Highway Factors Attachment – Pennsylvania Turnpike Commission specifications for single axle dump truck

Mount Pleasant, PA

HWY20MH002

(47 pages)

Pennsylvania Turnpike Commission

Single Axle Dump Truck
Effective November 2, 2017
46 Sheets and 33 Drawings

INTENT STATEMENT

The purpose of these specifications is to describe a conventional cab, single rear axle dump truck, equipped with dual rear wheels, dump body, hoist, hydraulic power system and snow plow hitch. It shall be capable of one-man operation while plowing snow and simultaneously spreading granular and liquid materials during winter operations. During summer operations it shall be capable of hauling roadway materials, towing trailers, and operating attachments as specified. It shall be capable of being loaded with a front-end wheel loader.

The Components of this document are as follows:

1.0 SCOPE

The unit shall be new and of the latest standard model. Strengthening of standard model is permitted if necessary to meet the special requirements of these specifications. It shall conform in all respects with the law of the Commonwealth of Pennsylvania governing such equipment. The truck dimensions shall conform to the specifications identified on the attached drawings. **All up fitted fasteners (nuts, bolts, pins, clevises, cotter keys, fittings, hose clamps, etc.) and brackets shall be stainless steel or composed of materials that are non-corrosive and durable.**

2.0 GENERAL TRUCK SPECIFICATIONS

2.1 G.V.W.R.

43,000 G.V.W.R. truck (minimum), complete with dump body in accordance with the following conditions, requirements and specifications. The following indicates MINIMUM requirements, including all genuine parts, accessories, and equipment and safety features considered standard whether mentioned herein or not.

2.2 FRAME

The frame shall be heat treated 120,000 psi steel having a minimum resisting bending movement of not less than 2,820,000 inch/lbs. (double frames not acceptable). Continuous frame side rails shall reach sufficiently ahead of radiator to allow mounting of hydraulic pump and snowplow equipment. Bolted, tapered, riveted or welded frame extensions are not acceptable. Steel heavy-duty **7/16**" minimum extended front bumper with tapered ends, tow hooks mounted on front frame section. Install open mesh type aluminum tread plate between bumper and fender (Bustin NST or approved equal Ref. EQN-32 PTC Modified). Back of cab to end of frame must be clear of obstructions above the frame rail.

2.2.1 OPTIONAL HEAVY DUTY TRAILER TOW PACKAGE

A Holland PH-760 pintle hook shall be installed at 30 inches above ground on a 3/4" steel plate properly supported to frame and cross member. The truck shall be equipped with a full trailer air brake package. The controls are to be located in the cab; hand control valve for trailer only. The glad hand connections shall be located at the rear of the truck and located to industry standards (Emergency-Red on driver's side, Service-Blue on passenger side). There shall be two 7-pole trailer receptacles mounted at rear of truck. The receptacles shall be non-conductive corrosive resistant solid pin Phillips Model 16720 with boot #15740 or approved equal **and permanently labeled using a weatherproof acrylic plastic (Ref. Duets by Gemini) adhered to receptacle mounting plate.**

1. One shall be wired to current standards and permanently labeled. Reference: Drawing PTC-80A.
2. The other shall be wired for electric brakes with the center post wired to an electric brake controller mounted on dash and labeled. This plug will be connected to a TEKONSHA PRODIGY part #90885 electric brake controller (no substitute standardization). Lights will be wired for a two tail-light system. All wiring will be home runs to cab. No junction boxes shall be exposed to the elements. Reference: PTC drawing: PTC-80A, PTC-80E, PTC-81S, PTC-84

2.3 WHEELBASE

The wheelbase shall be of sufficient length to properly mount a dump body 10′ long and 8′ wide as hereinafter specified with approximate 12" overhang from center line of hinge to end of body; approximate clear CA 99" or less.

2.4 ENGINE

- The engine shall be diesel powered 10.8 liter minimum, Peak HP 395 at **1450**-1700 RPM electronic minimum, torque, **1560** lbs. at 1200 RPM. Engine must be compliant and certified to meet the U.S. E.P.A **2017** Emissions Standards without using Federal E.P.A. credits.

- The engine shall be equipped with a two-position engine brake, a 135 amp minimum, 12V brushless alternator (as manufactured by **Delco Remy #35SI** or Denso brushless, or approved equal. 12V starting motor, Reference: Delco Remy #39MT H.D. with over crank protection or Denso P5.0 (no substitute standardization).

- Fuel filter with engine cooling fluid heater and 12V pre-heater element with a weather pack connector. TO BE LOCATED OUTSIDE OF FRAME RAIL FOR EASE OF ACCESS TO CHANGE FILTER. Reference: DAVCO #382 (no substitute standardization). Fuel Shutoff valve (Reference DAVCO #102008) shall be present on the inlet side of the filter housing to prevent fuel loss during fuel filter servicing. **A secondary OEM filter must also be present.**

- Tachometer with engine hour-meter. Electrical system shall be shielded to prevent interference by 2-way radio.

- Crankshaft PTO 1350 adapter and flange installed on front of crankshaft with clearance needed for PTO driveshaft, low oil pressure/high engine temperature alarm system and low coolant level warning device.

- Radiator shall be aluminum tube and fin type, maximum heavy duty size possible to be compatible with engine, and approved by engine manufacturer with an automatic fan, E.D.P.M. (Ethylene Propylene Diene Monomer) radiator and heater hoses with constant torque clamps. Reference: Gates Blue Stripe.

- **The exhaust aftertreatment system shall be right side mounted and not protrude behind the cab.** The exhaust pipe shall be vertical with a 180-degree heat shield made of aluminum or stainless steel and a 90-degree turn-out extending past the outside edge of the cab protector.

- Inside/outside air intake, WITH AIR-DRIVEN VALVE TO OPEN/CLOSE PORTAL in-cab filter restriction indicator.

- Engine shall be equipped with 1500 watt, 110V single-phase electric pre-heater with thermostat, with 1500 watt, 120V single-phase electric pre-heater with thermostat.

2.4.1 FAST LUBE OIL CHANGE SYSTEM (FLOCS)

This system will be installed with all the fittings, brackets, clamps and hoses as specified by the Equipment Operations Manager. The system will be compatible with all fittings presently used by the Pennsylvania Turnpike Commission. The Fleet / Equipment Operations Manager - Maintenance will approve the final placement of the male half of the snap coupler on equipment prior to installation. Aeroquip fitting # 5602-12-12S and Aeroquip fitting cover 5657-12 (no substitute standardization). Reference: Drawing EQN-351A.

2.4.2 ENGINE COOLANT

Extended Life Coolant Protection with Nitrites. Reference: Texaco Long Life Engine Coolant #79998 with Nitrites. (50/50 mix) to -34 degrees Fahrenheit.

2.4.3 OPTIONAL STAINLESS STEEL INLINE FUEL WARMER

Stainless Steel inline fuel warmer with thermostat and electric preheat 120V. Both the engine pre-heater and the fuel warmer shall be wired via a “Y” cord with the male plug installed on the left side of the cowl panel. Reference: Arctic Fox model I-704BTEH.

2.5 TRANSMISSION

Manual transmission is to be Eaton/Fuller #RTO-16908LL or Mack T-310 **with dustproofing and Eaton Advantage EZ-pedal 2 plate 4 paddle with mechanical clutch cable-air assist not accepted. Clutch shall have a release lube hose and starting switch.** (no substitute standardization).

2.5.1 OPTIONAL AUTOMATIC TRANSMISSION

Allison Automatic Model 4500 RDS-6 with dash mounted console, a push button shift selector and an external oil cooler. The transmission dipstick shall be located under hood and all transmission cooling lines to be stainless steel.

2.5.2 OPTIONAL AUTOMATED MANUAL TRANSMISSION

Twelve (12) speed minimum automated manual w/ overdrive (vocational shift package with premium shifter, with grade holding capabilities).

Note: Driveline shall be Dana Spicer **SPL250XL** with full circle clips or equal.

2.6 FRONT AXLE

The axle shall be conventional or set forward type with a maximum of 37 inches from the centerline of the front axle to the front of the front bumper. The front axle shall be rated at 20,000 LB minimum capacity. The front axle, drag links, tie rods, and kingpins shall have grease zerks installed. Kingpin or bushings shall be grooved to permit grease flow. Sufficient tire clearance is required at maximum turning angles. Complete “Stemco” oil seal assembly, including hub, plug type window, and "Guardian" seal, or approved equal. Each unit shall receive a front-end alignment prior to delivery. Bumpstops shall be set to optimum turning radius. Unitized front axle is acceptable. **A SET BACK AXLE IS NOT ACCEPTABLE.** The steering system components must meet or exceed the design proper for the axle weight.

2.7 REAR AXLE

The axle shall be a 23,000-lb. single speed EATON MODEL 23105S, MERITOR RS-23-160 or equal. Ratio will be determined after final bid to achieve a 75 mph maximum speed. All rear axles must provide axle shafts with a **minimum diameter of 1.89" at the spline**. All rear axles shall have an extended breather tube to prevent debris build up from entering axle housing. Aluminum or lightweight housings are unacceptable.

2.8 SPRINGS

Springs must be adequate for service stated and satisfactory with front and rear axles specified. Rear helper springs to be included. 10,000 lb. capacity at ground for each front spring. The six (6) front spring pins or bearings/bushing shall be furnished with 360-degree grease grooves to insure adequate lubricant penetration. Front springs shall be of multi-leaf design and be controlled by shock absorbers. Spring hangers shall be heavy castings with sufficient pin and bearing surface to render trouble free service.

2.8.1 OPTIONAL WING PLOW SPRING PACKAGE

Front right spring shall have correct spring build up to accommodate weight of the wing plow. A Timbren block shall be installed on the right front to assist in maintaining proper ride height. Reference: **Timbren part # MFRD** (No substitute standardization.) (Contact: Timbren Industries, 320 Hopkins Street, Whitby, ON, L1N 2B9 Canada, Phone 800-263-3113, 905-444-9004.)

2.9 LUBRICANTS

Lubricants for front axle, rear axles, and transmission shall meet, or exceed, all appropriate MIL and SAE specifications for synthetic lubricants, and shall have all plugs identified as synthetic oil or painted red.

