to the chassis manufacturer's standard.

POWER STEERING

Power steering shall be the manufacturer's standard.

SHOCK ABSORBERS

The shock absorbers shall be heavy-duty.

TIRES

Sixteen and 22 passenger chop van conversions shall have minimum LT-235/65R16C highway type tread with a tubeless radial, American made from a major manufacturer.

TRANSMISSION

The transmission shall be a heavy-duty automatic.

WHEELBASE

A minimum 138-inch wheelbase is required on all 22-passenger school buses.

Sixteen-passenger single rear wheel van conversion shall have a 138-inch wheelbase.

WHEELS

Dual wheels shall be provided on the rear of 22-passenger chopped van conversions. Single rear wheels shall be provided on all 16-passenger van conversions.

WINDSHIELD

Windshield washers and wipers shall be the manufacturer’s standard for Type "A" buses with tinted glass.

WINDSHIELD WASHERS AND WIPERS

Windshield washers and wipers shall be the manufacturer’s standard.

SECTION II PART 2
TYPE A BODY

The specifications in this section apply to type "A" school bus bodies with a rated pupil capacity of 16-passengers and 22-passenger special needs shells.

Type "A" school buses shall meet all specifications of Section 1, Part 2, unless listed as exceptions under this part.

NOTE: Fiberglass may be used for certain transition pieces with the design intent being primarily for aesthetics but not for structural integrity. Prior approval of non-metal transition pieces must be obtained. Composition materials may be used provided they equate to steel strength characteristics.

BATTERY

The 16 and 22-passenger van conversion shall have a battery box installed, meeting the design intend of specification as called for in Section 1, Part 2, for Type "C" school buses. Body Company installed battery cables shall comply with the chassis manufacturer’s recommendation regarding electrical resistance.

BRAKES

GENERAL REQUIREMENTS

All brake lining shall be of asbestos-free material. All hydraulic brake systems 16 to 22-passenger shall be equipped with an antilock brake system.

BUMPER (REAR)

The rear bumper shall be a minimum 8-gauge metal, approximately 8 inches wide with wrapped ends and closed corners, and black.

CONSTRUCTION

All construction material used in modification of fabrication, unless noted below, shall be equal to the strength of steel. Body joints present in the portion of the Type "A" school bus body, furnished exclusively by the body manufacturer shall conform to the performance requirements of FMVSS 221. This does not include the body joints created when body components are attached to components furnished by the chassis manufacturer (see CONSTRUCTION, SECTION 1 PART 2). All side panels shall be the equivalent in strength to 22-gauge steel. Roof sheets shall be equivalent to 23-gauge steel. This allows for nonferrous metal side and roof panels. All bodies shall be bow frame construction to form a "safety cage". Front and rear caps may be composite material provided they contain a metal inner liner.

DOORS - SERVICE DOOR (FRONT ENTRANCE DOOR)

The front entrance door on a 22-passenger chop van conversion shall be a conventional school bus door and meet all applicable school bus crash worthiness standards. The service door shall be designed to open outward. The driver's door shall be the manufacturer's standard with the locking mechanism intact and shall include a running board.

The emergency door shall have a conventional school bus door latch.

The entrance door shall have an extended entrance step covered with pebble top flooring.

ELECTRICAL SYSTEM

LIGHT TERMINAL

Connection of the rear brake lights, taillights, turn signals and back-up lights shall be the manufacturer's standard.

HEADLIGHT SWITCH

The headlight switch and accessory loads shall be wired as the manufacturer's standard.

NOTE: The total constant electrical load is to be computed as the constant load plus 35% of the intermittent load. The intermittent load shall include only these items:

- Four Turn signal lamps
- Four Stop lamps
- Two Back-up lamps
- One Stepwell lamp
- Eight Domes
- Eight Warning lamps
- Two Stop arm with dual lights

The eight-light warning system flasher shall be an Aeroflash Signal Corporation, Model 165-0018, Weldon 7000, or Inpower SFB-90.

BODY CUT-OFF SOLENOID SWITCH

The body cut-off solenoid switch shall be a minimum of 60-AMPS continuous capacity. The solenoid switch electrical feed wire shall have an amperage rating 25% greater than the design continuous load.

FANS (AUXILIARY)

Delete auxiliary fans for Type "A", 16 and 22-passenger shells.

FLOOR

Base floor material shall be metal. Floors deviating from the floor specifications for Type "C" buses shall be covered with a minimum of 1/2-inch plywood exterior grade or approved equal

FLOOR COVERING

Floor covering shall be the same material as used on the conventional bus.

FUEL FILL OPENING

The fuel fill opening shall be the manufacturer's standard.

HEATERS

The heating system in Type "A" school buses shall meet the performance criteria of Type "C" school buses with the following exceptions:

1. Temperature performance shall be measured 26 inches inward from the sidewalls, 26 inches inward from the windshield, and at the rear door 30 inches up from the floor.
2. Valving for heaters shall be equal in size to the heater supply line.

DEFROSTERS

Defrosters shall be the manufacturer's standard.

BULKHEAD FITTINGS

The heater hose entrance into the body floor shall not require bulkhead fittings when the heater hose bibs extend through the floor. These heaters provide the seal between the heater bottom and the floor opening.

HEATER HOSES

Heater hoses shall be Goodyear Hi-Miler or approved equal.

INSIDE HEIGHT

Twenty-two passenger conversion vans shall have an inside height of 72 inches at a minimum and 78 inches at a maximum.

Sixteen passenger conversions shall have an inside height of approximately 65 inches at a minimum and 74 inches at a maximum.

LETTERING

Lettering on the 8-inch lettering belt shall be a minimum 3/4 inches wide stroke and 6 inches in height. Sixteen and 22-passenger school bus bodies shall require the lettering as per Section 1, Part 2.

LIGHTS

The requirements of Section 1, Parts 1 and 2, apply to Type "A" school buses. Should body configuration prohibit the installation of lights as per requirements of Section 1, prior approval of necessary modifications shall be obtained from the Pupil Transportation Branch.

Fender mounted Class A turn signals are not required.

MIRRORS

INTERIOR

The mirrors shall be 6 by 16 inches on the interior, meeting performance requirements of Section 1, Part 2.

EXTERIOR

Rear vision mirrors on the 16 and 22-passenger buses shall meet the performance requirements of FMVSS 111. Rosco Eurostyle heated remote mirrors shall be used to meet this requirement.

Rear vision exterior mirrors shall be mounted and braced to minimize vibration.

FRONT VIEW AND SIDE VIEW

Front and side view mirrors shall comply with Type "C" specifications (refer to Section 1, Part 2).

NOTE: The intent of the exterior mirror size and location specification is to ensure compliance with the mirror performance specification in Section 1, Part 2. Should any manufacturer's design dictate the installation of the mirror other than those specified above, prior approval is required.

PAINT

All body company-applied paint and primer shall be polyurethane.

RUB RAILS

Terminate rub rails at the driver's door. Eliminate the lower rub rail as is described in Section 1, Part 2.

SEAT (DRIVER)

The driver's seat shall be the manufacturer's standard high back seat, and the seat belt shall be the manufacturer's standard "Type II" for Type "A-1" and "A-2" buses.

SEATS (PUPIL)

The 16 and 24-passenger school bus shall have seats meeting the design criteria of the Type "C" school buses with the floor plan and seat width being the manufacturer's standard for the passenger size. The manufacturer's standard floor plan and seat width shall provide for a minimum 12-inch aisle between the seats. Seat plans shall provide a minimum 8 inch buffer zone in the rear of the bus. Lap/shoulder belts shall be installed on all 16 and 22-passenger buses. Lap/shoulder belts shall be required.

SUN VISOR

Sun visors shall be the manufacturer's standard.

TEST

Intrusion tests will not be required on the bodies of 16 and 22-passenger school buses.

SECTION III
SPECIAL NEEDS SCHOOL BUS

The specifications in this section apply in general to vehicles designed to transport special needs pupils.

GENERAL REQUIREMENTS

School bus bodies of this type shall meet all specifications as published in the Kentucky Minimum Specifications for School Buses, Section 1 Part 2 and Section II Part 2 except for the modifications necessary for the installation of special equipment as listed herein.

NOTE: For the purpose of this specification, passenger capacities refer to the shell sizes of equivalent conventional school buses.

DOORS

SPECIAL SERVICE OPENING, Type C Buses

There shall be a service opening for the electrohydraulic lift, located on the right side of the bus body between the entrance door and rear wheels, subject to approval by the Pupil Transportation Branch. The door(s) shall be fastened with a positive locking device for the open and closed positions. The door(s) shall have a glass window in the upper half and shall be equipped with a device that will activate a green or red light in the driver's compartment labeled "Lift Door".

SPECIAL SERVICE OPENING, Type A Buses

There shall be a service opening for the electrohydraulic lift, located on the right side of the body behind the rear wheels. All other requirements, except for location, shall be the same as a Type C bus.

Special service doors shall have a minimum height of 58 inches. Roof intrusion tests at the special service door shall be required if installation of this door requires removal of window header.

SERVICE DOOR ENTRANCE

Suitable devices shall be provided to assist passengers during entry or egress. These devices shall allow for easy grasping or holding and shall have no openings or pinch points which might entangle clothing, accessories or limbs. It shall be designed to afford easy accessibility to small children. All special needs buses shall be equipped with two service door handrails (one on the left and one on the right). The door handrails shall be painted yellow.

The 22-passenger conversion van shall have, at a minimum, two step risers designed for easy entrance and exit by special needs students. The risers shall be equal in height and width with the height being a maximum of 9 inches.

On the 34 through 66-passenger bus, there shall be three step risers of equal height in the entrance way, placing the first landing approximately 12 inches to 14 inches above the ground level and otherwise meeting all requirements listed for the regular-type school bus. All steps must extend the full width of the step well.

ELECTRO-HYDRAULIC LIFT

Only Type "C" 34 through 66-passenger and type "A" 22-passenger school buses may be equipped with an electrohydraulic lift.

Thirty-four through 66-passenger body shells shall be equipped with a Braun Millennium series hydraulic lift Model L917IB or L919B standard. Local districts may request, Ricon S series S5510 or MaxonWL7 version C.

The above-mentioned lifts shall be rated at a minimum 800 pounds working capacity, be equipped with a pressure relief switch for ground contact, and have automatic positioning at the floor level.

The successful vendor shall provide factory support from the lift manufacturer on an as needed basis and up to five training classes for technicians during the contract period.

