

WATERFORD SCHOOL DISTRICT
Alternate propane powered
2018 BUS CHASSIS and BODY SPECIFICATION
54 PASSENGERS CONVENTIONAL

The following represents the minimal specification that will be accepted by Waterford Schools for a complete 54 passenger school bus.

The body and chassis must be current model and production, first line quality and meet all Michigan Standards and National Minimum Standards as published in the most recent literature entitled Recommended Minimum Standards for School Bus bodies. These standards have precedence over specifications described herein or on attached sheets should any difference be inadvertently included. All transportation costs shall be included with Bus Bid Pricing.

The manufacturer or his agent shall include a letter detailing scheduling and production procedures and furnish us with a maximum time for delivery. All vehicles shall pass Michigan State Police Inspection prior to delivery to School District from dealer.

FRAMES

TOW HOOK, Front (2) and rear (2) Frame Mounted

FRAME RAILS mild Carbon Steel (36,000 PSI Steel);

BUMPER, FRONT Steel, full width, Aerodynamic Heavy Duty .250 Material Thickness

FRONT AXLES

AXLE, Front, I-Beam Type 10,000 lb. Capacity Minimum

***With Oil Bath Bearings and Caps**

SPRINGS/ Rear axle

SUSPENSION, REAR, Air ride, Single axle 20,000 lb. Capacity, 9.5 Ride Ht., with Shocks Absorbers

BRAKES

Bendix brake system Air Dual System

ABS (Anti-Lock Brakes)

BRAKES, FRONT, AIR CAM S-Cam; 15.0 X 4.0; Includes 16 Sq. In Brake Chambers

BRAKES, REAR, AIR CAM S-CAM; 16.5 X 7.0; Includes 30 Sq. In Anchor Lock Spring Actuated Parking Brake Chambers

AIR DRYER with Heater, (***Midland spin-on***) Standard Location

AIR COMPRESSOR 13.2 CFM, DV2

Bendix Heater Valve Wet Tank

STEERING

Steering Column Tilting

EXHAUST SYSTEMS

Exhaust System single, Horizontal Muffler and Long Tail Pipe, Aluminized Steel; Frame Mounted

ELECTRICAL SYSTEMS

ELECTRICAL SYSTEM 12 VOLT, STANDARD EQUIPMENT

HORN electric (2)

CIRCUIT BREAKERS Manual Reset (Main Panel) SAE Type II Replaces all fuses except Instrument Cluster Feed

ALTERNATOR 12 Volt 185 AMP capacity

AMMETER 150 AMP; Mounted in cluster

BATTERY SYSTEM Post Type, (2) 12 Volt 1400CCA min.

TURN SIGNALS< Front Dual Face, Amber/Amber, Mounted on top of Fender, Used with Standard Flush Mounted Front Turn Signals, Side Marker Lamps, Parking Lights LED and Reflectors

To be wired for or equipped with Zonar brand GPS system.

HEADLIGHTS Long Life Halogen

**The Waterford School District requires that any power connection must be fused within three (3) inches of the point of connection.*

FRONT END

Front End Tilting, Fiberglass

ENGINES

220 hp/560 ft lbs torque min Propane

Must meet federal emission for 2018 Engines

Electronic hand throttle

FAN DRIVE Viscous (Schwitzer DD-260)

TRANSMISSION

TRANSMISSION, AUTOMATIC, with severable transmission Oil Filter

FUEL TANKS

FUEL TANK Rectangular Steel, 100 US Gal min with Protective Cage,

TIRES

Front – 10R22.5	Steering G661 HSA (Goodyear)
Rear – 10R22.5	Mud and snow (Goodyear)