2.9.1 OPTIONAL CENTRALIZED LUBRICATION SYSTEM

An on-board centralized lubrication system installed on the truck chassis, dump body and tailgate. The unit shall be operated by air or 12V D.C. and designed to utilize any lubricants of NLGI grades from #000 up through NLGI #2 with a reservoir capacity of 2 liters. Steel tubing shall not be utilized. A dash mounted light shall be installed to indicate a system error. Control unit shall be mounted under the passenger seat to allow access to the manual cycle switch. Reference: J&A Lube Central #JA KFU240 12V (no substitution, standardization) vendor contact 610-213-0060. Vendor to provide a two-year unconditional warranty and mechanic training on the operation and testing of the system.

2.10 DRAIN PLUGS

All drain plugs for axles, transmission, and hydraulic system shall be magnetic.

2.11 TIRES AND WHEELS

The truck shall be equipped with hub piloted 15-degree tubeless steel wheels **with 5 year corrosion free warranty**

- **Front Wheels-** 22.5 x 9.00, 10 hole – 285.75mm bolt circle with 220mm bore, tubeless steel disc wheel rated at 10,000 lbs./4,536 kg at a maximum inflation pressure of 130 PSIG. Accuride, part number 29039 or equal.

- **Front Tires**- 315/80R22.5 Load Range L. Reference: Goodyear G291, Michelin XZUS2 or Bridgestone M860A (no substitute standardization).

- **Rear Wheels**- 22.5 x 8.25, 10 hole – 285.75mm bolt circle with 220mm bore, tubeless steel disc wheel rated at 7,500 lbs./3,402 kg at a maximum inflation pressure of 120 PSIG. Accuride, part #28828 or equal.

- **Rear Tires**- 11R.22.5 Load Range H. Reference: Goodyear G182RSD, G751MSA; Michelin XDS2 or Bridgestone L320 (no substitute standardization). The dual rear wheel/tire assembly shall have clearance between the tires, which permits the use of dual tire chains.

- **Wheel-Guard Separators**- The wheel ends shall be equipped with the Accuride part number 5903 Wheel Guard Separator as follows:

  - Front axle – between the wheel and the brake drum.
  - Rear axle – between the inner wheel and the brake drum and between the inner and outer wheels.

- **Paint**- The wheels shall be topcoat painted with TGIC Polyester Powder Paint MD: -82008 High Gray or equal applied over Cathodic Electro-Disposition Gray Primer.

2.11.1 OPTIONAL WHEELS

Front – 22.5 x 9.00, 10 hole Hub piloted (11.25"/286mm Bolt Circle) **7.00" Offset**, tubeless aluminum disc wheel rated at 10,000 lbs. at a maximum inflation pressure of 130 PSIG. Reference: **Accuride Accu Armor Heavy capacity 41730R**

Rear – 22.5 x 8.25, 10 hole Hub Piloted (11.25" /286mm Bolt Circle) **6.59**" **Offset**, severe service, tubeless aluminum disc wheel rated at **8,100** lbs. at a maximum inflation pressure of 120 PSIG. Reference: **Accuride Accu Armor Heavy capacity 40008R**

Wheel-Guard Separators – The wheel ends shall be equipped with the Accuride part number 5903 as follows:

Front axle – between the wheel and the brake drum.
Rear axle – between the inner wheel and the brake drum and between the inner and outer wheels.

2.11.2 OPTIONAL FENDERS

The unit shall have Spray Mate fender and accessories: two full round fender sets (two fenders per set) part number FLE-031-01520 (Polly Fenders), two spray Mate curved brush kits (two brushes per kit), part number FLE-031-01536, and eight stainless steel end mount kits part number FLE-031-01251.

2.11.3 REAR AXLE MUD FLAPS

Black rubber splashguards (mud flaps) shall be provided behind rear wheels to meet federal regulations including 22½ degrees tangent mounting angle. Mud flap mounting will be determined at Pre-build.

2.12 BRAKES

Vehicle shall be equipped with self-adjusting cam brakes (**Meritor "S" Cam Q+ No substitute, standardization)** front 16½" x 6" and rear 16½" x 7" with backing plates. Full air service complete with low-pressure buzzer indicator and heated air dryer. Reference Bendix AD-IP with heater, turbo cutoff valve and coalescing filter. Rear parking brakes shall be spring-loaded. Reference MGM, Model LTR-L3.

2.13 FUEL TANK

The fuel tank shall be aluminum or stainless steel, unpainted, with a usable capacity of 70 gallons, MINIMUM. A solid rubber barrier shall be inserted between the fuel tank and the stainless steel mounting straps. The fuel cap shall be a minimum of 3½".

2.14 BATTERIES

Three 12V maintenance-free batteries, 2100 CCA to have a three-year non-prorated warranty and protected by an approved anti-corrosive non rusting battery box and cover with a 1/4" shock pad.

2.14.1. OPTIONAL BATTERIES WITH IDLE REDUCTION SYSTEM

Two (2) All Glass Mat (AGM) Deep Cycle Batteries (Reference: Alliance AEN9A31) and one (1) Ultracapacitor Engine Start Module (same size as a Group 31 battery with 4 year warranty. Reference: Maxwell ESM123000-31). No substitution, standardization. **With this option the three batteries in 2.14 are not needed.**

2.14.1.1 IDLE REDUCTION SYSTEM

This solution shall provide heat using engine coolant heater for driver comfort and engine warmth during anti-idle conditions. The solution will provide AGM battery power, used to run electrical loads and appliances necessary for the driver during anti-idle conditions. The AGM battery power will ensure all communications equipment remain functional during anti-idle conditions. The solution must provide in severe winter conditions: driver comfort, engine heat, power for communication, and safety lighting for a minimum of 6 hours.

This product shall fully integrate into the truck from an electrical and mechanical standpoint. The heater shall integrate into the trucks coolant system providing heat for both driver comfort and engine warmth. Electrically, the trucks start circuit shall be isolated from all other circuitry for proper operation of these circuits. Integration into other circuits may be required for proper operation and functionality.

User Interface Requirements

- The system shall be controlled by a factory dash ON/OFF switch and be properly labeled.
- The interface shall provide a dash display of battery voltage, an audible alert when battery voltage needs to be replenished, and automatically disconnect the noncritical loads at a predetermined low voltage setting.

Performance/Capacity

- Shall power electrical loads during no-idle conditions with deep-cycle AGM batteries for a minimum of 6 hours with enough power remaining to start the truck engine.
- Shall provide a minimum of 17,000 BTUs of heat providing ample heat for driver comfort and engine heating.

- Battery power reserved for electrical loads shall be a minimum 200 amp-hours per Manufacturer's specifications. Adding additional battery trays/batteries shall not be permitted.
- Shall provide electrical power to heater, blower motor and controls, parking lights, Turnpike radio, AM/FM radio and emergency lights with key in auxiliary position.
- Truck engine shall start normally after AGM batteries are discharged and shall never use the AGM batteries for powering engine starter motor.
- Truck shall use electronic start module (ESM) for engine starting.
- All AGM batteries and ESM shall be group 31 and fit in the OEM battery tray without modifications.

The idle mitigation shall power the following necessary equipment:

- HVAC controls on dash and blower motor for interior cab heating.
- Coolant heater
- AM/FM radio
- Body lighting Circuits

The Low Voltage Disconnect (LVD) shall disable all the above.

Location of system to be approved by PTC representative. Reference: Idle Free Systems Model # MT-HR-H-06-M1 (No substitution, standardization)

2.15 CAB

The cab shall be galvanized steel or aluminum; hood and fenders shall be fiberglass or other non-corrosive material manufacturer's standard conventional with factory installed air ride. The cab selected shall be 120" minimum standard BBC and shall provide room for the hydraulic control console. The engine components facing wheel areas, on both sides, shall be shielded to protect the engine, fan and radiator from stones, water and debris. A stainless steel or approved grill and stone guard to protect radiator to be provided. Any protective system shall be prior approved by a PTC representative.

2.15.1 EXTERNAL COMPONENTS

- Safety Handles - Grab handles shall be supplied on all cab entry locations. Three points of contact shall be achievable at all cab entry locations. Right and left grab handles to be provided on inside of door panel and on exterior of cab. All exterior grab handles shall be furnished with non-skid paint to provide "optimum safety" for field personnel (non-skid tape is unacceptable). Reference: Valspar (vendor phone 1-800-323-5129).
- Fiberglass, tilting one piece hood. Fenders shall be part of tilting hood. Front fenders shall cover the width of the front tires. Grille shall be fixed. Hood shall not come in contact with plow frame or wing plow frames. Must allow appropriate access to engine with hood open. Access to front-end hood tilt handle shall not be blocked.
- Clear or smoke, hood mounted air deflector to be manufacturer's standard full width for the truck model.
- Minimum 1 air horn (cab mounted) with snow shield.
- Windshield shall be heated, two piece construction and shall be tinted.
- Tinted safety glass throughout the cab.

- Steps: Drivers and passenger entrance steps: **Open mesh self-cleaning aluminum or stainless steel external safety steps shall be at least full length between the outside edges of the stainless steel tank straps. The steps shall be progressive.** (Overlay is not acceptable). Step design material must be the same, both left and right side. Reference: Bustin No. NST4 full size **or approved equal.** Top of the first step shall be approximately 18 inches above the ground.
- Dual windshield wipers, arctic type with J hook style wiper arms and the heaviest arms, linkages and motor available. Wipers shall be minimum 2-speed electric with intermittent feature.
- Washer system shall be electric. Minimum capacity of four (4) quarts of washer fluid and shall be filled with an anti-freeze type solvent. Must be mounted back of cab.
- Driver's and passenger side power adjustable and heated mirrors with dimensions of 6" x 16" minimum, West Coast style, or manufacturers' standard heavy duty with breakaway arms. There shall also be heated convex mirrors, 8" round on both sides. A blind-spot elimination mirror shall be mounted on the right front fender and it shall be 8-inch minimum diameter and heated. Mirror shall be a conventional convex mirror, and shall not be of the half-round cross view type. Fender type washers stainless, or aluminum, with rubber pads to be placed on both sides of the fender shall be included. Pedestal system shall be single, double or triple mounting assemblies Mirrors and arms shall be stainless steel or composite with mirror glass shock mounted and sealed. There shall be a lighted switch for the heated mirrors mounted within accessible reach of the operator. The heating element shall affect a minimum of 95% of the rear surface on the glass. The wires shall be fitted in such a way that unplugging wire leads can change the mirror glass/element.