The controls pennant shall be mounted and accessible to the operator from the outside of the bus. It shall be protected by a re-settable circuit breaker within the lift manufacturer's specifications. The platform shall be thirty-inches wide at a minimum, with the power provided through the ignition switch energizing a separate solenoid. The solenoid on all 24-passenger buses shall be located under the hood. A ground cable shall be installed from the lift frame to the vehicle frame of the bus.

The re-settable breaker shall be in the engine compartment subject to the approval of the Pupil Transportation Branch.

NOTE: No solenoid or breaker shall be installed in any battery box.

NOTE: Lifts shall be actuated only when the ignition switch is in the accessory or run position. The location and installation of the lift shall require prior approval of the Pupil Transportation Branch. Lifts shall be in compliance with FMVSS 403,404 and all applicable ADA requirements.

Twenty-two passenger conversion vans shall be equipped with a Braun Millennium Series, Model 917IB, or prior approved equal. The lift shall meet all of the above-mentioned requirements, with the exception of the height and platform width. The platform width shall be a minimum thirty inches horizontal pathway.

FLOOR COVERING (PLYWOOD)

Five-eighths inches CD plywood shall be installed on all special needs school buses. The plywood shall be fastened to the bus floor with screws and shall extend from the rearmost point to the chassis toe board area. The plywood shall be marine grade or treated to reduce water damage and rot. All edges shall be sealed.

FLOOR PLAN

The 22 and 34-passenger body shells shall be equipped for two wheelchair locations; the 52 and 66-passenger body shells shall be equipped with four wheelchair locations.

All wheelchair locations shall be directly accessible to the entrance, the lift and the emergency doors. Wheelchair locations shall be so positioned to be forward facing. The lift door shall be provided in the first body section behind the service door on 34 through 66 body shells. All 66-passenger body shells shall include a left side emergency door. Twenty-two passenger shall be manufacturer standard.

NOTE: The floor plan design requires wheelchair locations to be forward of the rear axle when possible. Proposed floor plans shall require prior approval of the Pupil Transportation Branch.

FLAT FLOOR OPTION

A 34-passenger (shell size) Special need bus may be purchased as an option. A flat floor effects bus may be equipped with 19.5 by 7.5 inch rims and 245/70R/19.5 tires. Flat floor buses shall be equipped with full length continuous L track. A Flat floor bus shall meet all other type C bus requirements listed in Section I Parts 1 and 2 as well as Section III of this specification.

GLASS (TINTED)

All school bus body shells equipped for special needs operation shall be equipped with tinted glass in the side windows, including the lift door. The side windows are to be safety glass, tinted for approximately 28% light transmittance.

IDENTIFICATION SPECIAL NEEDS SYMBOL

Buses equipped for the transportation of special needs students shall be equipped with the International Special Needs Symbol. The locations of this symbol are as follows: One on the rear center portion of the rear emergency door; one on the right lettering belt, adjacent to the entrance door; and one aft the stop arm. The symbol size shall be approximately 6 inches.

MODESTY PANELS, STANCHIONS AND BARRIERS

A restraining barrier or padded modesty panel and stanchion must be provided rearward of the entrance door. A restraining barrier shall be positioned between the back of the driver's seat and the first wheelchair position. A restraining panel and stanchion must be provided immediately forward and rearward of the lift. Restraining barriers shall meet the FMVSS 222 design criteria for barriers.

NOTE: A padded modesty panel and stanchion are permitted only forward of a wheelchair position. Retaining barriers are required forward for all passenger seats.

SEATS

All body shells shall have barriers and seats sized to allow for a 30-inch clear aisle from the entrance door to the rear emergency door. All seats shall be forward facing. Excluding the driver's seat and wheelchairs, all seats shall be equipped with individual passenger lap/shoulder belts that attach to the seat. Lap/shoulder belts shall be required.

SPECIAL LIGHTS

A light shall be placed inside the bus over the special service door and shall be operated by a separate switch. Location requires prior approval of the Pupil Transportation Branch.

A skirt-skirted mounted landing area light shall be provided with bezel and shall be white L.E.D's.

SUPPORT EQUIPMENT

Support equipment, not applicable to be housed in the under-skirt storage compartment, shall require a securing system that would retain equipment when a force of 20G's is applied in any direction.

BELT CUTTER

A whole handgrip belt cutter shall be installed on all handicap-equipped buses. This belt cutter is in addition to the standard belt cutter requirement included on page 73 of the specifications.

BODY FLUIDS KIT

A body fluids kit shall be installed on all school buses.

EVACUATION AID

Each handicap-equipped school bus shall be equipped with an Evac Aid ™ manufactured by Tie Tech, Inc. Westchester Ohio.

The evacuation aid shall be at least 18-square feet in size, having a minimum width of 29 inches. The Evac Aid shall be enclosed in a non-metallic enclosure pouch of no more than 5 1/2 inches in depth, 8 1/2 inches by 10 1/2 inches in length and width, and identified on the front as to the contents. The pouch shall be mounted on the left side interior wall in the buffer zone, behind the left rear seat as close to the rear entrance door opening as practical on a horizontal and vertical line no higher than the horizontal metal seat portion of the seat frame. The evacuation aid and pouch combined weight shall be less than 10 pounds and shall be attached to the interior wall in a manner that would retain the pouch to the wall when a 20G force is applied to the pouch in any direction. The location of the evacuation aid shall be subject to the approval of the Pupil Transportation Branch.

WHEELCHAIR ANCHORS AND OCCUPANT SECUREMENT SYSTEM

1. The Mobility Aid Securement and Occupancy Restraint System shall be designed, installed and operated to accommodate passengers in a forward-facing orientation within the vehicle.
2. For each Mobility Aid Securement System provided, a Type 2, three-point occupant restraint system consisting of a lap (pelvic) belt and a shoulder (upper torso) belt complying with all applicable provisions of 49CFR, part 571, shall be provided for use by mobility aid users. The shoulder belt shall be adjustable without the use of tools.
3. The Occupant Restraint System shall be equipped with a single-point, push-button "quick disconnect" for the lap belt and the lower end of the shoulder belt to provide immediate release of the occupant in the event of an emergency evacuation.
4. The shoulder belt system shall provide a vertical height adjuster with 12 inches of vertical adjustment for proper placement of the shoulder belt.
5. The Mobility Aid Securement system shall utilize four adjustable securing strap assemblies that attach to the structural members of the mobility aid at four separate points: two strap assemblies for

attachment to the front of the mobility aid, and two strap assemblies for attachment to the rear of the mobility aid.

6. Each front securing strap assembly shall be capable of withstanding a minimum static load force of 5,000 pounds. Each rear securing strap assembly shall be capable of withstanding a minimum static load force of 6,000 pounds.
7. The Mobility Aid Securement System shall utilize positive-locking anchorage and attachment hardware to prohibit accidental or inadvertent release of the system. Each wheelchair position shall be equipped with four 50-inch sections of L track. If two wheelchair positions are adjacent the L track shall be continuous and a minimum 100 inches long
8. The Mobility Aid Securement Strap Assemblies shall be composed of a different size or color of material than the Occupant Restraint Belts to provide quick visual identification of the two systems and to distinguish the separate function.
9. Each of the individual securing straps and restraint belt assemblies shall be marked with the manufacturer's name, part number, month and year of the manufacture.
10. The Mobility Aid Securement and Occupant Restraint System shall be subjected to, and successfully pass, a dynamic 30 mph/20G force Impact Test per Society of Automotive Engineer's SAEJ2249 Wheelchair Tie-down and Occupant Restraint Systems for use in Motor Vehicles. The testing shall be performed and documented by experienced personnel using an impact simulator with proven ability to provide reliable, accurate and repeatable test results.
11. A storage container shall be provided for each securing station to allow for clean storage of the system straps and belts when not in use. A separate space within the container shall also be provided to insert detailed operation instructions for use of the entire system.

OCCUPANT SECUREMENT

All wheelchair positions shall be equipped with a "Type II" occupant protection and securing system meeting the requirements of FMVSS 209 and 210. The design of the securing system shall reference, as a standard, the Sure Lock, four-point wheelchair anchor part number FF612-4C-7 Q'Straint QRT System part number Q8111-L and the physical dimensions of an Everest & Jennings manual wheelchair, Model T8A200, to determine the seating reference point and the design angle of pull of the torso belt for passenger protection between the average size 6-year old and 50th percentile adult male. Adjustable attachment points of the overhead torso belt connectors shall be identified in some manner that a prudent operator would assure achieving the design angle of pull relative to the physical dimensions of the person being transported.

WINDOWS

School buses equipped with a handicap lift on 22 through 66-passenger body shells shall have push-out windows installed as per the requirement of Section 1, Part 2. No wheelchair restraint may be in a body section containing a push-out window. If the specified window location interferes with the specified wheelchair restraint placement, window(s) shall be relocated. Manufacturers are required to submit floor plans showing location of lift, wheelchair restraints, and emergency exits. Emergency window decals shall be applied to both sides of the glass to ensure readability through the dark tinting on special needs windows.

SECTION IV
ALTERNATIVE FUELS

The specifications in this section applies to specific changes required for alternative fuels.

PROPANE POWERED

The Kentucky Minimum Specifications for School Buses is the primary specification for all school buses in the Commonwealth pursuant to KRS 156.153. This document is supplemental to that specification and is applicable to propane powered buses only. All provisions of the primary specification shall be adhered to unless specifically mentioned in this supplement. This specification is for new propane powered school buses only and does not allow for the modification of any existing school bus.

COMPLIANCE WITH FMVSS

All propane powered buses shall be in full compliance with all applicable Federal Motor Vehicle Safety standards as well as CMVSS 301.1 (LPG Fuel System Integrity).

CHASSIS MODIFICATION

A propane fueled engine may be installed on all Type A, 66 and 72-passenger type C and 78-passenger type D, FE school buses as a local district purchase option. These propane powered buses shall be designed to improve fuel economy while decreasing emissions.

All propane powered buses shall be equipped clearly marked with lettering and decals as required by NFPA 58 'Liquefied Petroleum Gas Code' to enable first responders to readily identify the vehicle as being fueled by propane.

A Fuel Door Interlock Switch in the fuel door opening of propane powered unit is required. The interlock must prevent the engine from starting if the fuel door is not securely latched. With the fuel door open the engine will not start but opening the fuel door with the engine already running, will not shut down/cutoff the engine. The fuel door shall be lockable.

"LIQUIFIED PETROEUM GAS" shall be painted or decaled on or adjacent to the fuel fill access cover in approximately 1-inch black lettering for propane-fueled engines installation.