WHEELS

HUB MOUNT DISK WHEEL 22.5, 10 Hole METRIC BOLT PAINTED STEEL 7.50 DC RIMS

VEHICLE INTERIOR

Drivers Area

1. Battery Cut-Off Switch: Ignition key operated battery cut-off switch shall be designed to turn off all electrical systems with the exception of the four (4)-way hazard lights, headlights, tail lights, and marker or clearance lights. These systems shall be switched independently.
2. Defroster Fans: There shall be two 6 inch electric defroster fans with two-speed switches supplied. Location may be specified by each District. Mounting locations must be reinforced, wires to be covered.
3. Driver's Seat: Vehicles shall be equipped with a fully 6-way adjustable driver's seat with retractable seat belt which will keep the seat belt from reaching floor when not in use. Driver must be able to adjust the seat without leaving the seat. The seat must be independently adjustable for vertical, horizontal, and back tilt positions. Driver's seat belt shall be 24 inches longer than normal for adjustability.
4. Glass: A second glass shall be located in the lower portion of the emergency door.
Windshield: Windshield to be flat safety glass with "shaded" top. No thermo windows.
5. Heaters: The fresh air left front heater and defroster shall have a 90,000 BTU, or greater output. The fresh air right front heater and defroster shall have a 50,000 BTU, or greater output. Heater hose to be four (4) ply, heavy-duty rubber and/or neoprene. Heater hoses must be covered inside the bus to protect driver and passengers against burns caused by hose failures. A Hot water 80,000 BTU air circulation heater is to be furnished and mounted at the tenth (10th) seat from left front. All heater hoses shall be quipped with brass gate type "shutoff" valves located at the engine. Cores shall be supplied and installed. All cores shall be filtered with aluminum filters easily serviced. Heater hoses shall be located as to not to interfere with service repairs to engine. 12V auxiliary pump to aide in circulation with driver controlled/lighted switch.

6. Radio/Speaker: AM/FM Radio, CD player with clock and four (4) speakers installed in compliance with Michigan Standards.
7. 7. Video recorder system as follows A Seon Design Inc system using an part number/ TL-H500G removable drive with a delay shutoff timer adjustable from fifteen to three minutes with three cameras one front facing rearward, one in rear facing forward and one middle of bus. Cameras able to record in both day and night lighting with three microphones in system. Operating temperature range of 5 to 105 degrees F. Completely shocked mounted and installed* per state police standards.

Video Installation & Services is the preferred installer

8. Child Reminder System: Electronic child reminder system installed.

DIGITAL MOBILE RADIO

9. DMR radio should include the following features:

- TDMA format - (2 time slots for 2 conversations at the same time)
- Mixed Mode – able to work with existing analog radios and talk with digital radios
- Trunking – ability to find open channel to allow more than 2 conversations
- Text messaging with large multi-color LCD display
- GPS – send location, speed and vehicle parameters
- Emergency alert – driver can alert dispatch of emergency situation covertly
- Versatile Voice Groups – communicate with everyone, one on one or with select subgroups
- High Power – 45 watts
- Loud volume – 10 watts

Hardware to include:

- Heavy duty microphone
- Auto on/ delay off cabling
- Mounting bracket
- DC power cable
- Mic clip

Emi Electrocomm *the preferred installer*

10. **GAUGE CLUSTER** English with English Electronic Speedometer and with Tachometer gauges for Air Brake, Engine oil pressure, water temp, fuel amp meter and voltmeter.