2.15.2 INTERNAL COMPONENTS

- Air Conditioning: Highest output available as OEM option. Minimum 18,800 BTU/hr. required.
- An infinitely adjustable steering column with manufacturer's standard steering wheel.
- AM/FM CD player radio with weather band and Bluetooth.
- All controls and switches shall be properly identified.
- Brake pedal and throttle shall be suspended FLOOR MOUNT NOT ACCEPTABLE.
- Cab floor covering shall be heavy-duty rubber with closed cell rubber backing.
- Cruise control.
- Cup holder in the cab within easy reach of the operator.
- Dome light shall be provided. Dome light to be activated by both doors.
- Dual sun visors.
- Deluxe fresh air hot water heater and defroster, manufacturers highest output.
- Drivers and passenger's side **windows and door locks shall be power**.
- Driver's seat shall be high back adjustable Bostrom air 915 Series with lumbar support or National 195 Series with lumbar or DuraForm Air Command Series (fabric form cushions with lumbar support), with body cloth insert and three-point retractable seat belt. There shall be no inside armrest on the driver's seat plus an outside armrest installed on the seat or the driver's door. Color coordinated to cab interior. Reference: BOSTROM AIR 915 Talladega or prior approved equal. Individual passenger seat, high back fixed, non-suspension type with cloth insert and three-point seat belt or prior approved equal, color to match. (Reference: BOSTROM 900R)

2.16 OPTIONAL ROADWATCH SYSTEM

There shall be a ROADWATCH road/air temperature system, part #SS-849-1262-003 Fahrenheit, installed as manufactured by Sprague Controls (no substitute standardization). Sensor and wiring shall be mounted on the mirror arm/bracket independent of the mirror. Display shall be integrated into CS-550 screen as well as dash gauge. (Mirror arm/bracket mount Ref. M.S. Foster Part #MSFA277125)

2.17 ELECTRICAL

A completely designed and coordinated 12V, negative ground system shall be provided; computer voltage may vary. The system shall be designed such that all components are permanently grounded (-) and positively (+) energized where possible. All components must be selected to meet severe service. All wiring shall have lug type terminal ends or push-on type with locking modular plugs.

The circuit breakers shall conform to the SAE J553 standard, type III, manual reset, and type I automatic reset mounted in a gang type terminal block inside the cab, and must be readily accessible for resetting. All fuses shall conform to the SAE J1284, J2077 and J554 standards. All terminals and splice clips shall conform to the SAE J163 standard. The use of Scotch-Loc or equal connectors will not be accepted.

All high currents shall be distributed through power relays and installed in each circuit. It is recommended that each circuit have both primary and secondary protection devices. The primary device will be an automatic reset circuit breaker, or a manual reset circuit breaker. The secondary protection device may be a circuit breaker or a fuse. It is preferred that the protection device be as close to the power source as practical. The circuit protection shall provide both high and low resistance short circuit protection, while at the same time allowing normal overload conditions (for example, light bulb inrush current or motor start up). Each circuit shall have the proper size wiring for the protection device, and the load draw shall not exceed 80% of the protection device.

All wiring harness shall have protective coverings to provide extra protection against operating and environmental conditions. The harness coverings may include tape, plastic sleeve or conduit, braid, nonmetallic loom, or other suitable shielding or covering. The edges of all metal members through which the harness passes shall be de-burred and rolled or bushed with suitable grommets. The wiring harnesses shall be secured or supported at intervals no greater than 18" to prevent rubbing or chafing due to wire movement. Wiring shall be located to afford protection from heat, road splash, stones, abrasion, grease, oil and fuel. Various types of plastic and non-corrosive clips, clamps and ties shall be used to support wiring harnesses. All external terminal connections shall be soldered and sealed with heat shrink or other approved coatings.

The OEM shall provide in-dash switches as indicated on **Appendix A** (Switch diagrams) and two spares complete with circuit protection, wiring and a junction block for the body builders hook-up in cab. All switches shall be within easy reach of the operator.

The wiring for the snow plow lights shall terminate in the grille area for the body builders hook-up of the snow plow lights; the wiring shall have an extended lead, minimum 24".

Note: Wiring for the snowplow lights must comply with the PA State Vehicle Safety Inspection Laws.

Note: The electrical wiring routing shall be of professional quality. All electrical connections shall have ample di-electrical coating during installation. **OEM body builder plug shall terminate at a location inside the cab mounted junction box. All wiring shall be home runs to cab and organized in a junction box Intergra Enclosures Part # H141206HFLL.(No substitution, standardization). Mounting hardware and brackets shall be 304 stainless steel and shall be removable from outside of the box. A wiring schematic shall be adhered to the inside of the box lid. Extra wire and cable shall be present to allow the box to be removed and placed on the passenger seat.**

2.18 SAFETY EQUIPMENT

Supply properly rated and mounted UL fire extinguisher. Supply three safety reflective triangles in a protective case. Supply two each wheel chocks **and mount on driver's side front bumper**. Reference: Buyers Company #WC796R. Reference: Drawing PTC-82.

2.19 BACKUP ALARM

Alarm shall be self-adjusting from 87 to 112 decibels. Reference ECCO SA940 with unlimited lifetime warranty (no substitute standardization). Ref. drawing PTC-81S for mounting location.

2.20 LIGHTING

2.20.1 STANDARD LED LIGHTING

In a truck without a wing plow, there shall be an all LED lighting system comprised of the following lights:

- Two Forward facing and two side facing 6" oval grommet mounted amber strobes installed horizontally in the cabshield. On the outside edge of the forward facing 6" oval there shall be a 2" grommet mounted amber led marker light.
- Each front lower corner side sheets shall have a 2" round amber marker light installed.
- Each rear corner post shall contain one 6" oval amber strobe above a 6" oval backup above a 6" oval BTT. A combination BTT/BU light may be utilized on the aluminum single axle body due to limited space. These lights shall be mounted vertically in the corner posts facing rearward.
- In each rear corner post side sheet there shall be one amber led strobe light that shall protrude no more than 1" and a grommet mount 2" red marker light.

This lighting package shall include all necessary cables to connect power supply to the lights. All lighting connections shall use weather proof connectors and cables shall be home runs to the in cab junction box or flash controller(No splicing will be permitted). Strobe lights may be internally controlled or controlled by a central flash control. All hardware or brackets used for light mounting shall be stainless steel for corrosion resistance.

The lighting system shall have a lifetime warranty on the cables, lights, and any strobe control components.

All lighting components must comply with all federal and state laws and be supplied by a manufacturer that has a dealer network throughout the Commonwealth of PA.(Ref. Federal Signal, Grote, Truck-lite)

2.20.1.1 OPTIONAL STANDARD LED LIGHTING WITH WING PLOW

In a truck with a wing plow, the lighting package shall include all components and conditions listed in 2.20.1 plus:

- 1 Steady burn marker light mounted near the outer edge of the wing. This light shall be powered with the parking lights of the truck.
- One led strobe light mounted on the rear of the wing angled rearward when wing is deployed. This light shall be grommet mounted in a 3/16" thick stainless steel mounting flange and welded to a wing plow vertical support rib.
- 1 One rubber mounted PAR36 wing spot light mounted on the right front wing plow light bracket. The PAR36 illumination light part # 9036120 shall be mounted within a rubber housing or aluminum that utilizes all stainless steel mounting hardware.

This lighting package shall include all necessary cables to connect power supply to the lights. All lighting connections shall use weather proof connectors and cables shall be home runs to the in cab junction box or flash controller (No splicing will be permitted). Strobe lights may be internally controlled or controlled by a central flash control. All hardware or brackets used for light mounting shall be stainless steel for corrosion resistance.

The lighting system shall have a lifetime warranty on the cables, lights, and any strobe control components.

2.20.2 OPTIONAL WHELEN LIGHT PACKAGE

In a truck without a wing plow, there shall be a Whelen model No. PATRNSY4 Super-LED lighting system installed. The lighting system shall include two Cab Shield 400 SS. Each Cab Shield 400 SS shall contain two 400 Series Super-LED Warning Lightheads (Front/Side) facing that are to be mounted within a 7-gauge stainless steel housing assembly. The Cab Shield 400 SS shall also have an integrated amber marker light. There shall be 50' of 10/C 18-gauge TPE cable for the Cab Shield 400 SS warning lights and marker light. Each rear corner post shall contain one 400 Series Super-LED® Warning, one 400 LED BTT, and one 400 LED Back-Up. The rear Lighthead shall be mounted within a Whelen 400 series 7-gauge, stainless steel D housing. Each housing assembly shall include flex tubing for strain relief purposes. There shall be 30' of 11/C 18-gauge TPE cable for the warning lights and BTT/BU lighting included with each rear housing assembly. The system shall also include four body-grommet mounted red marker lights and two body-grommet mounted amber marker lights. Each marker light shall come complete with 2/C 18-gauge TPE cable. All the Lightheads shall be easily replaceable and utilize waterproof Deutsch® connectors for each light module. All Whelen cable shall home run into the cab where all connection will be made within the Whelen DOT-LED® flasher/junction box. Each lens shall be made of polycarbonate and have a smooth outer surface for self-cleaning. The Lighthead assemblies shall use stainless steel screws that screw directly into a nylon mounting bracket to eliminate dissimilar metal corrosion. Units that screw into a steel bracket are unacceptable since

they tend to corrode over time. The system shall be warranted by the manufacturer to the user directly to be free from defects of material or workmanship for a period of 24 months from date of purchase (no warranty is offered on optical plastic parts and halogen bulbs). LEDs shall be warranted for a period of five years. Written proof of this warranty by the manufacturer must be furnished by the bidder and attached to the bid. The product being bid must meet all current "S.A.E." requirements for this type and use of warning device, and be certified by an AMECA-accredited testing lab to meeting these requirements in the appropriate specified safety colors.