All propane systems shall be factory installed by the OEM on new buses only.

The propane powered chassis shall comply with all specifications for a Type C school bus with the following exceptions and additions:

ENGINE

1. A Ford 6.8L V10, 7.3L V8, or a GM 8.0L engine shall be the standard engine for this application.
2. Type A bus may have a GM 6.0L engine.
3. Minimum 270-horsepower, 450 foot/pounds torque. Type A may have a minimum of 380 foot/pounds torque.
4. Coolant shall be the engine manufactures standard and all heating systems shall be filled with the same coolant.
5. The oil filter shall be the engine manufactures standard oil filter.

6. The propane powered bus does not require supplemental fuel filtration fuel systems, drain plugs, overflow tubes, top mount fuel sender, fuel sender access plate or other parts normally associated with liquid fuel systems.
7. Electronic high idle may be used in lieu of a high idle switch.
8. The propane powered bus may be equipped with a side exhaust pipe.

FUEL TANKS

1. Minimum 60-gallon mounted between the vehicle frame rails and shielded under the bus.
2. Optional 90-gallon mounted between the vehicle frame rails and shielded under the bus.
3. Type A shall have minimum 37-gallon mounted between the vehicle frame rails and shielded under the bus.

PROPANE IDENTIFICATION

A propane vehicle emblem or label shall be affixed to the right tag panel. An emblem or label shall also be affixed to the right side of the bus rearward of the entrance door and to the left side of the bus aft of the driver's window. LIQUIFIED PETROLEUM GAS sign shall be affixed above the fuel fill door in minimum 1-inch block letters. Cut off valves to the tanks shall be clearly labeled.

TRANSMISSION

A propane fueled bus shall use a Ford 6R140 or an Allison 2300/2500 series transmission. Transmission shall be filled with synthetic fluid approved by the transmission supplier.

Type A may have a GM 4L80E transmission.

WARRANTY

All propane systems shall be factory installed and backed by a three year unlimited mileage warranty on components related to the fuel system (tanks, valves, injectors) all other warranties shall be as stated in the Kentucky Minimum Specifications, Section I parts 1-2.

HYBRID ELECTRIC DRIVE

The Kentucky Minimum Specifications for School Buses is the primary specification for all school buses in the Commonwealth pursuant to KRS 156.153. This document is supplemental to that specification and is applicable to hybrid diesel electric buses only. All provisions of the primary specification shall be adhered to unless specifically mentioned in this supplement. This specification is for new hybrid school buses only and does not allow for the modification of any existing school bus.

WARRANTY

All hybrid systems shall be warranted for three years, unlimited miles. In addition, all normal warranties listed in the Kentucky Minimum Specifications for School Buses shall not be compromised by the hybrid systems.

TRAINING FOR LOCAL SCHOOL DISTRICT PERSONNEL

The successful vendor shall provide training to local district personnel including technicians and driver trainers. These classes shall be provided at multiple locations around the state in response to local demand. Class content, location and frequency shall be approved by the KDE.

COMPLIANCE WITH FMVSS

All hybrid systems shall be in full compliance with all applicable Federal Motor Vehicle Safety Standards.

CHASSIS MODIFICATION

Charge sustaining hybrid electric drives may be installed on 66-passenger type C school buses as a local district purchase option. These hybrid drives shall be designed to improve fuel economy while decreasing emissions.

All hybrid electric chassis shall be equipped with a master electrical disconnect as close to the batteries as possible and clearly marked in 1-inch block letters to enable first responders to readily identify the electrical hazard associated with the vehicle.

The hybrid called for in this specification shall be the charge sustaining type. All hybrid systems shall be factory installed by the OEM on new buses only.

The diesel electric hybrid chassis shall comply with all specifications for a Type C school bus with the following exceptions and additions:

BATTERIES

1. All system batteries shall be lithium ion technology. Any battery upgrade shall require the approval of KDE.
2. Batteries shall be electronically monitored to ensure the charge is equally distributed for maximum battery life.

3. Batteries shall be air-cooled or water cooled. This cooling system shall include a fan to assist air movement.
4. Batteries shall be shrouded to guard against road debris and water.

ENGINE

A Cummins ISB or MaxForce DT engine shall be the standard engine for this application.

1. Minimum 240-horsepower, 560 foot/pounds torque.
2. All engines shall have a standard engine starting system in addition the hybrid drive.

ELECTRIC MOTOR/GENERATOR

1. The electric motor shall assist launch by providing a minimum of 300 foot/pounds of torque. The generator shall produce regenerative braking of 300 foot/pounds.
2. The electric drive shall have a manual disconnect that will allow the bus to operate as a conventional diesel if the electric drive is not functioning properly.
3. All hybrid systems shall be capable of engine only operation.

HYBRID IDENTIFICATION

A hybrid electric vehicle emblem or label shall be affixed to the rear bumper. An emblem or label shall also be affixed to the right side of the bus rearward of the entrance door and to the left side of the bus aft of the driver's window.

INVERTER

The power electronic modules and inverter shall have a cooling system separate from the engine cooling system.

TRANSMISSION

A hybrid electric drive system shall use an Eaton Auto shift or an Allison 2500 PTS transmission.

WIRING

1. The hybrid drive system shall have a manual cut off switch.
2. High voltage wiring shall be color coded with orange sheathing.
3. High voltage decals shall be applied to the outside of the battery case and the power electronics carrier.

ELECTRIC DRIVE

An electric powered school bus shall meet all Federal Motor Vehicle Safety Standards and all Society of Automotive Engineers standards that are applicable at time of manufacture.

ADDITIONAL REQUIREMENTS

MARKINGS

1. The outer layer of insulation or wiring conduit for drive system high-voltage wiring shall be bright orange.
2. All enclosed compartments which contain high-voltage components shall be labeled with a high voltage marking/warning.
3. At a minimum, an identifying label shall be affixed on the right rear corner of the bus body. An additional label may be applied to the right side of the bus rearward of the entrance door and to the left side of the bus aft of the driver's window.

ELECTRIC POWER SOURCE (BATTERY)

1. Shall not be in or accessible from the interior of the school bus.
2. Shall be designed to prevent the passenger compartment from becoming energized.
3. All batteries shall be designed to prevent any dangerous fluids or fumes from entering the passenger area.
4. There shall be a disconnect switch or device to shut-off the high voltage components at the power source in the event of a crash.

POWER DISCONNECT

A power disconnect device or switch shall be provided.

1. This disconnect device or switch shall be clearly marked.
2. If located inside a compartment, the compartment shall be clearly marked.
3. This device or switch shall not be in or accessible from the passenger area.

RANGE

OEM design which can operate with a range of 100 miles or more.

INSTRUMENT DISPLAY

The instrument display panel must also contain an indication showing the state of charge (power and/or range).

SOUND GENERATION

All electric school buses must comply with FMVSS 141 producing sound while in motion below 20 mph.

CHARGING

a. Charging connection point shall be outside the passenger compartment
b. While charging, the transmission/propulsion system shall be rendered inoperative

PROPULSION SYSTEM (Exempted from all engine specifications)

Shall be of enough power to propel the vehicle fully loaded up to 65 mph.
The propulsion system may be mounted utilizing a normal drivetrain or positioned in a way to provide direct power to the wheels. All propulsion systems must be contained below the floor line and cannot come into contact with the road surface.

BRAKES

Brakes may produce regenerated power.

PERFORMANCE SPECIFICATIONS: The installed air conditioning system shall cool the interior of the bus to 80 degrees Fahrenheit measured at a minimum of three points, located 4 feet above the floor at the longitudinal centerline of the bus. The three points shall be 1) near the driver's location, 2) at the mid-point of the body, and 3) 2 feet forward of the emergency rear door, or for Type D rear engine buses, 2 feet forward of the end of the aisle. The test conditions under which the above performance must be achieved shall consist of (1) placing the bus in a room (such as a paint booth) where ambient temperature can be maintained at 100 degrees Fahrenheit; (2) heat soaking the bus at 100 degrees Fahrenheit with windows open for at least one hour; and (3) closing windows, turning on the air conditioner with engine at chassis manufacturer's recommended low idle speed, and cooling the interior of the bus to 80 degrees Fahrenheit or lower within a maximum of 20 minutes while maintaining 100 degrees Fahrenheit outside temperature.

The manufacturer shall provide facilities for KDE personnel and/or a purchasing school district representative to confirm that a pilot model of each bus design meets the above performance requirements.

Type C and D buses shall include an evaporator/blower assembly in the driver's area to direct air to the driver and passengers in addition to the main evaporator assemblies mounted at the rear of the bus. Side-mounted evaporator assemblies and/or ducting may be used on any unit. Location of front evaporator must provide for air directed toward the school bus driver.

EQUIPMENT REQUIREMENTS

NOTE: All 52-capacity (shell size) and larger shall consist of a dual (split) type system to provide redundancy of the air conditioning system. Such systems shall be totally separated so that failure in one part of the system will not affect the other side of the system, including separate systems for refrigerated condensers, evaporators, and electrical control.

Power Source and Compressor(s):

1. The compressor(s) shall be chassis engine driven.
2. The system shall be equipped with both a high pressure and low-pressure switch to prevent compressor operation when system pressures above or below recommended and safe levels.
3. The compressor(s) shall be mounted in the safest area possible. Compressors shall not be mounted below the chassis frame rails. Size and other aspects are not specified since bus shall meet performance requirements outlined previously.
4. Power to the air conditioning shall be controlled by a separate cut off relay.

Condensers(s):

1. Condenser(s) shall be equipped with copper coils and aluminum or copper fins, except that any aluminum-coiled condenser provided by chassis manufacturer on a type A bus.
   Body skirt-mounted condenser(s) are required on Type C and D buses. Condenser assembly(s) shall include permanent magnet, ball bearing, sealed motors for cooling fans, and cases constructed of aluminum or other metal treated as specified for standard body sheet metal. All condensers mounted

under the bus body shall have ventilation to the exterior of the bus body via a grate in the body side skirt.

2. The system shall be equipped with a sight glass (or at least one for each part of a split system), which is accessible and directly visible for checking the level of the refrigerant.
3. Condenser(s) shall be mounted to isolate condenser(s) from vibration or excessive road shock. If condenser(s) is skirt-mounted, it shall be located forward of rear wheels on the left side of the bus whenever possible and shall be protected by full width splash shields or mudguards. If a condenser is mounted within three feet of the rear of any wheel, the bus is required to have mud flaps on both of those wheels and extra protection, as necessary, to ensure mud and road debris is directed away from the condenser.