EXTERIOR EQUIPMENT

1. **Battery Box:** Battery Box is to be mounted at the rear of driver's seat on body frame. Batteries shall be mounted on an easily movable slide out tray. Box must be enclosed on bottom, both ends and both sides: welded to the body frame and in addition, secured by four (4) 3/8 inch bolts with lock washers. The rectangular angle frame, which fits around the top of the battery, shall be of sufficient strength and design to equalize the pressure throughout the entire top of the battery. The battery hold-down shall be fastened to a slide out tray with 3/8-inch bolts or larger. All cables shall be #2 cable or heavier. Ground cable to be grounded to frame with 3/8 bolt (minimum). No splicing in positive or negative leads from battery to engine. The battery compartment door shall have a locking device with a recessed handle. The door, hinged from the top, shall have a hook or catch device to hold the door open. If the door is to be hinged at an edge other than at the top of the door, it shall be specified by the District.
2. **Cowl Seal:** Cowl seal shall be made of rubber and of sufficient width to be anchored by all cowl bolts.
3. **Mirrors:** All exterior mirrors must be heated type and conform to Michigan standards and be mounted according to District specifications. Total of 4 (four) 7-1/2" or 8" convex mirrors to permit localized left front, shall be mounted on right front bracket. No Bus Boy style.
4. **Service Steps:** Two (2), folding cowl service steps with "non-slip" surface shall be mounted on each side of the vehicle body. Four (4) six inch grab handles shall be supplied; two mounted below the windshield on cowl, 12 inches from outer corner of the windshield, (one on each side) and two (2) shall be located on the corner posts. Service steps shall be 3 X 5 inches – 15 square inches.
5. **Windshield Wipers:** The body shall be equipped with two 2-speed electrically driven and intermittent controlled windshield wipers with heavy duty motors.
6. **Emergency Exit:** Interior handle guard to be center reinforced.
7. **Tow Hooks:** The body shall be equipped with two tow hooks front and rear bolted with 3/4 inch diameter bolts and adequately welded on #7 gauge steel or heavier cross member connecting the chassis rails. They shall be mounted in a position so that bumper damage will not occur when towing. Hook mounting shall be adequate to support weight of bus and reinforced to prevent breaking or bending.
8. **Electrical Wiring:** All electrical wiring is to be inside the body wall channel and readily accessible (without removal of other equipment) through movable panels in the interior of the bus and all harnesses and wires shall be protected from raw metal openings in the wall support structures. In addition to a permanently affixed color-coded wiring diagram, a separate, color-coded wiring diagram must be provided. All wiring to be lock type connectors.
9. **Roof Hatch/Vent:** 1 *Transpec* dual-purpose roof hatch model #DMA-1122 installed in roof over rear axle (see item #8 – lighting interior exterior).

LIGHTING: INTERIOR, EXTERIOR

1. Alternating Flasher Control: Alternating flasher control shall be "AERO-FLASH", or equivalent flasher until with flashing one inch diameter pilot light located in front of the driver on the instrument panel. The control unit shall not be the type which allows the lights to flash to a simultaneous phase. To include 8 lamp flasher system.
2. Alternating Flasher Switch: Alternating flasher switch shall be distinctively mounted in a position separated from other switches for easy location and manual operation by the driver. The switch shall be located to the left of the driver in his control position.
3. Warning Light Monitor Board: Monitor must be mounted and easily viewed by the driver.
4. Back-Up Lights: There shall be two back-up lights with a minimum size of 7 inches in diameter that are automatically actuated when the vehicle is in reverse gear.

5. All exterior lights to be the LED type lights

6. Clearance Lights: Clearance light shall be "Armored Type". "Armored Guard" to protect front side of lens.
7. Interior Lights: There shall be nine (9) interior lights as follows:
 - A. Eight (8) passenger compartment dome lights shall have (2) switches in driver compartment. One (1) switch shall be wired to control the front four dome lights and one switch shall be wired to control the rear four
 - B. There shall be one separately switched dome light for the driver area.
Option: dome light for driver area may be wired independently of ignition switch.
7. Stop Lights: There shall be (2) two, seven inch stop lights and tail lights, to work in conjunction with the now existing two, four inch stop and tail lights. These additional lights shall be located as near existing directional lights as possible in a horizontal line. All seven-inch diameter tail and stop light lenses shall be from one manufacturer identical in design and shape.
8. Strobe Light: Furnish and install one (1) per unit a (white) with lighted switch on control panel. Strobe to be mounted to the rear of Transpec roof hatch and in compliance with state standards.
9. Furnish and install one (1) swing arm stop sign with LED lights per governmental safety regulations.
10. Furnish and install back-up alarm that is activated when vehicle is placed in reverse. (See government regulations).