2.20.2.1 OPTIONAL WHELEN TRUCK LIGHTING WITH WING PLOW

In a truck with a wing plow, there shall be a Whelen model PATRNSY3 Super-LED lighting system installed (no substitute standardization). The lighting system shall include two Cab Shield 400 SS. Each Cab Shield 400 SS shall contain two 400 Series Super-LED Warning Lightheads (Front/Side) facing that are to be mounted within a 7-gauge stainless steel housing assembly. The Cab Shield 400 SS shall also have an integrated amber marker light. There shall be 50' of 10/C 18 gauge TPE cable for the Cab Shield 400 SS warning lights and marker light. Each rear corner post shall contain one 400 Series Super-LED® Warning one 400 LED BTT, and one 400 LED Back-Up. The rear Lighthead shall be mounted within a Whelen 400 series 7-gauge, stainless steel D housing. Each housing assembly shall include flex tubing for strain relief purposes. There shall be 30' of 11/C 18-gauge TPE cable for the warning lights and BTT/BU lighting included with each rear housing assembly. The system shall also include four body-grommet mounted red marker lights and two body-grommet mounted amber marker lights. Each marker light shall come complete with 2/C 18-gauge TPE cable. All the Lightheads shall be easily replaceable and utilize waterproof Deutsch® connectors for each light module. All Whelen cable shall home run into the cab where all connection will be made within the Whelen DOT-LED® flasher/junction box. Each lens shall be made of polycarbonate and have a smooth outer surface for self-cleaning. The Lighthead assemblies shall use stainless steel screws that screw directly into a nylon mounting bracket to eliminate dissimilar metal corrosion. Units that screw into a steel bracket are unacceptable since they tend to corrode over time. The lighting system shall contain a Whelen WPLOWZ3A Wing Plow warning light system. The amber Lighthead mounted in the plow positions shall be flashing. The Lighthead mounted in the stowed position shall be set to steady burn. The system shall include a PAR36 Wing Plow illumination light mounted on the right plow light bracket. The PAR36 illumination light part # 9036120 shall be mounted within a rubber housing that utilizes all stainless steel mounting hardware. The PAR36 wing illumination light shall come complete with 20' of 2/C 18-gauge TPE cable. The system shall be warranted by the manufacturer to the user directly to be free from defects of material or workmanship for a period of 24 months from date of purchase (no warranty is offered on optical plastic parts and halogen bulbs). LEDs shall be warranted for a period of five years. Written proof of this warranty by the manufacturer must be furnished by the bidder and attached to the bid. The product being bid must meet all current "S.A.E." requirements for this type and use of warning device, and be certified by an AMECA-accredited testing lab to meeting these requirements in the appropriate specified safety colors.

2.20.3 OPTIONAL FEDERAL SIGNAL LIGHTING PACKAGE

In a truck without a wing plow, there shall be an all LED lighting system comprised of the following lights:

- Two Forward facing and two side facing 4" x 3" QuadraFlare Stainless Steel box mounted amber strobes installed horizontally in the cabshield. On the outside edge of the forward facing amber strobe lights there shall be a 2" Signaltech amber led marker light. There shall be 4 30ft TPR cables with weater tight connectors.
- Each front lower corner side sheets shall have a Signaltech 2" round amber marker light installed.
- Each rear corner post shall contain one 4"x3" QuadraFlare 3-up mounting boxes with a QuadraFlare LED amber strobe light, above a white backup light, above a red Stop/Tail/Turn light. These lights shall be mounted vertically in the corner posts facing rearward. There shall be 4 60ft TPR cables with weather tight connectors included with these lights.
- In each rear corner post side sheet there shall be one amber led Micropulse 3 strobe light that shall protrude no more than 1" and a grommet mount 2" red marker light.
- The DOT System Flasher will come standard with (14) selectable flash patterns; (1) flash pattern shall be a SAE compliant true random flash pattern. The product shall operate with two-programmable modes of operation, up to 4 individual zone activations, support single and dual color lighting products, and have a power pass-through feature. The DOT System Flasher shall support up to 35 Amps. The DOT System Flasher shall be Federal Signal part number 605010.

This lighting package shall include all necessary cables to connect power supply to the lights. All lighting connections shall use weather proof Deutsch® connectors and cables shall be home runs to the in cab flash controller (No splicing will be permitted). Flash controller shall be mounted under the passenger side seat. All hardware or brackets used for light mounting shall be stainless steel for corrosion resistance. The lighting system must comply with all state and Federal laws.

The lighting system shall have a minimum 5 year warranty on the cables, lights, and any strobe control components.

2.20.3.1 OPTIONAL FEDERAL SIGNAL WING PLOW LIGHTING

In a truck with a wing plow, the lighting package shall include all components and conditions listed in 2.20.3 plus:

- 1 Steady burn Led IMPAXX wing plow marker light mounted near the outer edge of the wing. This light shall be powered with the parking lights of the truck.
- One led strobe light mounted on the rear of the wing angled rearward when wing is deployed. This light shall be an IMPAXX wing plow light and mounted to a wing plow vertical support rib using a stainless steel plate and controlled with a factory dash switch.
- 1 One rubber mounted LED PAR36 wing spot light mounted on the right front wing plow light bracket and controlled with a factory dash switch. The PAR36 illumination light shall be mounted within a rubber housing that utilizes all stainless steel mounting hardware.

This lighting package shall include all necessary cables to connect power supply to the lights. All lighting connections shall use weather proof connectors and cables shall be home runs to the in-cab junction box or flash controller (No splicing will be permitted).

Strobe lights must be controlled by a central flash control. All hardware or brackets used for light mounting shall be stainless steel for corrosion resistance.

The lighting system shall have a minimum 5 year warranty on the cables, lights, and any strobe control components.

2.21 PLOW LIGHTS

Snow plow lights shall be REF: Truck-Lite model 80800 universal snow plow ATL lights (no substitute standardization). Bracket design shall be either molded fiberglass or aluminum with the brackets mounted to the truck hood REF: PA DOT Drawing EQN-124. Brackets shall be designed/constructed to provide sustained support of the light assembly while offering minimum vibration/movement. The height and width of the brackets shall be governed by the application and shall meet all Federal and State lighting regulations. The location of snowplow lights to be determined on the pilot model.

2.22 SPINNER LIGHT

An LED PAR36 spinner illumination light mounted on the rear driver's side bed lip. The PAR36 illumination light shall be mounted within a rubber housing that utilizes all stainless steel mounting hardware. The PAR36 work illumination light shall come complete with 20' of 2/C 18-gauge cable with weather proof connector and be operated by an independent dash switch.

2.23 DAYTIME RUNNING LIGHTS

Daytime running lights are to be provided, OEM or approved equal.

2.24 PAINT

The chassis, front bumper, snowplow attachments, frame, and aprons shall be finished black. The cab is to be Omaha Orange, DuPont #31 for shade only. Cab and chassis paint shall be a base coat/clear coat manufacturer's standard professional quality polyurethane with two coats of primer (2 MIL minimum) under base coating. All steel parts are to be primed and painted (all sides) to prevent rusting.

2.25 OPTIONAL RUSTPROOFING

The complete chassis undercarriage inclusive of cab bottom, axles and complete frame rails, as well as, back side of front bumper, snowplow attachments, engine underside and transmission. Particular attention should be given to all hydraulic fittings and any steel or aluminum components. Reference: Rhomar RH-415 Armour-Seal or approved equal.

3.0 HYDRAULIC SYSTEM AND CONTROLS

3.1 CENTRAL HYDRAULIC SYSTEM

The hydraulic system shall be of the central type; all hydraulic functions are to be powered hydraulically using a single, pressure and flow control (load sensing) pump. Multiple hydraulic functions such as: auger/conveyor, spinner, body lift/lower, plow lift/lower and plow power reverse must be capable of functioning simultaneously without stopping the action of any one or more hydraulic functions.

All electrically operated solenoid valves will have a neutral or de-energized position that automatically positions the pump to a zero flow and low pressure stand by condition. The hydraulic system shall be of the pressure port blocked closed center design. Entire system (hydraulic and electrical) shall have a two-year warranty.

To ensure complete system compatibility, the joystick controller, spreader controller, hydraulic valve, hydraulic pump, armrest and pre-wet system shall be from a single manufacturer. Items that are manufactured by one entity and "branded" with another manufacturer's name shall not be accepted as being from a single manufacturer. Manufacturer shall be both ISO 9001 and 14001 certified.

All up fitted fasteners (nuts, bolts, pins, clevises, cotter keys, fittings, hose clamps, and brackets, etc.) shall be stainless steel or composed of materials that are non-corrosive. No black iron pipe or fittings to be used in the plumbing of the hydraulic system.

3.2 HYDRAULIC PUMP

The pump shall be a direct driven, heavy-duty, pressure/flow compensated, load sensing variable displacement design Reference: Bosch Rexroth R902534642 (No substitution, standardization). Output flow shall be no less than 48 GPM at 1800 engine RPM. No less than 6.1 cubic inch displacement is acceptable. Input shaft of pump is of keyed or splined design to standardize mounting configuration.

A DIN 2353 standard pressure test point is to be installed directly to the pump compensator. This test point will be used for attaching a pressure gauge for troubleshooting and verifying pressure settings. The test point shall be constructed of corrosion resistant materials.

Note: Body up-fitter shall adjust pump standby and compensator adjustments prior to delivery. Pump standby shall be set to 300 psi and the pump compensator shall be set to 2000 psi.

3.3 PUMP CONTROL

The pump control through hydraulic system logic must automatically select and adjust discharge pressure and flow in regard to the highest load demand regardless of the number of functions engaged or the engine RPM.

3.4 PUMP DRIVE

The pump shall be driven off of the front of the engine crankshaft using a flexible driveline of the U-joint type and be installed in reference to alignment as per manufacturer's specifications. The driveline shall be of the solid stub shaft design and constructed of C-1137 C.D. bar stock. The 1.375-16 splined section of the stub shaft must be hardened to RC48-53 surface hardness. The complete driveline must be rated to accept a working torque of a minimum of 130 foot-pounds. If equipped with grease fittings, fittings shall be positioned for easy access. **Vendor shall supply PTC with detailed drawing of pump shaft and manufacturers' part numbers.**

3.5 HYDRAULIC OIL SUPPLY TANK/VALVE ENCLOSURE COMBINATION

- The hydraulic reservoir shall have a minimum 40-gallon capacity and be constructed of 11 gauge stainless steel and be internally baffled. Reservoir and enclosure shall be made as one unit.

- The valve/tank combination unit shall be mounted the side frame rail of the vehicle and shall be mounted in such a manner as not to transmit any torsional loads.

- The design of the enclosure shall allow for easy access to the control valve without the use of tools. **The electronic control modules and mount shall be mounted in such a way that they can be removed from the valve enclosure for easy access to the valve sections.**

- The overall height of the valve/tank unit shall not exceed 27.6" including any filters, fillers or fittings.

- The overall width along the frame rail of the chassis shall not exceed 39½".

- The valve/tank unit shall not extend more than 30.27" off the chassis frame rail.

- All hydraulic connections shall be made directly to the control valve without the use of bulkhead connections.

- The fill port of the reservoir shall be accessible without first having to remove any covers.