Evaporators and Ducting:

Type A buses shall be equipped as follows:

1. Minimum of two evaporators required (one front and one rear). Rear unit shall be ceiling or bulkhead mounted above emergency exit.
2. Rear ceiling or bulkhead-mounted evaporator shall blow forward; front

For all buses:

1. Evaporator cases, lines, and ducting (as equipped) shall be designed such that all condensation is effectively drained to the exterior of the bus below floor level under all conditions of vehicle movement without leakage on any interior portion of bus.
2. Any evaporator or ducting system shall be designed and installed to be free of injury-prone projections or sharp edges. Installation shall not reduce compliance with any Federal Motor Vehicle Safety Standard (FMVSS) applicable to the standard bus, including FMVSS 217, 220, 221, and 222. Any ductwork shall be installed so that exposed edges face the front of the bus and do not present sharp edges.
3. Any evaporators used must be copper cored (aluminum or copper fins acceptable), except that front evaporator, if provided by Type A chassis manufacturer, may be aluminum cored.
4. The air intake for any evaporator assembly, except for front evaporator of Type A1, shall be equipped with replaceable air filter(s) accessible without disassembly of evaporator case.
5. On wheelchair lift equipped buses, evaporator and ducting (if used) shall be placed high enough that they will not obstruct existing or potential occupant securing shoulder strap upper attached points. This clearance shall be provided along entire length of the passenger area on both sides of the bus interior to allow for potential retrofitting of the new wheelchair positions and occupant securing devices throughout the bus.
6. No portion of the air conditioning system may block the driver's view through any window.

Controls, Wiring, Hoses, and Miscellaneous Hardware

1. All system operating controls, including on-off switch, blower switch, and temperature control(s) shall be accessible in seated position.
2. Blowers shall be a minimum of two speeds.
3. Wiring shall be copper with color-coded insulation and shall be in a loom.

4. System shall be equipped with at least one manually reset circuit breaker per side to provide overload protection for the main power circuit feeding the evaporator blowers, condenser fans, etc.; system control circuits shall also have overload protection.
5. All wiring, hoses, and lines shall have grommets routed, and supported to reduce wear resulting from heat, chafing, vibration, and other factors.
6. All Type C and D buses equipped with air conditioning shall also be equipped with a high idle system that will increase engine idle speed while the engine and air conditioning are operating, and the transmission is in neutral. This system shall be disabled during performance testing as outlined in performance specifications.
7. The total system shall be temperature thermostatically controlled, with thermostats located at the evaporator assembly tied to remote thermostat control at the driver's location.
8. Refrigerant shall be R134A.
9. Minimum Alternator shall be a 240-Amp Leese-Neville A0014951-PA.

Body and Insulation

Bodies of air-conditioned buses shall be equipped with a diesel noise reduction package as standard equipment in addition the standard insulation required in Section 1 Part II.

OTHER REQUIREMENTS
APPLICABLE TO ALL TYPE A, C, AND D AIR-CONDITIONED BUSES

Warranty – Air-conditioning compressor applications must be approved in writing by the chassis engine manufacturer, stating that the installation will not void or reduce the engine manufacturer's warranty or extended service coverage or liabilities in any way. The total air conditioning system on any bus shall be warranted, including parts (excluding fluids, gases and air filters and labor with no warranty limitations on the number of operating hours.)

Serviceability – All components requiring periodic servicing must be readily accessible for servicing, including, but not limited to, the following:

1. Refrigerant service ports (high and low pressure).
2. Sight glass – must be directly visible.
3. Receiver-dryer (as equipped) – accessible for replacement; must not use sweat-type fittings.
4. Expansion valve.
5. Drive belts – for replacement and adjustment.
6. System fuses and circuit breakers.
7. Evaporator air filters.
8. All major component serial numbers must be readily visible.

Parts and Service Manuals – Parts and Service Manuals shall be provided for entire system including, but not limited to, compressor(s), wiring (includes wiring diagram) evaporators, condensers, controls, hoses and lines. Parts catalog shall be designed so that all replaceable parts are illustrated by line drawings and such parts are numbered on the illustration, with a part description (part name), and the quantity required for the application illustrated on the drawings. Service manual shall include an overall A/C system diagram with component plumbing, locations, and identity indicated for diagnostic purposes.

Parts and Tools Availability – All system parts and required special service tools must be readily available, and a list of suppliers shall be provided with each air-conditioned bus delivered.

Suspension Capacity and Ground Clearance – Ground clearance at the lowest point of the air conditioning system shall be no less than the ground clearance of the bus at the step well. Any special chassis gross axle weight rating (GAWR) requirements required to maintain ground clearance or to ensure adequate suspension capacity must be indicated by the body manufacturer for each configuration of air-conditioned bus.

Compliance - Installed air conditioning system shall not reduce compliance of the finished bus with any Federal Vehicle Safety Standard, including FMVSS 217, 200, 221, 222, and 301.

Performance- Air conditioning system manufacturer shall provide information and data as needed to assist KDE's in establishing chassis engine performance requirements and in determining chassis electrical components or specifications, which may be needed to accommodate the additional electrical demands imposed by the air conditioning system.

Rating- All air conditioning systems used on shall be rated in BTUs using the International Mobile Air Conditioning Association, Incorporated (IMACA) Recommended Procedure 250 for vehicle air conditioning systems. Ratings shall be based on the procedures and conditions listed in Procedure 250 for rating condition "CITY." The following school bus sizes shall have the following minimum BTU ratings for installed air conditioning systems.

Capacity	BTUs
34	78,000
52-72	106,000
7884	120,000

These ratings should not be interpreted as recommended ratings, nor do these ratings relieve the manufacturer of the responsibility to meet the air conditioning performance requirements previously listed.

SECTION V
OPTIONAL EQUIPMENT

The specifications in this section shall apply to optional accessory equipment, which may be installed by Kentucky school districts.

NOTE: Optional equipment is not to be considered by manufacturers when preparing bid quotations.

Installation of optional equipment by Kentucky school districts shall require prior approval of the Pupil Transportation Branch Methods of installation shall be consistent with recognized original equipment manufacturing standards.

12V/USB POWER SOURCE

Installed 12V or USB power sources shall be outside of a compartment and contain a dust cover. The power supply shall only turn on when the vehicle is in the accessory position or on position. It shall not function in any other position.

AIR FAN CLUTCHES

Horton Drive Master air operated fan clutches may be installed as a local district purchase option.

AIR DISK BRAKES

Air disk brakes may be installed as a local district purchase option provided they are in full compliance with all applicable FMVSS standards and certified by the original equipment manufacturer at the time of the bus's construction.

AIR FOILS

A rear airfoil may be installed by Kentucky school districts. Airfoils shall be "SEE II" Corporation, PO Box 426, Darby, Montana, 59827. Airfoils shall be installed consistent with OEM's installation requirements.

BARRIER COMPARTMENT

A single pouch on the front side of the driver's side crash barrier with minimum dimensions of 17 by 12 by 4 inches may be installed. It shall be accessible to the driver from the seated position. It must be made of the same material as the covering on the barrier and have a lid or cover with a latching device such as Velcro™ or snaps. It shall comply with all FMVSS 222 crash barrier requirements.

BRAKE DEVICE

The Maxie Brake Release device may be used on buses to aid in the setting of the parking brake.

BUS ROUTE ID

A magnetic bus route ID sign may be used on the outside of the bus in the same vicinity of the current school bus number. A suction cup style or laminated style may be used inside on the first window. It shall not obstruct the view of the driver.

CHAINS

On Spot TM automatic chains may be added as a local district purchase option.

CLOCKS

Local districts may install glue back clocks, not to exceed 2 inches in diameter, in the driver's area.

COLLISION MITIGATION

An active collision mitigation system may be installed by the OEM as a local district option.

CROSSING CONTROL ARMS

Existing school buses may be retrofitted with crossing control arms in compliance with the specifications listed in Section I, Part 2 "Body."

CRUISE CONTROL

Cruise control may be installed as a local district purchase option or for crash mitigation systems to be activated.

DRIVER DOME LIGHT

Local districts may install a separately switched driver's dome light as a purchase option.

ELECTRONIC VEHICLE INSPECTION SYSTEM

Zonar electronic vehicle inspection system may be installed as a local district purchase option.

ENGINE BRAKE

An engine brake may be factory installed on type C and D buses. The engine brake shall be integrated into the engine and shall not be a stand-alone or aftermarket addition. The engine brake shall not increase the noise level, when activated by more than 2 decibels.

ENGINE

Cummins Engine offers an extended warranty 10-year unlimited miles.

FIRE SUPPRESSION SYSTEM

The engine compartment may be protected by a fire suppression system. Nozzles for suppression systems shall be located in the engine compartment, under the bus, or in the electrical panel, but shall not be in the passenger compartment. The system shall be triggered by a loss of pressure (LOP) detection system or an electronic activation through a control panel that provides an audible and visual alarm. The control panel shall be within view and easy reach of the driver. The control panel shall supervise all detection and suppression circuits.

The fire suppressant chemical shall be a water mist agent, Purple K (dry type), ABC (dry type) or FE-36 (liquid clean agent). The fire suppression system shall be capable of being activated whether the engine is running or not. The fire suppression system shall be specific to school bus application.

The fire suppression system shall not have a vehicle shut down system. A decal shall be placed in clear view of the driver "IN CASE OF FIRE, STOP VEHICLE, SHUT OFF ENGINE" and any necessary instruction providing further driver directions.

FUEL DOOR

Fuel fill door removed and replaced with a filler neck bezel and a cap. Diesel Only.

HEADLIGHTS (RETROFIT)

School districts may retrofit Halogen with LED, the entire headlight bucket shall be replaced. The headlights shall conform to FMVSS 108 and OEM approval.

INTEGRATED CHILD CARRIER SEATS

Local districts may have integrated child seats factory installed on new buses. The standard seating plan shall be altered by the body company and forwarded to the Pupil Transportation Branch to be recorded at the time the order is placed. This altered and approved floor plan will be forwarded to the district as a part of the normal order confirmation process. Districts may use seats certified by the school bus body company as meeting all applicable FMVSS Standards. Only the original equipment manufacturer or their representatives will install these systems.

LAP/SHOULDER BELTS

Local districts may install lap/shoulder belts as a purchase option.

MIRRORS (RETROFIT)

School districts may retrofit pre-1994 mirror systems with post-1994 mirror systems, provided that the entire system is replaced by an FMVSS 111 system supplied in total by the original equipment manufacturer (OEM). School districts shall install these mirror systems according to OEM's instructions.