PROTECTION AND FINISHING

1. Insulation: Inside the panels shall be spray coat of mastic with an additional one inch blanket of mineral type sheathing in sides, rear and roof and fill all cavities.
2. Mud Flaps: There shall be four (4) mud flaps made of cord base, 5/16 inch rubber, supplied with a steel reinforced mounting edge. Each mud flap will be mounted with a minimum of (4) four bolts directly behind the wheels.
3. Painting and Lettering: Painting and lettering shall conform to standards most recently established by Michigan State Highway Commission which must conform to US Department of Transportation's Standard #17.
4. Contact Mike Sauk @ Waterford Schools Transportation Department at (248) 674-2692 for vehicle numbering. The year number should denote the title year of the bus all numbering would be *bus number – titled year*

In conjunction with Oakland County Sheriff Department, bus will be numbered on the roof. If bus number is *#14- and titled year is 18* roof numbering would be *WF-1418*
4. Rust Prevention: Sixteen (16) gauge body exterior panels. Body panels and undercarriage shall be guaranteed against rust or flaking paint for a period of five (5) years, with the exception of those areas where rust occurs because of collision damage.
5. Undercoating: Body panels will be undercoated to prevent corrosion. It shall be spray type for the floor, wheel housing and side panels below floor level. All exposed metal or underside must be covered. Inner body panels shall also be covered to prevent rust. Documentation of rust proofing/undercoating will be provided at delivery.
6. Body Mounting Pads: Body mounting pads shall be of cord based rubber, ½ inch or greater in thickness and full width of the widest contact member. They must be installed at every body "hold down" location.
7. Warranty Procedure: If paint or mechanical problems occur, a mutually agreeable solution shall be reached by the District representative and manufacturer's representative.
8. Bumpers: will be of the heaviest duty offered, a minimum of ½ inch thick and 8 inches wide and wrapping around end of bus to meet body panels (rear). There will be no open holes or spaces where a hand or fingers could fit.
 - A. Both bumpers will meet State and Federal Guidelines and will be sufficient to withstand minimal collision damage and support vehicle while towing without damage.
 - B. Rear bumper to have step installed to aide in rear exit / entry of rear emergency door
9. Service Door: Outward opening **Air Door**. Air door control cylinder to be mounted over the door with an access panel to the cylinder, with no exposed parts on the exterior of the bus. Air door to include a two-position switch. No thermo glass. Must have two hand rails to aide students on and off the bus.
10. Sunvisor: One (1) Polaroid driver visor (10 in X 30 in) shall be supplied, mounting bracket shall permit visor to be lowered to near center of windshield.

11. Emergency Equipment: The following items will be located in the driver's area *in compliance with Michigan State Police Inspections*. All items will be accessible and serviceable.
 - A. Fire Extinguisher: One (1) fire extinguisher showing a rating of not less than 2A 10DC (dry chemical) with a metal valve body and shall be clearly marked to indicate that the unit has been approved by Underwriters Laboratories or current State of Federal specifications.
 - B. First Aid Kit: One first aid kit as specified by Michigan Standards.
 - C. Triangle Warning Devices: Three (3) SAE-W-472 DOT triangles.
 - D. Fuses: Three (3) red 20 minute fuses in canister.

PASSENGER AREA

1. SEATS: All passenger seats to have *C.E. White* with built in child safety seats, two (2) per seat.
2. Shoulder padding installed full length of bus interior both sides of bus.
3. Side Windows: All side windows shall be "double-hung". All side windows are to be tinted for sun shading and heat deflection.
4. Floor Covering: Floor covering shall be "Rub-Bub", or equivalent.
5. Bus to have installed Air condition unit with minimum of 50,000 BTU's.
6. Driver's compartment covering shall be smooth surfaced 1/8 inch thick material.
7. Aisle covering shall be ribbed 3/16-inch thick material and shall be one continuous sheet from the rear of bus to step well. The step well and aisle covering shall be jointed as a 45-degree angle so as to permit easy cleaning. There shall not be any metal strip(s) across step or aisle covering.
8. Plywood Floor: Complete plywood flooring.
9. Access door to fuel tank sending unit through floor, permitting removal of same.

MANUALS

All guarantee/warranties to commence on date of delivery to district.

TO BE PROVIDED AT TIME OF DELIVERY to WATERFORD BUS GARAGE

One (1) Chassis and One (1) Body parts manual per order will be provided at the time of delivery

One (1) *Line Set* Ticket shall be provided for each bus

All necessary software to be provided and installed on the mechanic lap top computer used in the Waterford bus garage.

Delivery of buses shall be to the Waterford Bus Garage, Waterford Michigan. All vehicles will be subject to inspection before delivery sign off.