- On the outboard side of the reservoir there shall be a combination level/temperature gauge.

All hydraulic hoses must exit the bottom of the enclosure to allow for the mounting of other components adjacent to the enclosure.

Reservoir shall have a dedicated clean-out opening of not less than 7½" with a **stainless steel cover**. The cover shall be sealed with an O-ring seal. There shall be a 2" brass shut-off valve plumbed to the suction port of the tank. Reservoir shall have a 10-micron in-tank return filter sized to allow a minimum of 50 GPM. There shall be a low oil sensor mounted in the tank for use with the low oil shut down system.

Note: Any unit submitted for bid shall have undergone Finite Element Analysis (FEA) testing to ensure the structural integrity of the unit.

Note: In order to keep the hydraulic valves accessible, no items are to be installed in the valve enclosure that are not part of the hydraulic valve system.

Valve enclosure shall be mounted on the driver's side unless otherwise noted in the prebuild.

3.6 HYDRAULIC HOSES

All hydraulic hoses shall meet or exceed specifications. Each hose assembly shall be cleaned of debris and fitted with JIC swivel connectors on ends where connection to system component is made, except for the suction hose. All pressure line hoses shall meet or exceed SAE specification 100R16 and shall be Gates Mega-flex M2T high pressure hose (no substitute standardization), for sizes up to and including 1" ID. The suction hose is to be 2" nominal I.D. SAE specification 100R4 braided fiber, spiral wire reinforced, rubber-covered hose with replaceable bolt-on type fittings. All hydraulic hoses are to be fully installed and ready for operation. Spreader control valve pressure lines and reservoir tank return line to be manifold mounted at center of frame rear cross-member. These lines to be equipped with complete 5100 series Aeroquip quick disconnects (coupler and nipple to be supplied) and metal cap and plugs in the following sizes: spinner pressure 1/2"; conveyor pressure 3/4"; return tank line 1¼".

Galvanized or black iron pipe fittings and connectors are unacceptable. All fittings and connectors shall be of the steel type designed for hydraulic system use. Pipe thread ported components and connectors shall be used only when the specific component is not available with SAE or JIC porting. All pipe thread connectors that are used are to be coated with liquid Teflon pipe sealer before assembly; Teflon tape is unacceptable. Hoses run to the front of truck chassis for snowplow functions shall be manifold mounted behind the front bumper with sufficient access for pump assembly service and snowplow hitch installation. These lines shall be equipped with complete 1/2" "Aeroquip" Model 5100 Series quick disconnects (coupler and nipple to be supplied) and metal caps and plugs. All hydraulic lines shall be routed and clamped with rubber lined two-bolt type HYCON clamps, with type 304 stainless steel bolts and positioned with maximum available clearance from chassis exhaust system, wear points and service items such as engine oil/fuel filters, etc. Any hydraulic lines located within 10 inches of exhaust system shall be heat shielded.

Note: All hose routing shall be of professional quality.

3.7 FILTRATION

Hydraulic system to include two 10-micron, replaceable spin-on cartridge type return line filters of 60 GPM capacity with integral 43 psi, by-pass valve plumbed parallel. Suction line is to be isolated from reservoir by a non-restrictive full flow type brass ball valve with 2" NPT minimum porting. The filter unit shall be equipped with a pressure gauge to indicate filter condition by means of a central control console mounted indicator lamp. Filter to be mounted on outside of frame rail. One extra replacement filter shall be provided for each truck. Return line filter: reference HYDAC #0180MA010BN. Filter Housing: HYDAC #MFBN180G10G1.1\12.2B3.4 020661169.

3.8 HYDRAULIC VALVES

All the central hydraulic system valving shall be of mobile design made to withstand exposure to de-icing chemicals and severe weather conditions and shall be mounted in a watertight enclosure. Valving shall be Rexroth M4-12/2X horizontally stackable with power beyond (no substitute standardization). Each function shall have its own valve section. Hybrid or aluminum manifolds shall be unacceptable. Each valve section shall have a built-in flow and pressure compensator to allow simultaneous operation regardless of any other system function. Directional control valves shall be positioned within the assembly by order of flow/pressure to minimize overall differential pressure drop. All function controls shall utilize PWM proportional solenoid valving. All sections are to have control solenoids, manual overrides, and stroke limiters.

All valving shall be in one main valve assembly. Multiple valve assemblies are unacceptable. Dump body valve shall allow an empty body to retract in 20 seconds or less.

Valve shall have a pressure/temperature transducer mounted in the valve inlet so that the system pressure and temperature can be displayed on the spreader controller screen.

The Rexroth M4/12-2x valve must include the following sections:

- Top Ported Inlet
- SA Electric Proportional Spinner
- DA Electric Proportional Auger w/Reverse
- SA Electric Proportional Pre-Wet
- DA Electric Proportional Hoist w/A Port LS Pressure Limiter to 1200 psi
- DA Electric Proportional Plow Up/Down

- DA Electric Proportional Plow Angle
- Power Beyond Outlet

Reference additional valve sections needed for optional equipment.

3.9 ELECTRONIC CONTROL PANEL

Electronic control panel shall be a Rexroth CS-150 (no substitute standardization).The control of all cylinder functions such as body, plow, wing, tow plow, scraper, etc. shall be controlled by a single 3-axis multi-function joystick mounted to a padded armrest. The armrest unit shall be pedestal mounted and have both a height and swivel adjustment. The distance from the cab floor to the top of armrest shall be adjustable from 23” to 26”. The dimension from the back of the cab to the back of the armrest should be approximately 13”. Final approval of location and design to be approved during the pilot build process. Pedestal shall be **FIRMLY** mounted in such a way that it does not contact either driver or passenger seat and is not mounted on the transmission access panel. The width of the armrest unit shall not exceed 4½".

The armrest shall have:

- Accommodations for six rocker switches or dual function indicator lights. The armrest shall have a mounting location for an optional six-switch add-on module.
- Power switch, body up indicator light (red), low oil indicator light (red), change filter light (red), auger jam indicator light (red), and low oil override (amber).

The joystick shall have:

- Deadman trigger that serves as an electrical interlock to prevent the unintentional movement of any function. No function shall activate unless the dead-man trigger is activated. Anytime the dead-man trigger is activated or a mode button is pushed the controller shall announce, in a human voice, the joystick operating mode.

- Six pushbuttons on its face for activating the following: power float, dump body mode, plow mode, body height limit override, spreader pause and spreader blast. Final button configuration shall be approved by a Resources & Programs Division Representative.

- An interface with the spreader controller and give both visual and audible (human voice) indications of joystick operating mode.

Anytime the dead man trigger is activated the controller screen shall automatically change to a joystick screen that gives a visual representation of the joystick layout. The joystick screen shall also give a visual representation of any active axis.

The joystick unit shall use a voice feedback system that will announce to the operator in which mode of operation the joystick is.

The joystick shall have adjustable minimum and maximum output current settings for each function. The adjustment of the minimum and maximum settings shall be accomplished onscreen in the controller programming mode. An External programming device to set the min./max. is unacceptable.

3.10 LOW OIL SHUTDOWN

A single, normally open, two-position, two-way poppet type solenoid valve (reference: Bosch Rexroth 142246) must be mounted directly to the hydraulic pump discharge port in such a way as to stop all oil flow to the hydraulic system when energized. The solenoid valve must be wired directly to an in-tank mounted level indicator. The level indicator shall be of the float type, and mounted from the top of the reservoir. When the float switch contacts close, the shutdown valve blocks pump flow and an enunciator on the main control will be activated. The momentary switch shall be mounted in the main control console for low oil shutdown override. This switch shall be wired in such a way as to de-energize the system shutdown to facilitate fault-finding and equipment stowing.

3.11 LOW OIL SHUTDOWN OVERRIDE

Rocker type/momentary design/amber lens. This switch allows operator or maintenance personnel to operate hydraulic system in case of low oil.

3.12 BODY LIMITING SWITCH

There shall be a limit switch installed that can be set to stop the dump body from being raised past a height of 12’6”. Reference: Telemecanique Part# XCKL108H7 (no substitute standardization). The switch shall be mounted on an adjustable stainless steel bracket with stainless steel fasteners, so the height limit can be set and adjusted over time. The switch shall be set so that when the dump body reaches the height limit, there will be a visual warning message displayed on the spreader controller screen alerting the operator that the dump body has reached the height limit. There shall also be an audible warning when the dump limit has been reached. There shall be a body limit override button as part of the operator control console joystick that will allow the operator to raise the dump body past the limit. The dump body warning message shall be logged as part of the spreader controller’s onscreen error log.

The body limit circuit shall have a summer/winter mode. In winter mode, the body limit circuit shall operate as described above. In summer mode, the body limit circuit shall be bypassed so that the operator can raise the body fully without sounding any alarms or having to override a limit circuit.

Changing between summer and winter modes shall only be accomplished through the spreader controller programming.

3.13 BODY UP SWITCH

A double-pole limit switch must be mounted on the body in such a way as to indicate that the bed is not down on the frame rail. The switch must be totally enclosed and be impervious to environment. The 12V output of this switch will be connected to the “Body Up” input on the CS-150 Armrest. Reference: Telemecanique Part# XCKL108H7(no substitute standardization).

3.14 SPREADER CONTROL

Spreader controller shall be a Rexroth CS-550 (no substitute standardization).

The CAN Bus spreader control system shall be ground speed orientated to maintain a pre-determined application rate regardless of vehicle speed. Control shall be by microprocessor for high control accuracy with the outputs being current compensated.

In order to ensure there will be no electrical interference either to or from the controller, any controller bid shall comply with the following standards:

- ISO 11452-2(2004-10) for RF Immunity
- ISO 11452-4(1996) for RF Immunity
- ISO 7637-2(2004) for Conducted Immunity
- ISO 7637-2(2004-06) for Transient Emissions

Controller shall comply with ISO 16750-5 for Resistance to Media. (Resistance to spills of coffee, soda, etc.).

The controller shall be capable of operating in Manual, Automatic Closed Loop, Open Loop, Ground Speed Triggered Manual and 12V Triggered modes. The controller shall initially be configured to operate in Open Loop mode.

Controller shall have a 7" wide VGA touch screen display with 262144 colors. The display shall be a glass/film/glass design with a hardness of 7H. The display shall have adjustable brightness with the maximum brightness being no less than 400 cd/m2. The display shall include a 1.5-watt speaker that uses a human voice feedback system to announce rate changes, pause on, pause off, blast on and blast off.