OXYGEN CYLINDER TRANSPORTATION

When a student's IEP requires that an oxygen cylinder be transported the district shall secure the cylinder by an approved system such as the Sure Lock GO2 hold down. This system shall be load tested.

RADIO (AM, FM, CB, PA, UHF, VHF)

Radio equipment may be installed by Kentucky school districts. ALL EQUIPMENT SHALL BE INSTALLED AS PER THE ORIGINAL BODY MANUFACTURER'S INSTRUCTIONS. Speakers and wiring shall be in the body wiring raceways. Wiring shall be protected when entering and exiting metal areas and attached to the body wiring harness. Radio shall be wired as per the manufacturer's instructions and fused accordingly. All equipment shall be in controllable reach of the school bus driver. No speaker, except for two-way communication speakers, shall be located within four feet of the driver's ear as measured by attaching a 4-foot cord to the top of the driver's seat.

REAR MUD FLAPS

Local districts may install mud flaps on the rear of the school buses, which meet the following specifications:

1. The mud flaps must be constructed of heavy-duty multi-ply mud flap material, no less than 1/4 inches thick.
2. They must be comparable in size to the width of the rear wheel housing and not to extend lower than 10 inches above the ground.
3. The flaps must be plain black and display no type of advertisement or design.

STORAGE COMPARTMENTS

Kentucky school districts may install under floor, skirt-mounted key-locked storage compartments as optional equipment on 52 through 84-passenger school buses. Storage compartments shall be of the largest capacity available as standard production for the rated pupil capacity school bus. Kentucky school districts may install one storage compartment on the left side center of a 52-passenger school bus body and three storage compartments, on 66 through 78-passenger buses, or any combination thereof, on the left side center, left side rear and/or right side rear (depending on exhaust routing) and the right side center. The storage box shall be sealed to minimize dust and water leakage.

Kentucky school districts may retrofit under floor, skirt-mounted key-locked storage compartments in school buses. Catches shall utilize a rod type mechanism. Cable release catch mechanisms may be utilized if provisions are made in the compartment design to permit opening of the compartment door in the event that the cable breaks or becomes detached. Storage compartments must be manufactured by the body company who originally manufactured the school bus body on which they are to be installed.
Under skirt storage compartments shall be installed as per original equipment the manufacturer's instructions.

SUPPLEMENTAL HEATING SYSTEMS

A supplemental heating system may be installed as a local district purchase option provided it is O.E.M. installed (at the factory) and is designed to work in concert with the existing coolant-based heating system.

The body company shall certify that these systems meet FMVSS 301 fuel system standard at the time they leave the factory.

SIDE GLASS TINTING

Regular education school buses may be equipped with tinted side windows of approximately 28% light transmittance. The driver's window, entrance door glass and rear glass shall be clear glass.

TABLET DEVICES

Tablet devices may be installed on Kentucky school buses as a part of routing, GPS and pre-trip systems. These systems shall have the ability to go dark and silent when the vehicle is in motion. The tablet shall be removable and be firmly secured in place when in its mount. The tablet shall be mounted in a safe location that does not interfere with the driver's view of the roadway, mirrors or component controls.

TOW HOOKS

Tow hooks may be purchased as a local school board option on Type "C" buses.

TRASH CONTAINER AND HOLDING DEVICE

A trash container may be installed that meets the following requirements:
1. The container may be no greater than 14-quart capacity;

2. It shall be secured by a holding device that is designed to prevent movement and to allow easy removal and replacement;
3. It shall be installed in an accessible location in the driver compartment, not obstructing passenger use of the service door or driver view of the service door.

UCRA SEATS

When Universal Child Restraint Anchorage (UCRA) seats are installed on a Kentucky school bus they shall be placed in such a way as to eliminate the possibility that a seat back will be double loaded. On all buses equipped with a left side emergency door, the UCRA seats shall be installed forward of the left side emergency door beginning from the rear seated position to the front seated position of the bus.

Buses not equipped with a left side emergency door (34 and 52-passenger shell size) shall have the UCRA seats installed from rear to front. Local district personnel will load the students from the rear positioned UCRA seat forward and ensure that no unrestrained passenger is seated behind a restrained passenger unless a barrier is present to avoid seat back double loading.

All UCRA seats shall be available for purchase by school districts as a local school district purchase option.

Vendors installing this option shall submit a floor plan to KDE for approval prior to accepting the order.

VIDEO CAMERA

Kentucky school districts may install a video camera in school buses for the purpose of video recording students, drivers or outside vehicular activity while being transported to and from school and school-related events. A digital camera system may be used provided the recording equipment is secured to ensure that it will sustain a 20G load without release from its mounting.

Use of video recording equipment shall require the following:

1. The video camera shall be equipped with a time-date generator.
2. The utilization of the bus 12-volt system shall be used as the power supply.
3. The camera and container shall be capable of withstanding at least a 20G load in any direction.
4. A provision for fuse protection of the equipment is required.
5. The camera shall have an automatic focus.
6. An audio input is required.
7. There shall be a time/date generation.
8. Keyed connectors are required.

Use of video enclosures shall require:

1. The enclosure is to provide security for the camera from vandalism or burglary and shall ensure that the camera not be detectable by students and/or by the driver.
2. The enclosure is to be so designed to eliminate sharp edges and/or appendages that would readily cause injury should any person aboard the school bus come in contact with the enclosures.
3. If a Dual-Vision (Roscoe) type system is utilized the camera head shall not intrude below the ASA-1 line on the windshield.

School districts using video recording equipment on school buses to monitor student activity shall establish board policy relative to the usage that is consistent with the statutes of the Commonwealth of

Kentucky. The policies shall address the use of surveillance equipment and penalties, which may occur should student riders receive disciplinary action as a result of the use of recording equipment.

WHEELCHAIR ANCHORS AND OCCUPANT SECUREMENT SYSTEM

STARS seat securement system, slide and click floor pocket, or track segment. Q'straint 8300A1 & Q'straint 360 slide-n-click and pocket may be used.

WIFI HOTSPOT

Local district may install Wi-Fi equipment on bus at their discretion provided the equipment is separately fused and secured. Equipment should be powered from the auxiliary side of the electrical panel.

WINDSHIELD TINTING

Local districts may, at their discretion, tint the upper 1/4 of the windshield and driver window. Tinting shall not exceed 28% light transmittance. Drivers window tinting may not interfere with the driver's sightline of the rear-view mirrors.

BUS REFURBISHMENT SPECIFICATION

Districts wishing to refurbish buses to current specifications by a contract for services shall bid the refurbishing as a package to include all work necessary to bring the older bus into compliance with the most current specifications including but not limited to:

1. Crossing gates
2. Lettering
3. Lighting
4. Mirror systems
5. Outward opening air door
6. Paint
7. Reflective materials
8. Seat backs, cushions, seat covering and frames.
9. Step treads
10. Stop arm assemblies
11. Windows

GENERAL INSTRUCTIONS

Vendors shall perform all work in compliance with the OEM's specifications. Any necessary modifications shall be done within the requirements of the OEM standard of repair.

Vendors shall show proof of general liability insurance of at least $1 million dollars at the time of the bid. This insurance is to remain in force during the life of the contract.

The extent of the required work shall be agreed on by a joint inspection of the bus by the school district and the bidders prior to the invitation to bid. Chassis repairs, when needed, will be the responsibility of the district and will be performed prior to the beginning of the body work.

All warranties on new components shall remain in force and it shall be the responsibility of the successful bidder to process the claims on behalf of the local district.

The district shall conduct a pre-bid conference/inspection with all prospective bidders to clarify the scope of the work and answer vendor questions.

Modifications to the basic structure of the bus body may not be made unless to satisfy the requirements of a recall. Structural repairs, when needed shall be pursuant to OEM repair instructions and industry accepted repair practices. Parts exhibiting excessive corrosion shall be replaced with OEM replacements. Flat panels may be replaced with sheet metal that meets or exceeds the OEM's original specifications. Body refurbishment should be bid as a package separately from chassis repairs.

CROSSING GATE

Crossing gates shall be installed on all refurbished buses to include a manual cancelation switch. Air operated or electric operated system may be utilized depending on the controller being used.

FLOORING

If the flooring is to be replaced, the same type of flooring is to be used as was used by the OEM in compliance with the current specifications. Flooring shall be fire resistant RCA Rubber or Koroseal.

LETTERING

Lettering shall be reapplied after painting using high quality cut letters in compliance with the current specification.

LIGHTING

Lamps and signals shall be upgraded to LED in compliance with the current specification. The buses' current wiring shall be checked for continuity. Connectors shall be cleaned. Grounds shall be cleaned and protected from corrosion by dielectric grease or spray. If replacing headlight to LED the full headlight bucket shall be replaced. The headlight shall conform to FMVSS 108 and have OEM approval.

MIRROR SYSTEMS

Mirror systems shall be upgraded to current FMVSS 111 standards and in compliance with the OEM's installation instructions. The installer shall set up the standard FMVSS 111 grid and ensure all the cones are observable from the standard seated position.

PAINT

All rust shall be repaired using OEM standard repairs and reinforcing when needed.
All windows shall be removed, and all surface rust shall be treated as follows:
(a) If the affected area (with no holes rusted through) cannot be taken down to white metal by mechanical means (sand blasting) POR Marine Clean (or similar product) rust preventative paint shall be applied.

1. Remove loose rust from surface.
2. Clean grease, oils and wax from area where POR 15 is to be applied.
3. Spray POR 15 Metal Ready (or similar product) on all cleaned metal and keep the area wet for at least 20 minutes to allow for metal etching and to leave a zinc phosphate coating. Rinse with water.
4. The surface must be completely dry before applying POR 15 rust preventative paint.
5. Apply urethane primer and surface sealer. Nason 2K 421-12 or equivalent.
6. The repaired area should be top coated with high quality urethane paint such as DuPont Centari or Akzo Nobel U-Tech.

b) Replacing rusted out metal on school buses.

1. The rusted-out metal must be completely removed. Patch panels will not be allowed.
2. New replacement metal must be cleaned with non-petroleum-based cleaner to grease, wax or oil.
3. New replacement metal must be treated with metal conditioner. Spray POR 15 Metal Ready or equivalent product, on all cleaned bare metal areas and keep the area wet for at least twenty minutes to allow for metal etching and to leave a zinc phosphate coating. Rinse with water.
4. A high quality self-etching primer, such as DuPont 616 or equivalent, should be applied. The substrate coating should be sealed with a high-quality urethane primer and surface seal.
5. The topcoat applied shall be a high-quality urethane such as DuPont Centari or Akzo Noble U-tech or similar product.
6. Any replacement panels must be primed, painted and undercoated on the backside if they are below the floor line of the bus.

(c) Preparing the school bus for paint.

1. All areas that have been sanded to bare metal must be coated with a self-etching primer.
2. Substrate coatings must be sealed with a urethane surface sealer, Nason 421-21 or a similar product.

3. A topcoat of quality urethane paint must be applied. DuPont Centari 5000, Akzo Nobel U-tech or similar product.

All top coating shall be DuPont Centari 5000 polyurethane or Akzo Nobel U-Tech or similar product. All painting shall be conducted in full compliance with 40 CFR part 63 and in compliance with Region IV specifications as to VOC. The painted bus shall be brought to a temperature of 140 degrees Fahrenheit for not less than one half hour to allow for proper curing.

REFLECTIVE MATERIALS

New reflective materials shall be installed in compliance with the current specification. The film utilized shall have a minimum of a 7-year warranty.

SEAT BACKS, CUSHIONS, FRAMES, AND COVERS

All seat back foam that has been broken down shall be replaced. Seat cushions that depress more than 80% of their height when a force of 360 pounds is applied shall be replaced. Seat back pans shall be checked and re-welded if loose. All torn or frayed seat covers shall be replaced with covers that match the remaining seats in full compliance with the current specification. When seats are removed to replace flooring the same type and grade bolt shall be used to reinstall the seats.

STEP TREADS

Step treads shall be upgraded to Keroseal pebble top material with polymer construction backing. All rust on the stairwell shall be repaired to OEM specifications. Surface rust will be treated with rust inhibitor. All step tread material shall be sealed with Sikaflex TM or window Weld Super Fast 3M Urethane sealer #08609 around the edges.

STOP ARM ASSEMBLIES

Stop Arm assemblies shall be up graded to LED lights in compliance with the current specification.

OUTWARD OPENING DOORS

All refurbished buses will have outward opening air powered doors.

WINDOWS

Windows shall be removed prior to painting. All side window sashes shall be checked for operation and replaced as needed. New weather stripping shall be used during reinstallation and the window shall be sealed with a high-quality silicone caulk of the appropriate color for the application (yellow or grey).

TIRES (RETREAD)

Kentucky school districts may install retread tires on the rear axle ONLY of Kentucky school buses. The Kentucky Minimum Specification for School Bus Retread Tires, revised 2000, herein presented were developed as a generic specification to be used by all Kentucky school districts purchasing retread tires for application on Kentucky school buses.

These specifications were developed through the cooperative efforts of a retread tire specification committee comprised of KDE's Pupil Transportation Branch staff, representatives from local school districts, and representatives of retread tire manufacturers.

GENERAL PROVISIONS

SCOPE: It is the intent of these specifications to establish minimum standards through which all Kentucky school districts may purchase retread tires which meet the wet traction specification as listed in the Kentucky Minimum Specifications for School Buses, revised 2013. In addition to meeting the traction performance requirement (wet braking traction test), this specification establishes minimum standards dealing with tire rubber physical properties, minimum tread dimensions, casing acceptance, and casing preparation for tread.

TREAD SPLICES

Retread tires shall not have more than two splices in top cap. No more than one splice per quadrant shall be permitted.

MINIMUM TREAD DIMENSIONS

Tire Size	Tread Depth (Inches)
9.00R20	16/32
265/75R22.5	16/32
295/75R22.5	16/32

UNDER TREAD RUBBER THICKNESS

Under tread rubber thickness shall be 20% minimum to 25% maximum of tread depth. Casing shall be prepared to receive under tread rubber thickness of 3/32 inches to 5/32 inches maximum.

CASING ACCEPTANCE

The qualifying re-treader shall be the party in all cases making determination about casing acceptance or rejection. Previously retreaded tires having retread installed improperly regarding dimensional requirements of the original tire manufacturer and/or have casings rounded to receive a retread of a different dimensional width shall be rejected. Rejected casings shall be returned to the local board of education. Casings shall not be more than 60 months old.

It is recommended that a non-destructive inspection method be used to analyze grade casings to find hidden anomalies, separations, injuries and to determine whether a casing is acceptable for a given application and operation.

CASING PREPARATION

The casing shall be buffed to dimensions compatible to the retread system used. The worn tread surface shall be removed to a symmetrical profile in accordance with the procedure and new tire manufacturer specifications. The buffed area of the casing shall be free of contamination and oxidation. All buffing shall be done with the casing inflated.

Casing preparation shall be performed to require original tire manufacturer tread width installation only when applying a retread dimensionally.

CASING REPAIR (Radial Only)

All casings shall be repaired in accordance with International Tire and Retreaders Association (ITRA) tire repair standard. (Exceptions to repair size listed below)

REPAIR TYPE

1. Nail Hole- Nail Hole (puncture) cannot exceed 1/4 inches diameter. Nail hole repairs in the crown of the tire only!
2. Spot Repair – Spot repair is limited to cuts or crack in rubber with no damage body plies.
3. Section Repair – Section repair shall be limited to virgin casings only. Section shall be performed to International Tire and Retreaders Association (ITRA) specifications except for limiting repair size to 1-inch in crown area and maximum of two cables in the sidewall area with a maximum of 3-inches length. All section repairs shall require prior approval of the respective board of education.
4. Bead Repair – The following conditions will be considered repairable in the rubber covering the bead area.
    a. Cuts or tears in the rubber covering the bead area that do not damage the body piles or expose bead wires;
    b. Limited in size to that which will assure duplication of original bead contours;
    c. Repairs that can be performed at a cost low enough to be practical.
5. Sealant Materials - Sealant Materials for tire repairs shall be approved by International Tire and Retreaders Association (IRTA).
6. Repair Identification – (Sections) Retreaders shall affix a permanent identification label in the area of the section repair and subsequent section repairs.

CASING IDENTIFICATION

Board of Education shall identify and capture data regarding casings to include brand name, size, and serial number prior to pick up by retreaders. The retreader shall designate on the form the acceptance or rejection of the casings.

Casings being returned shall be designated on the form at time of return by date and signature of returning agent. The district may only accept the original casings which were provided to the retreader.

DOT NUMBER

DOT numbers shall be affixed to all tires per federal standards. On pre-cured retreads, DOT numbers shall be affixed near existing DOT numbers reading from the left to the right. On mold cure retreads, pre-existing DOT numbers may be removed during the succeeding process.

WARRANTY

Retreaders shall warrant workmanship and materials 100% for the first 10% of tread wear. Workmanship and materials shall be prorated from the first 10% of tread wear to 2/32 inches remaining tread depth.

Casing failures shall be warranted 100% through the first 25% of tread wear and 50% for the next 25% of tread wear. Warranty cost is applicable only as it relates to retreading and/or casing repair cost and not to casing replacement.

LONGEVITY

Retreaders supplying retread tires to Kentucky Board of Education shall supply retreads designed to provide tread life no less than 90% on a per 1/32-inch basis as compared to original equipment tires for respective duty cycles.

SURETIES

A qualifying retreader shall furnish to the Kentucky Board of Education a non-revocable assurance of having product liability insurance in the minimum amount of $3 million.

Retreaders shall be required to provide a performance and/surety bond in amount deemed necessary by a contracting Board of Education.

CERTIFICATION

The qualifying retreader shall have been certified by a retreader trade association, franchiser, and/or the International Retreaders Association for quality within a 12-month preceding the award of a contract.

DELIVERY

Under the agreement of this specification after notification from a Board of Education, the qualifying retreader shall be required to pick up casings, retread and return to the Board of Education within 10-working days.

APPROVAL OF QUALIFICATION

Retread tires purchased by local boards of education for use on Kentucky school buses shall have been qualified for use by the KDE's Pupil Transportation Branch. Qualification shall require wet traction test (ASTM F403-98 Modified for medium duty truck tires) comparison to a control tire with all pertinent testing information, technical data, tire description, and a tread footprint on file within the KDE's Pupil Transportation Branch. The control tire shall be at the discretion of the KDE.

9.00:20 treads previously qualified with a Unisteel II control tire shall meet the intent of this specification.

WET BRAKING TRACTION TEST PROCEDURE SPECIFICATIONS

Wet braking traction testing will be conducted in accordance with the applicable sections of *ASTM F 408-96, Standard Test Method for Wet Traction Straight-Ahead Braking, Using a Towed Trailer,* except as modified herein:

The vehicle is an instrumented truck with a load cell installed on the left rear drive axle position, not a separate tow vehicle and instrumented trailer. The responses are similar to that of a towed trailer; therefore, when the trailer or tow vehicle is referenced in this procedure, it is assumed that the truck test vehicle is appropriate.

A. The test vehicle shall be a semi-tractor or straight truck with a single drive axle and the capacity to allow the test wheel position to be loaded from twelve hundred fifty (1250) to eight thousand (8000) pounds. The test vehicle will have an instrumented load cell installed on the drive axle. The braking system must be modified to allow braking on only the test wheel position. Brakes are applied firmly until the test tire is locked and then held locked for a period of 1.5 seconds.
B. Testing will occur at test speed of 20 mph.
C. All un-mounted tires must be stored at the same conditions at least 24 hours prior to mounting.
D. All tires must be conditioned by mounting them on the drive wheel positions of a vehicle loaded such that the tires have a load similar to the load under which they will be tested. The purpose of the tire break-in will be to remove mold lube from all tires, give tires a worn appearance, and stabilize tire compounds. The conditioning for medium truck tires will require the following:

1. Mount tires on vehicle and run 50 miles on test track.
2. Reverse direction and run 50 additional miles.
3. Rotate all tires.
4. Run 50 additional miles in either direction.
5. Reverse direction and run 50 additional miles.

E. Test tires will be run 200 miles on paved roads on the test track location.

1. Mounted test tires shall be placed outside near the test site at least 12 hours prior to testing so that they will have the same temperature. Storage should be such that test tires are shielded from the sun under a tent to avoid heating by solar radiation.
2. Test loads for medium truck tire testing will be according to the following table:

Tire size Metric	Tire size (Conventional)	Load per tire (± 5%)	Inflation (± 2%)	Reference tire size
Light Truck			50 psi	(Based on ASTM 1805-98 specs)
225 through 265	8 and 9	4525 lbs.	90 psi	(Based on 10R22.5 @ 90 psi)
275 through 295	10 and 11	5260 lbs.	90 psi	(Based on 11R22.5 @ 90 psi)
305 through 325	12	5197 lbs.	100 psi	(Based on 315/80R22.5 @ 100 psi)
365 through 445		7500 lbs.	110 psi	(Based on 385/65R22.5 @ 110 psi)

Table applies to tubeless truck tires only (not applicable for off-road or agricultural tires). Loads and inflation for any tires not listed should be reviewed prior to testing.