The controller shall be capable of having four different solid material calibrations, four different pre-wet liquid calibrations and four different anti-ice material calibrations for a total of twelve different materials. Each material shall have nine programmable application rates.

Controller shall have three detent rotary knobs for application rate selection. Each knob shall have stainless steel shafts and have a rotational torque of at least 8 oz.-in.

The controller shall be capable of operating Auger/Conveyor, Spinner, Pre-Wet, Anti-Ice, Cross Conveyor speed, Cross Conveyor Direction, Air Gate, Closed Loop Gate and Spinner Chute control.

The Controller shall be capable of the following:

Gate Read Back:

Spreader control must be capable of reading a gate feedback signal to alert driver when gate is out of range and inaccurate spreading may be occurring. This requires an optional feedback sensor.

Closed Loop Hydraulic Gate:

The controller shall be capable of automatically controlling the opening of the gate in response to groundspeed and application rate changes through the use of an optional hydraulic gate cylinder with built-in position sensor. Gate positioning range shall be from fully closed to fully open and any setting in between. Controller shall be capable of detecting whenever the gate is fully closed and disable the conveyor output to prevent damage to the gate.

Anti-Icing:

The controller as supplied shall be capable of controlling a 3-boom anti-ice unit. The controller shall come complete with boom control outputs for turning on and off each of the 3-boom ball valves.

Material Calibration Verification:

The controller shall have a catch test feature that will allow the user to specify an application rate, speed driven and time to run in order to simulate spreading for performing calibration verifications. The controller will use the resulting information to automatically make adjustments to the material calibration values to ensure the most accurate material setup.

GPS/AVL Compatible:

The controller, as supplied, must be capable of passing data logging information directly to a third party GPS/AVL system without having to purchase additional equipment from the spreader controller manufacturer.

Temperature Read Back and Temperature Compensation:

The controller shall display both road temperature and ambient air temperature on screen when an external temperature sensor is used. The controller shall be capable of automatically increasing the application rate in response to decreasing road temperature. The rate at which the controller increases the application shall be adjustable in the controller's programming.

Onboard Wi-Fi and GPS:

The controller shall have built-in Wi-Fi and GPS for optional data downloading. This requires optional Wi-Fi and GPS antennas only.

GPS Mapping with Data Logging:

The controller shall be capable of loading all spreading data to a USB stick. When the data is transferred to a PC it shall be capable of displaying all spreader and route data via Google Earth without the need to purchase any mapping or data logging software. This requires an optional GPS antenna.

Auto Nulling:

The controller shall be capable of auto nulling spinner, conveyor/auger and liquid channels when feedback sensors are used. Manual nulling must be available for all circuits including cross conveyor left and right.

System Programming:

Programming shall only be accessed by use of an encrypted USB key. All programming shall be done by using the touch screen display. The touch screen display shall have an onscreen pop-up keyboard for ease of entering information. The use of external programming devices, such as a laptop computer, shall not be acceptable.

Material Set Back:

When using liquid to pre-wet granular material the controller must be capable of cutting back the granular material by a predetermined percentage when the liquid is being applied. The percentage shall be programmable.

Trip Summary Information:

The controller shall display a real-time trip summary log on screen. The trip summary shall include miles traveled, solid material spread amount and liquid material applied amount. If operating in tow plow mode, the controller shall display a real-time trip summary for both the truck spreader and tow plow spreader.

On-Screen Error Log:

For ease of troubleshooting, the controller shall have an on-screen error log that is capable of displaying the last 20 error codes that have been generated. The log shall be viewable without the use of a program key. The error log shall not clear itself when the controller is powered off. The error log can only be cleared when the proper USB key is inserted into the USB port.

Data Logging:

The controller, as supplied, shall be capable of event-based data logging. The controller shall log the following information: date and time of event, event type, truck ID, driver ID, region name, solid material usage, pre-wet usage, anti-ice usage, pause distance, blast distance, distance spread, total distance, blast amount, number of times blast was used, gate position (if a gate position sensor is used), temperature (if external temperature sensor is used), set point of spinner, set point of conveyor/auger, set point of pre-wet and set point of anti-ice.

All the information will be transferred from the spreader control to a desktop/laptop computer via an encrypted USB drive. All data logging information must be capable of being customized and exported. Summation reports are not acceptable.

The controller shall come with all the necessary software for viewing data logging and programming information on a desktop or laptop computer.

USB keys:

Each controller shall come with two color coded USB keys. There shall be one red key that can be used to access all programming, setup and data logging and one black key that can only be used to collect data logging information.

Software Updates:

The spreader control software must be able to be upgraded via encrypted USB key. All software updates shall be provided free of charge from the manufacturer.

Interface connections:

The controller, as supplied, shall have the following interface connections built-in for use with GPS, Wi-Fi, temperature sensors, third party GPS providers, data logging and software updates:

Two CAN 2.0B ports
Two USB ports
Two Serial RS232 ports
One Wi-Fi antenna connection

Note: Body up fitter is responsible for performing initial setup of the spreader controller. This is to include setting the nulls for each proportional output. Up-fitter shall be responsible for all programing. All groundspeed calibrations shall be performed by the up-fitter prior to delivery. PTC shall provide pounds per mile and spread width information.

3.15 SPREADER REVERSE FEATURE

A momentary switch on the control panel will reverse the auger, in case of clogging or other stoppage, under operator control. This switch will also cut out power to the proportional control for the spinner.

3.16 BLAST FEATURE

Blast mode shall be controlled by means of a push type switch. Blast amount is programmable from 1% to 100% of hydraulic capacity. A separate and clearly defined audible warning alarm shall sound when blast button is in the "on" position for longer than the pre-set blast time. The blast shall also be able to be programmed to operate for a set period of time from 1 to 59 seconds.

3.17 POWER FLOAT

A power-float system (reference: Rexroth R987381753) shall be installed in conjunction with the present hydraulic system. The power float system shall provide a reduced pressure to the plow lift cylinder to reduce the amount of down force the plow can transmit to the road surface. The amount of force that the plow can transmit to the road surface shall be adjustable without the use of tools by turning a hand-wheel adjustment on the power float manifold. The power-float manifold shall be plumbed in series with the plow circuit and include counterbalance valves to prevent the plow from drifting when power float is not active.

The power float system, once turned on, shall engage and disengage automatically by detecting joystick movement. The power-float system shall be integrated with the spreader controller and shall be programmable for a resetting mode or a non-resetting mode. In the resetting mode, the power float will turn itself off when the plow is raised off the ground and will have to be turned on again by the operator. In non-resetting mode the power float shall de-activate when the plow is raised off the ground and automatically re-activate when the plow is returned to the down position. The power-float manifold shall be mounted inside the valve enclosure and be plumbed to the power beyond end cover of the hydraulic valve.

3.18 CABLE ASSEMBLIES

All electrical cables supplied must come complete with attached watertight "quick disconnect" connectors, shielded, heavy-duty industrial and anti-scuff and cut sheeting. Wire joints must be soldered and heat shrink tubing used in all appropriate locations. All quick disconnects must have ample dielectric grease when installed.

3.19 FINAL HYDRAULIC TEST AND INSPECTION

Any items not specifically stated herein, but necessary for proper system operation, shall comply with recommended hydraulic industry standards. The vendor shall be responsible for initial servicing and testing of hydraulic system, which shall include the following:

- Initial fill of reservoir with a high grade of hydraulic fluid to approximately 40-gallon level. Hydraulic oil specifications must be ISO 32 compatible with the Pennsylvania Turnpike Commission's specifications.
- Start up and initial high pressure run of all hydraulic system components, check for leaks, excess heat buildup, system efficiency, pressure settings, etc. Vendor shall be responsible for replacing any defective components. Vendor will be responsible for initial test of spreader and all plow circuits including wing plow if equipped. After initial start-up and system check, vendor will recheck oil level in reservoir and replace hydraulic filters.
- Any hydraulic lines located within 10 inches of exhaust system shall be heat shielded.
- A hydraulic oil analysis of the vendors bulk tank must be performed and provided to the PTC within 30-days of delivery of the each truck. One test will cover any truck delivered in the 30-day time frame.

4.0 UP-FITTED BODY, SPREADER AND PLOW SPECIFICATIONS

4.1 ALUMINUM DUMP BODY (OPTION 1)

The dump body shall be 5 cubic yard capacity water level measure without the use of sideboards. Sideboard pockets and tailgate height shall provide additional carrying capacity of 2 cubic yards. There shall be midway sideboard supports (left and right) (2" x 12" oak sideboards painted Omaha Orange to be included).

The gate shall be properly reinforced and extend not less than 6 inches above the body sides. The rear corner posts of the body shall be substantially braced to withstand heavy use without tailgate. The front of the dump body shall be equipped with a 24" cab protector. It shall also have brackets mounted on each corner and slotted to permit the use of sideboards to full height. A ⅝" x 10" x 24" aluminum plate (5454H34) shall be provided on the right lower side of the cross-members for mounting a dump body vibrator. The body shall be constructed of not less than 1/4" minimum wall thickness of 5454H34 aluminum unless stated otherwise. The body shall be thoroughly reinforced and continuous welded construction throughout. The body shall be mounted on 2-inch-thick, full-length rubber mounting sills attached to the longitudinals with slotted rubber and track extrusion assembly at the lowest possible mounting allowing proper clearance between underside of dump body and dual tires with chains.

The body shall be “Stacked Construction” Aluminum. Longitudinal member shall be minimum 6" I-beam, minimum weight 6.1 lb./ft., AL6061T6 (Squared flange). Cross-member shall be minimum 4" I-beam, 2.70 lb./ft., Al6061T6. 4" channel cross-member of equal strength is permitted at the front and rear of body to finish the unit, and in the area where hoist box is located. The body and body sub-frame shall be reinforced to withstand SEVERE duty service, for example dump body up while spreading salt and anti-skid material, or excavation rip-rap being dropped in the bed. The Fleet / Equipment Division will approve all methods of alternate design. The longitudinal I-beams and channels specified are minimums and may be exceeded to permit proper hoist mounting. Heavy gussets of minimum size 4" x 6" x ⅜" thick shall be furnished at all cross-members on the outside, where possible; otherwise they will be furnished on the inside.