F. Water depth will be maintained at a minimum of .050 inches and a maximum of .10 inches throughout the testing period.

G. Test vehicle must maintain a ground speed of 20 mph ± .5 (target) mph. Data acquired with a ground speed beyond 1 mph from the 20 mph specification will be removed.

H. Fifteen lockups will be completed for each variable. Data beyond 1.5 standard deviations.

Refer to ASTM F1805, “Standard Test Method for Single Wheel Driving Traction in a Straight Line on Snow- and Ice- Covered Surfaces”, Section 13, “Data Adjustment Procedures” for a description on the procedures used for wet braking traction data adjustments. Specifically, the gradient correction method and average correction method are used. F1805 also references ASTM F 1650, “Practice for Evaluating Tire Traction Performance Data Under Varying Test Conditions.”

MISCELLANEOUS SPECIFICATIONS

1. All tests should be conducted over the period of at least three days (one pass of the test sequence per “24-hour period” for three consecutive days.)
2. Three tires per test variable will be used for testing, and each tire will be used for one run only. Test sequence will be randomized within each test run.
3. A maximum coefficient of variation (CV) of 15% will be maintained for each test run. No test run should be repeated when the (CV) is less than 15%.

PROGRAM CONTROL TIRES

As much as possible, a standard control tire will be used whenever wet braking traction testing is conducted. This tire will be retread onto a casing of similar size, series, load range, and age as the test tires for that test group. Testing will be conducted under the same conditions as the test tires, and the coefficients obtained for the test tires will be compared to the coefficients obtained for the control tires to obtain the test tire ratings.

Before Kentucky school districts may install retreads on any Kentucky school buses, retread manufacturers shall be required to certify, to local school districts as part of their bid, their tire traction performance using ASTM Standard F403-74 testing procedures.

CERTIFICATION

Prior to the sale of retread tires to Kentucky school districts, retreads shall qualify their retread tires to the local school districts as a part of their bid submission and as meeting the above-mentioned performance standards.

RACK TESTING

A diagonal (racking) load test shall be performed on Type A, B, C and D school buses to assure adequate shear stiffness and strength of the bus body. Details of the test are provided below.

A two cycle loading sequence shall be conducted following the procedures as follows:

A. Requirements: When a force equal to 1 to 1-1/2 times the GVW is applied to the edge of the roof of the vehicle's body structure through a force application plate as specified in B, Test procedures:

A1. The diagonal movement at any point on the application plate shall not exceed 5 1/8 inches; and

A2. Each emergency exit of the vehicle provided in accordance with FMVSS 217 shall be capable of operation as specified in that standard during the full application of the force and after release of the force.

B. Test Procedures: Each vehicle shall be capable of meeting the requirements of (1) and (2) when tested in accordance with the procedures set forth below.

B1. The vehicle shall be supported on a rigid surface along the lower ledge of the frame or along the body sills in the absence of a frame.

B2. The load shall be applied through a force application plate that is flat and rigid. The dimensions of the plate shall be chosen to assure that the plate edges never make contact with the vehicle skin during testing. A typical width is 18 inches, and a typical length is 20 inches less than the length of the vehicle's roof measured along its longitudinal centerline.

B3. Place the force application plate in contact with the edge of the vehicle roof. Orient the plate so that it is flat, and the rigid surface is perpendicular to a diagonal line connecting the most distant points on an interior cross section of the vehicle. The rear edge of the plate shall be positioned approximately 20 inches from the rear edge of the vehicle roof. A temporary stand may be used to support the plate until a force is applied.

B4. Apply an evenly distributed force in a diagonally downward direction through the force application plate at any rate not more than 0.5 inch per second, until a force of 500 pounds has been applied.

B5. Apply additional force in a diagonally downward direction through the force application plate at a rate of not more than 0.5 inch per second until the force specified in A has been applied and maintain this application force.

B6. Measure the diagonal movement of any point on the force application plate which occurred during the application of force in accordance with B5 and open the emergency exits as specified in A2.

B7. Release all diagonal force applied through the force application plate and operate the emergency exits as specified in A2.

C. Test Conditions: The following conditions apply to the requirements specified in (3).

C1. Temperature: The ambient temperature is any level between 32 degrees Fahrenheit and 90 degrees Fahrenheit.

C2. Windows and Doors: Vehicle windows, door and emergency exits are in the fully closed position and latched but not locked.

D. An alternative method of testing for the racking load test shall be as follows:

D1. The racking load shall be applied along a line connecting the most distant points on a transverse cross section of the bus interior so that it produces a shear distortion of the cross section.

D2. The maximum jack load for a two frame assembly is determined by the following formula:

J=2P J-maximum jack load for two-frame assembly
P=load/frame
Where P=DVW divided by N
DVW-dynamic vehicle weight
N- total number of body frames
and DVW=DF x GVW
DF-dynamic factor, not less than 1.5
GVW-gross vehicle weight

Thus, for a DF=1.5, a GVW=22,000 pounds-force and N=11, the dynamic vehicle is DVW=33,000 pounds force, the load/frame is P=3,000 pounds force and the maximum jack force is J=6,000pounds force.

D3. When a complete bus body is rack loaded, the total load DVW must be distributed uniformly along the body. This may be accomplished by mounting a series of hydraulic jacks along the length of the bus interior. Seat may be removed to facilitate jack mounting. The rack load will be considered to be uniformly distributed when the variation in hydraulic jack readings is less than 10 percent. A maximum load, the sum of all jack readings, shall equal DVW.

The test may be performed on a complete bus body or on a representative section composed of at least two complete frames (body posts plus roof bows) and floor. Standard seats may be installed in the test section in a manner identical to that of the full bus body. Fabrication procedures for the test assembly shall be identical to those used in normal bus body production.

A two-cycle loading sequence shall be conducted, with intermediate, final load and deflection readings recorded according to the procedure described above.

The maximum deflection in line with the jack (A, maximum) shall not exceed 4 inches.

Manufacturers shall specify which testing was used and submit appropriate certification information to KDE.

SIDE CONSTRUCTION INTEGRITY

School bus body sides shall be so constructed that there will be no separation of construction joints or a lapped panel separation from a side impact. Body sides shall be so constructed to withstand an intrusion force of 20,000 pounds minimum.

As evidence of the above, the body shall be impacted at a point of 24 inches plus or minus 2 inches above the floor line, with an 8 to 10-inch diameter cylinder, 48 inches long, mounted in a horizontal plane. The cylinder shall impact the body side, spanning two roof posts in a body side area, having interior lapped panels with a force not to exceed a maximum of 10 inches to 8 inches minimum penetration of the body side into the passenger compartment after impact.

Body companies shall furnish to the Pupil Transportation Unit certification of the test performance; showing the body side, window header, and floor line deformation of a body side, consisting of a minimum of seven body sections with the impact test performed on a center line of the seven body sections. The impact test for the body shall be complete in structure with seats installed on the impact side. Body companies performing an intrusion test as part of the certification document shall include the amount of force required for penetration relative to the compliance standard.

SIDE INTRUSION TESTING PROCEDURE

1. Apply a 17,000 pound force to a designated area of the school bus side, including a left side emergency door, to determine if that force will cause a deflection amount greater than 10 inches inward.
2. Door retention hardware must be capable of withstanding an outward force of 5,280 pounds before the side intrusion test and 5,280 pounds after, through a distance of less than 10 inches 20,000 pounds of intrusion force applied. All body sides adjacent to the passenger seating positions shall be required to withstand the above-mentioned intrusion force, relative to the amount of deflection.
3. The left side emergency door, when installed, shall have an adjacent body structure so designed that the side body structure shall withstand the above-mentioned intrusion, relative to the amount of deflection. The left side emergency door shall be secured with a three point latching mechanism.

CERTIFICATION

The body company manufacturers shall certify that all school bus bodies having a left side emergency door installed meet the above requirements, by:

1. Performing intrusion tests, as referenced, with regard to the cylinder size and location;
2. Performing intrusion tests by placing the center point of the test cylinder so that, in a horizontal position, it aligns with the vertical centerline of the emergency door and the ends of the test cylinder span the emergency doorpost. When the intrusion test is being performed on a school bus body side, the school bus body shall be complete with passenger seats and restraint barriers properly positioned;
3. Applying a uniform force of 5,280 pounds to the left side emergency door retention hardware both before and after the side intrusion testing (certification shall require that the door retention hardware does not release or deform when the test is applied).

NOTE: This standard is in addition to the side construction standard performed on the right side as explained previously.

BOSTON BURN BAG TEST

The test shall be conducted in a draft-free, three sided, top-covered enclosure, with the Boston Burn Bag Burn Test applied to 2-foot wide by 3-foot tall vertical sample and a 2-foot wide by 2-foot long horizontal sample. Samples shall be tested in an L- shaped configuration, with the Boston Bag placed on the horizontal sample having the back resting against the vertical sample center. Scorching of material will be permissible, provided the material does not ignite.

HEATER PERFORMANCE TEST

A temperature measurement that is taken 39 inches inward from side walls, 39 inches inward from windshield and rear door, and 36 inches above the floor. It shall include measurements from the front, middle and rear of the bus. The heat shall be evenly distributed through the aisle area.

The bus will be soaked at an ambient temperature of zero degrees Fahrenheit for 15 hours. The temperature must rise to 50 degrees Fahrenheit inside in 20 minutes when 170 degree water is applied at a rate of 3 gallons per minute at a maximum of 6 PSI pressure.

Heater cores installed in Kentucky school buses shall meet the following test standard:

STATIC PRESSURE TEST	150 PSI
CYCLE TEST	20-50 PSI hydraulic surge pressure 450,000 cycles minimum

Total heater system flow restriction shall be measured at a flow rate of 3 gallons per minute at a maximum of 6 PSI pressure when measuring heater performance.

A bleeder valve shall be installed in the highest point in the return line.

HIGHWAY SAFETY PROGRAM
GUIDELINE NO. 17
Pupil Transportation Safety
March 2009

Each State, in cooperation with its political subdivisions and tribal governments, should establish a State highway safety program for pupil transportation safety including administration; the identification, operation, and maintenance of buses used for carrying students; and the training of passengers, pedestrians, and bicycle riders. The purpose of this guideline is to provide strategies for minimizing, to the greatest extent possible, the danger of death or injury to school children while they are traveling to and from school and school-related events.

I. PROGRAM MANAGEMENT

There should be a single State agency with primary administrative responsibility for pupil transportation that employs at least one full-time professional to carry out these responsibilities. The responsible State agency should develop an operating system for collecting and reporting information needed to improve the safety of operating school buses and school-chartered buses. Each State should establish procedures to meet the following recommendations for identification and equipment of school buses. All school buses should:

- Be identified with the words “School Bus” printed in letters not less than eight inches high, located between the warning signal lamps as high as possible without impairing visibility of the lettering from both front and rear, and have no other lettering on the front or rear of the vehicle, except as required by Federal Motor Vehicle Safety Standards (FMVSS), 49 CFR Part 571;
- Be painted National School Bus Glossy Yellow, in accordance with the colorimetric specification of National Institute of Standards and Technology (NIST) Federal Standard No. 595a, Color 13432; except that the hood should be either that color or lusterless black, matching NIST Federal Standard No. 595a, Color 37038.
- Have bumpers of glossy black, matching NIST Federal Standard No. 595a, Color 17038, unless, for increased visibility, they are covered with a reflective material;
- Comply with all FMVSS applicable to school buses at the time of their manufacture;
- Be equipped with safety equipment for use in an emergency, including a charged fire extinguisher that is properly mounted near the driver's seat, with signs indicating the location of such equipment;
- Be equipped with device(s) demonstrated to enhance the safe operation of school vehicles, such as a stop signal arm;

  Be equipped with a system of signal lamps that conforms to the school bus requirements of FMVSS No. 108, 49 CFR 571.108; and

- Have a system of mirrors that conforms to the school bus requirements of FMVSS No. 111, 49 CFR 571.111.
- School-chartered buses should comply with all applicable Federal Motor Carrier Safety Regulations (FMCSR) and FMVSS.

Any school bus meeting the recommendations above that is permanently converted for uses other than transporting children to and from school should be painted a color other than National School Bus Glossy Yellow, and should have the stop arms and school bus signal lamps removed.

School buses, while being operated on a public highway and transporting primarily passengers other than school children, should have the words “School Bus” covered, removed, or otherwise concealed, and the stop arm and signal lamps should not be operated.

II. OPERATIONS

Each State should establish procedures to meet the following recommendations for operating school buses and school-chartered buses:

- Personnel

  - Each State should develop a plan for selecting, training, and supervising people whose primary duties involve transporting school children in order to ensure that such persons will attain a high degree of competence in, and knowledge of, their duties;
  - Every person who drives a school bus or school-chartered bus occupied by school children should, at a minimum:
    - Have a valid State driver's license to operate such a vehicle. All drivers who operate a vehicle designed to transport 16 or more persons (including the driver) are required by the Federal Motor Carrier Safety Administration’s (FMCSA) Commercial Driver's License Standards (49 CFR Part 383) to have a valid commercial driver's license;
    - Meet all physical, mental, moral, and other requirements established by the State agency having primary responsibility for pupil transportation, including requirements related to drug and/or alcohol misuse or abuse; and
    - Meet the physical qualification standards for drivers under the FMCSR of the FMCSA, 49 CFR Part 391.

- Vehicles

  - Each State should enact legislation that provides for uniform procedures regarding school buses stopping on public highways for loading and discharge of children. Public information campaigns should be conducted on a regular basis to ensure that the driving public fully understands the implications of school bus warning signals and requirements to stop for school buses that are loading or discharging school children. Schools should work with local law enforcement agencies to enforce laws against passing a stopped school bus that is loading or unloading students.

  - Each State should establish policies to ensure that school districts are aware of the Federal statutory provision 49 U.S.C. Section 30112(a), as amended by Section 10309(b) of SAFETEA-LU (P.L. 109-59), prohibiting the purchase by schools and school systems of new non-conforming vehicles for school transportation purposes, and prohibit operation of any school bus or other vehicle used for school transportation purposes unless it meets the FMVSSs for school buses.

  - Each State should minimize highway use hazards to school bus and school-chartered bus occupants, other highway users, pedestrians, bicycle riders and property. Efforts to minimize such hazards should include, but not be limited to:

- Planning safe routes and annually reviewing routes for safety hazards;
- Planning routes to ensure the most effective use of school buses and school-chartered buses to ensure that passengers are not standing while these vehicles are in operation;

- Providing loading and unloading zones off the main traveled part of highways, whenever it is practical to do so;

- Establishing restricted loading and unloading areas for school buses and school-chartered buses at or near schools;

- Ensuring that school bus operators, when stopping on a highway to take on or discharge children, adhere to State regulations for loading and discharging including the use of signal lamps;

- Replacing school buses manufactured before April 1, 1977, with buses that meet the current FMVSSs for school buses, and not chartering any pre-1977 school buses; and

- Prohibiting public or private schools from purchasing school buses built prior to April 1, 1977 for school transportation or school-related events.

- Use of amber signal lamps to indicate that a school bus is preparing to stop to load or unload children is at the option of the State. Use of red warning signal lamps as specified in this guideline for any purpose or at any time other than when the school bus is stopped to load or discharge passengers should be prohibited.

- When school buses are equipped with stop arms, such devices should be operated only in conjunction with red warning signal lamps, when vehicles are stopped.

- Seating
- Children are protected in large school buses by compartmentalization, a passive occupant protection system. This provides a protective envelope consisting of strong, closely-spaced seats that have energy- absorbing padded seat backs that help to distribute and reduce crash forces. Compartmentalization is most effective when occupants are fully seated within the bus seat. Seating should be provided that will allow each occupant to sit on a school bus seat without any part of his or her body extending into the aisle.

- There should be no auxiliary seating accommodations such as temporary or folding jump seats in school buses.

- Standing while school buses and school-chartered buses are in motion should not be permitted. Routing and seating plans should be coordinated to eliminate passengers standing when a school bus or school- chartered bus is in motion.

- Drivers of school buses and school-chartered buses should be required to wear occupant restraints whenever the vehicle is in motion.

- Passengers in school buses and school-chartered buses with a gross vehicle weight rating (GVWR) of 10,000 pounds or less should be required to wear occupant restraints (where provided) whenever the vehicle is in motion. Occupant restraints should comply with the requirements of FMVSS Nos. 208, 209 and 210, as they apply to multipurpose vehicles.

- When transporting preschool age children in a school bus;

  - Each child should be properly secured in a Child Safety Restraint System, suitable for the child's weight and age, that meets applicable FMVSSs; and

  - The Child Safety Restraint System should be properly secured to the school bus seat, using anchorages that meet FMVSSs.

  - Emergency exit access

- Baggage and other items transported in the passenger compartment should be stored and secured so that the aisles are kept clear and the door(s) and emergency exit(s) remain unobstructed at all times.

- When school buses are equipped with interior luggage racks, the racks should be capable of retaining their contents in a crash or sudden driving maneuver.

- Vehicle maintenance.
- Each State should establish procedures to meet the following recommendations for maintaining buses used to carry school children:

- School buses should be maintained in safe operating condition through a systematic preventive maintenance program;

- Regularly scheduled vehicle inspections should be conducted as specified in accordance with FMCSA regulations contained in 49 CFR Part 396.3; and

- School bus drivers should perform daily inspections of their vehicles, including all safety equipment and submit a report of their findings daily as specified in 49 CFR 396.11.

III. OTHER ELEMENTS OF PUPIL TRANSPORTATION SAFETY

- At least once during each school semester, each pupil transported from home to school in a school bus should be instructed in safe riding practices, proper loading and unloading techniques, proper street crossing to and from school bus stops and should participate in supervised and timed emergency evacuation drills. Prior to each departure, each pupil transported on an activity or field trip in a school bus or school-chartered bus should be instructed in safe riding practices and the location and operation of emergency exits.

- Parents and school officials should work together to identify and select safe pedestrian and bicycle routes for the use of school children. (See Guideline No. 14.)

- All school children should be instructed in safe transportation practices for walking to and from school. For those children who routinely walk to school, training should include preselected routes and the importance of adhering to those routes.

- Children riding bicycles to and from school should receive bicycle safety education, be required to wear bicycle safety helmets, and not deviate from preselected routes.
- Local school officials and law enforcement personnel should work together to establish crossing guard programs.

- Local school officials should investigate programs that incorporate the practice of escorting students across streets and highways when they leave school buses. These programs may include the use of school safety patrols or adult monitors.

- Local school officials should establish passenger vehicle loading and unloading points at schools that are separate from the school bus loading zones.

- Before chartering any vehicle or motor coach for school activity purposes, schools should check the safety record of charter bus companies through the FMCSA Safety and Fitness Electronic Records System. Schools should also consider using a multi-function school activity bus in place of charter buses where feasible. A multi-function school activity bus is not required to be equipped with traffic control devices (i.e., flashing lights and stop arm). These buses are not intended for the roadside picking up and dropping off of children during service between home and school. They are intended for use by schools and other institutions that need transportation services for school activity trips or for other coordinated transportation activities.

IV. PROGRAM EVALUATION

The pupil transportation safety program should be evaluated at least annually by the State agency having primary administrative responsibility for pupil transportation.

V. DEFINITIONS
- A “bus” is a motor vehicle designed for carrying more than 10 persons (including the driver).
- A “school bus” is a “bus” that is used for purposes that include carrying students to and from school or related events on a regular basis, but does not include a transit bus or a school-chartered bus.

- A “school-chartered bus” is a bus that is operated under a short-term contract with State or school authorities who have acquired the exclusive use of the vehicle at a fixed charge to provide transportation for a group of students to a special school-related event.

- A “multi-function school activity bus” is a school bus whose purposes do not include transporting student to and from home or school bus stops.

- “Federal Motor Carrier Safety Regulations (FMCSR)” are the regulations of the Federal Motor Carrier Safety Administration (FMCSA) for commercial motor vehicles in interstate commerce, including buses with a gross vehicle weight rating (GVWR) or gross vehicle weight greater than 10,000 pounds; designed or used to transport more than 8 passengers (including the driver) for compensation; or designed or used to transport more than 15 passengers (including the driver), and

not used to transport passengers for compensation. (The FMCSR are set forth in 49 CFR Parts 390 – 399.)

- A “child safety restraint system” is any device (except a passenger system lap seat belt or lap/shoulder seat belt), designed for use in a motor vehicle to restrain, seat, or position a child who weighs less than 65 pounds.