Two stirrup-type steps shall be securely attached below side rail on each side of the body. The steps on both sides shall be retractable design; these steps shall be able to hold a minimum of 250-pound person. Reference: Bustin #SALA400 (no substitute standardization). Two non-slip grab handles above the steps, 20" length, shall be provided. There shall be two steps on the inside front corners of the body on both sides. Bustin Model 627 or Equal shall be used. Height shall be determined at pre build.

All welding inside the dump body must be continuous and free of skip welds. All posts, rails, and braces shall be continuous welded and completely enclosed. The floor shall be perpendicular to the interior sidewalls and have a 6-inch-wide by ¼-inch-thick plate welded to a 45 degree angle in the corner where the side meets the floor to prevent buildup of materials and provide additional side support. 4" integral extruded bottom rail is acceptable. The bottom rail shall incorporate ⅝-inch-thick x minimum 5-inch-wide dirt shedders at a 45 degree angle. Front and rear corner posts with three intermediate vertical side braces measuring a minimum of 7" in width shall be provided. The top horizontal side rails shall measure a minimum of 4" high x 4" deep and be fully boxed. The bottom rails shall be formed or extruded channel measuring 4½" deep and have a minimum 1¼" bottom return flange. Dump body hinges, web style mounted brackets, 3/8" thick, spanning across a minimum of two cross-members. There shall be a 1/4" steel backing plate on the inside of the bedrail that shall be bolted with a minimum of eight ⅝" grade-8 bolts with grade-8 lock nuts sandwiching the I-beam long sill between the plate and web mount. The hinges and backing shall be primed and painted on all surfaces and separated from the aluminum bed by a non-corrosive material. The hinge pin shall be a minimum of 2" O.D.; full length above the outer edges of both web mounts. The web mount brackets shall have a minimum of 1/2" walls with greaseable bushings. The hinge shall be of a low profile design. The truck hinge mounts shall add support to the frame and rear tow plate. (REF. EQN 76-3 MODIFIED)

MINIMUM DIMENSIONS AND MATERIAL

Inside length: 120"

Inside width: 86"

Outside width: 96"

Cross-members: I-beam: 4" x 3.373 lb. per ft. or approved equal; maximum spacing 12" O.C. with the exception of the hinge area (last 4) which shall be 8" O.C. 6061-T6

Cab protector: 24" long x 96" wide x 4" deep 3/16" thickness 5454H32

Front Bulkhead: 3/16" thickness 5454H32 one-piece design; shall be reinforced by three formed, equally spaced ribs. Approximate height of 62"; final height to be determined at pre-build meeting

Side height: 26"; 1/4" thickness 5454H34

Vertical side support spacing: approximately 22½" O.C. (avg.) 3 min. per side

Tailgate height: 34"; 1/4" thickness 5454H34

Floor: 3/8" thickness one piece 5454H34 with extruded Z side channel minimum 4.19 lbs./ft. 6061-T6

Front & Rear Posts: 3/16" thickness 5454H32

Vertical Side Braces: 1/4" thickness 6061-T6

Top Side Rails: 1/4" thickness 6061-T6

Bottom Rails: 1/4" thickness 6061-T6

Tailgate Plate: 1/4" thickness 5454H34

Tailgate Braces: 3/16" thickness 6061-T6

Longitudinal I-Beam: 6" x 6.274 lb./ft. 6061-T6 full length construction

Underbody Gussets: 1/4" minimum thickness 5454H34

Hoist Well: Sides 1/4" thickness; top 1/2" 5454H34

Note: Cast or forged brackets, hinges, and latches are unacceptable. Reference: Drawing EQN-62 & Drawing EQN-76 page 2-8.

Note: There shall be two safety body props with grease fittings on the pivot. The dump body shall extend a minimum of 4 inches beyond the chassis frame without the use of an extended apron.

4.1.1 TAILGATE – ALUMINUM

Tailgate, manufactured from grades 5454H34 and 6061T6. Double acting five-panel tailgate with offset hinges. The tailgate shall have 1½" diameter greaseable stainless steel top hinges, hinge brackets, and hinge pins with tapered end and with sufficient length for easy removal. Pins shall have a washer between the retaining clip or pin and the inside of the bed and be affixed with chains to prevent loss and be non-rotating. All grease fittings shall be connected to the centralized lube system. 3/8" grade 43 high test chain, galvanized, mesh covered and able to accommodate ½-inch-thick aluminum chain holder or ⅜-inch-thick steel chain holder. Minimum edge distance 1½". Two "J" hooks welded to the tailgate for chain hangers. Four tailgate chain brackets, two on each side. Shall have one material chute constructed of 1/4" stainless steel with levers and operating handle. There shall be two stainless steel adjustable linkages on the material chute door with an adjustable locking mechanism. All hardware (nuts, bolts, pins, turnbuckles, clevis, etc.) shall be AISI type 304 stainless steel. The tailgate latches shall be stainless steel construction, bolted into the rear corner post. The latch design shall be approved prior to building the pilot model. All pivot points will have grease fittings. Conspicuity required on the tailgate, Ref: EQN-122, PTC-81S, EQN-64 Pages 2-4.

4.1.2 AIR OPERATED TAILGATE

Tailgate must be operated via an in-cab dash mounted air valve and a body mounted **spring-over-air cylinder**. Air valve (Clippard Part # MJTV-4) must be dash mounted with safety cover (Dell City Part# 73200) to prevent accidental activation, right of the steering column, clearly labeled and within easy reach of operator(No substitution, standardization). All air piping and connections must be D.O.T. approved with 1/4" nylon tubing and brass compression fittings. **Spring-over-air cylinder** shall be warranted for a minimum of three years. Tailgate cross rod that attaches the cylinder to the latch mechanisms shall be 304 stainless steel. Latch pin will be connected to centralized lubrication system. All hardware (nuts, bolts, pins, turnbuckles, clevis, etc.) shall be AISI type 304 stainless steel. Reference: EQN-64 Pages 2-4, EQN-78A Pages 1-3.

4.1.3 BODY SIDES – ALUMINUM

The sides shall be minimum ¼-inch-thick aluminum 5454H34. Top rails shall be fully boxed and completely closed by "continuous" welding, both sides, one-piece construction for side top and bottom rails; no splicing. Running board width shall cover the outer rear dual tires and shall be full length of the body, both sides. A minimum of three vertical side braces per side on proper centers shall be furnished in addition to the front and rear corner posts. Side braces and front posts shall be furnished with bottom drain holes. The body shall be fitted with safety tread steps on both sides covering the area between the vertical corner posts of bed. Reference: Bustin Model 627 or Equal. Aluminum body shall be isolated from steel frame rails at the hinge by installing Mylar material. Conspicuity tape shall be installed along the entire length of the bottom as per FMVSS 108.

4.1.4 CAB SHIELD – ALUMINUM

The cab shield shall be a minimum of 96" wide x 24" long x 4" deep at front. A 1" slope in the floor front to rear shall be provided. Cab protector sides shall be formed channel with minimum 1½" flanges of 3/16".

Additional gussets shall be provided on each side under cab shield and front bulkhead plate. Approximately 3" clearance above highest point of truck cab and bottom of cab shield shall be provided; 3/16-inch-thick aluminum 5454H32. Welding shall be continuous on the front and back of the cab shield throughout. The cab shield shall have sufficient clearance to ensure that it will not hit the exhaust system when dumping on uneven terrain. If full wing posts are specified, the cab shield shall be modified with approval of the Fleet / Equipment Operations Manager.

Note: The Cabshield, if the standard lighting option is chosen, will be of a design in which the flanges and gussets are below the horizontal cabshield sheet. The design of this cabshield shall be submitted and approved by the PTC Fleet Representative prior to the manufacturing of the bed. The purpose of this design is to keep all lights and wiring out of the salt that may build up on top of the cab shield.

4.1.5 OPTIONAL BED VIBRATOR

Install a Cougar model DC-2500 (12V) bed vibrator (no substitute standardization). **Bed vibrator shall be wired directly from battery and have an exclusive resettable breaker**. Mounting location will be determined at pre-build meeting. The vibrator mount must meet the manufacturer's recommended mounting procedures.

4.1.7 HOIST

The hoist shall be double acting (power up and down), front mounted, telescopic, hydraulically operated, with a lifting capacity of 17.8 tons as certified by the National Truck Equipment Association (NTEA). The hoist shall be capable of raising the body to a 50-degree dumping angle plus or minus 4 degrees, and shall be equipped with 1.875-inch-diameter minimum upper and lower hinge pins. The hoist shall be mounted in a lower base and attached to chassis frame. The upper hinge pin shall be trunnion mounted and bolted on both sides of the bed frame long sills with a severe duty design. If a steel plate is used in the construction of the top hoist pin mount, a Mylar material must be installed between the two different metals. The hoist and mount may not protrude past the front plane of the headsheet. (Ref. Mailhot CS80-4.5-3DA)

All pivot points shall have accessible grease zerks to ensure adequate lubrication. The hoist and subsequent mounting hardware shall be capable of being raised for extended periods while spreading salt and anti-skid materials as vehicle is in motion. Bolt-on removable pin stop to be provided; weld-on stop not acceptable. The hoist shall be lowered in no more than 20 seconds with an empty bed and an anti-cavitation device shall be utilized. Hoist cylinder shall be 6" 3-Stage 88" with layered hard chrome plated plungers. (2"/5.08cm pin size both ends).

4.1.8 UNDERBODY

The underbody shall consist of 4" x 3.373 lb./ft. I-beam cross-members located on approximately 12" centers, in addition to a front and rear member. The body will use a heavy duty 6" extruded I-beam and will be 6061-T6 alloy with a 1/2" web and 3" flange. The I-beam shall have an integral 2" rubber-landing pad. It shall be mounted within a track that is an actual section of the I-beam. Floor cross-members shall be welded with approximately five welds on each side measuring approximately 6" in length with equal spacing between welds.

4.2 OPTIONAL ELECTRIC DUMP BODY COVERING SYSTEM

Electric dump body covering system with cab operated rotary switch and a cab operated automatic rear hold down lock system. The length shall be adequate to properly cover the dump body.

The arms shall be powered by two spring assemblies mounted on the side of the dump body. The springs shall be fully encased, for safety and protection, in a polished aluminum two-piece casting. For replacement purposes, the spring/arm assemblies shall be universal to eliminate the need for driver-side and passenger-side components. The springs shall have the ability to be pre-loaded with tension by simply rotating the pivot post without adding additional mounting holes to the dump body. The total thickness of the spring/arm assembly when installed is not to exceed 3" when installed on the dump body.

The arm assembly shall be constructed of high strength 6061-T6 aluminum extrusions with a wall thickness of 3/16" minimum for the ends of the tube for strength purposes. All arm components shall be polished. The arm sections shall telescope to allow for length and width adjustment, and shall be easily replaceable. Arms shall be angled at approximately 26 degrees to allow the arms to be recessed in the open position.

The roll-up bar assembly shall be a 6061-T6 aluminum extrusion with zinc plated steel machined end shafts. The roll-up bar shall be designed so the tarp can easily be attached without drilling any holes. The roller assembly mounting plates shall be polished aluminum with high-speed flanged, pre-lubricated bearings. A one-piece polished aluminum wind deflector shall be secured to the roller assembly mounting plates. To minimize installation, the wind deflector shall be designed so no cutting (to length) or drilling is required.

The electric motor shall be 12V and have a right-angle gearbox. The gears shall be steel, hardened and ground, and shall be designed to ensure that the tarp cannot back-drive. The cab-installed rotary switch shall be self-centering and constructed of metal. It shall be designed to eliminate the use of solenoids. All necessary wire fasteners and electric hardware shall be furnished.

The tarp material shall be an RFL-dipped, chemically treated fabric, suitable for covering asphalt. The width of the tarp shall be 9′. The tarp shall have a series of shock cords attached to the tarp, so the tarp’s width will constrict enough to fit on the roll-up bar. All sewing is to be lock stitched; chain stitching is not acceptable. A minimum of two polyester 2" webbing reinforcements are to be sewn to the tarp longitudinally for stability. Reference: Aero Industries Model 575.

4.3 OPTIONAL STAINLESS STEEL TAILGATE SPREADER

4.3.1 TYPE OF SPREADER

The unit bid shall include all standard equipment as published in the manufacturer’s specifications brochure. Reference: Smith Model UT696DDSSPA (No substitute standardization). The unit bid shall be identical with the latest standard model in use by the construction industry for the past six months and any modifications in that period shall be included to withstand rugged usage encountered in highway construction and maintenance. Units are to be installed on the truck.

Spreader shall be of the single spinner, single auger type with hopper which will universally mount on any standard dump body below the tailgate, will not interfere with normal dump body operation, and is independent of body tailgate. Builder shall take extra care to ensure that the spreader and spinner do not contact the roadway or pintle hook or any other part of the truck with dump body in the full elevated position. Loads may be dumped over or under the tailgate and the truck can be used for its normal work without removing the spreader hopper.
The discharge opening shall have a 7-gauge stainless steel shield to prevent the loss of free flowing materials when auger is idle. The complete spreader, spinner mount assembly and all hardware including quick detach hinges and pins shall be constructed of 7-gauge ASCII-304 stainless steel. The trough shall be so designed that the entire rear section shall open for ready access to the auger chamber to permit rapid clean out and drainage. This rear plate shall also act as the auger chamber cover plate. The spinner assembly shall not be attached to the rear cover plate.

NOTE: Vendor shall provide detailed drawings with part numbers for all serviceable parts.

4.3.2 FEED MECHANISM

Auger shall be mild steel ASTM A-36 6" O.D. minimum with ⅜-inch-thick HARD FACED FLIGHTS and a 4" maximum helix pitch feeding in both directions to the discharge opening 18.75 inches from left. The auger, drive sleeves and stub shaft shall be as per Drawing EQN-6 PTC Modified (no substitute standardization). The left side of the auger shaft shall be supported by one self-aligning 2-bolt flange, anti-friction, thrust, re-lube type SURVIVOR Series Corrosion Resistant bearing. Reference: Timkin #YCJT 1¼" PT (no substitute standardization). The bearing shall be attached to the removable 1/4" ASCII-304 stainless steel end plates. The right side of the auger shaft shall be supported by the drive motor. (Reference EQN-6 PTC Modified)

4.3.3 AUGER DRIVE, MOTOR

Auger drive motor shall have a displacement of 17.9 cubic inches per revolution, maximum. Reference: White Model RS 00300F3015AAZAA (no substitute standardization). Auger motor shall be direct drive. This sensor will be Hall Effect design and come complete with cable assembly to connect ITT/Cannon Surge seal type connection.

4.3.4 SPINNER

Single spinner shall be 18" in diameter and consist of a disc and six vanes formed into a single unit from polyurethane, to give a flat trajectory-spreading pattern. The spinner assembly shall be adjustable allowing for variable spreading patterns left, center or right. The entire spinner shall be easily removed by pulling two pins and uncoupling two hydraulic quick disconnect hoses. The spinner assembly shall be linked to the truck frame with a universally mounted parallel arm to keep the spinner horizontal to the road at all dump angles. The spinner hangers shall be a minimum of 1/4" thick and 2" wide. The spinner assembly shall have a minimum horizontal adjustment of 10 inches. The spinner drive motor shall have a displacement of 3.0 cubic inches per revolution maximum. Reference: Char-Lynn Model 101-1001-009 (no substitute standardization). The spinner hub shall be 4-bolt type hub to mount spinner disc with locking type nuts (must match bolt pattern for reference spinner). Hub material shall be ASCII-304 stainless steel.

4.3.5 HOSES

All hydraulic hoses and quick couplers needed to attach the spreader system to the truck hydraulic system shall be furnished. Note: The installation of the spreader and hose routing shall be of professional quality.

4.4 OPTIONAL PRE-WETTING LIQUID ON-BOARD SPRAY SYSTEM

4.4.1 PREWET TANK ASSEMBLY

There shall be a 120-gallon molded polyethylene tank. The tank shall have a minimum wall thickness of 3/8". The tank shall have a molded-in scale in 10-gallon increments to allow a visual indication of the liquid level. The scale shall show both gallons and liters and be visible on the outboard sides of thetank so as to be visible from either side of the vehicle. The tank shall come complete with two lifting lugs molded as part of the tank. The lifting lugs shall be located on the top of each tank.

The 120-gallon tank shall have two 6" lids and have a combination pressure and vacuum relief vent installed into the top which is rated for 10 CFM. Tank vent shall open on vacuum at a pressure difference of .5 PSI. Tank vents shall open at 1.5 PSI for pressure relief. Tank vents shall have a domed top to prevent the buildup of ice or snow from interfering with proper operation.

The tank shall be surrounded on all four sides by a stainless steel frame assembly. The tank assembly shall be mounted behind the cab across the frame rails of the chassis. The tank assembly shall not be more than 14" in width.

Each tank shall have a minimum 2" molded-in brass NPT fitting for a tank crossover. Each tank shall have a minimum 1½" molded-in brass NPT fitting for fill connections. A 1 ½” cam lock style coupling shall be installed for filling of the liquid tanks on the side of the tank.

A shut off valve shall be mounted behind the cab in easy reach.

To ensure the safety and integrity of the tank and frame assembly, any unit submitted for bid shall have undergone Finite Element Analysis (FEA) testing which simulates the stresses that would be seen on the assembly when the vehicle comes to an abrupt stop with full tanks.

4.4.2 Prewet Power Unit

The prewet power unit shall consist of a bronze gear pump, hydraulic motor, relief valve and flow meter all housed in a stainless steel enclosure.

The bronze gear pump shall be capable of delivering a minimum of 8 gpm at 1800 rpm and handling up to 100 psi.

The hydraulic motor shall be direct coupled to the pump by use of a lovejoy coupling. The hydraulic motor shall be supplied with hydraulic oil directly from a dedicated valve section in the main hydraulic valve assembly. The motor shall be of the orbital design and have a displacement of 12.5 cubic centimeters.

There shall be an adjustable relief valve installed on the pump outlet. The relief valve shall be plumbed so that when the relief valve opens, it will divert excess flow to the inlet of the pump.

There shall be a paddle wheel style flow meter installed in the pump outlet line. The flow meter shall be used to send flow information to the spreader controller. The spreader controller will use this information to monitor the accuracy of liquid flow, liquid calibration and to determine whether or not liquid is actually flowing through the system.

The enclosure shall be constructed of all stainless steel and have a removable lid. The lid shall be secured with a single rubber latch. The enclosure and lid shall also have a separate tab for optionally securing the lid with a single bolt.

4.4.3 PLUMBING

There shall be a strainer installed in the plumbing between the liquid tank and the prewet power unit. The strainer shall have a replaceable 50 mesh element.

There shall be a ¾" cam lock style quick disconnect in the spray nozzle line near the rear of the truck to facilitate the removal of the spreader from the truck. Located between the prewet power unit and this disconnect shall be an inline check valve to prevent siphoning(location to be determined at pre-build).

Spray nozzle shall discharge in the spreader trough and protected by a stainless guard. The nozzle shall be installed in such a manner that will not interfere with dumping operations. **(Location to be determined at pre-build) (Ref. T-jet part# 9191B-531TD, brass tip Part # tp11020, brass cap part # CP1325)**

4.5 PLOW MOUNTING

Low profile plow mounting. Reference: PA DOT Drawing EQN-50 Fleet/Equipment Operations Manager must approve hitch assembly. The hydraulic cylinder shall be double acting type with nitrided rod and include high-pressure hydraulic hoses. The nitrided shaft shall have ten times the corrosion resistance of hard chrome plating, twice the fatigue strength of untreated carbon steel tubing, and a Rockwell hardness of C60-C65. Hoses to be permanently attached to truck up to front bumper with hydraulic couplers at bumper. The vendor is responsible for inspecting existing plow hitch to assure compatibility. Dump truck hydraulic pump cover shall be aluminum Bustin type material sufficient to cover entire area from the grill to the bumper frame rail. Reference: Drawing EQN-32 PTC Modified.

4.6 OPTIONAL HEAVY DUTY PATROL WING PLOW

The purpose of these specifications is to describe a full floating patrol wing with tripping action and hydraulic telescoping action mechanism with the capability to lower the assembly to the travel position for improved visibility and to allow emergency egress.

The plow will be used for "severe duty" high-speed plowing and it is the responsibility of the manufacturer to ensure the plow, frame, and hydraulic cylinders meet the strength and durability to meet a "severe duty" operational setting. The plow shall be a current model and be a field tested design. All pivot points shall have grease fittings that are easily accessible.

4.6.1 WING PLOW

The wing plow shall be of the full tripping type. The tripping actuation shall be accomplished through an aeon rubber compression system or extension springs. This spring system shall be adjustable and shall automatically return the wing moldboard to its normal plowing position after it has passed over the obstruction encountered. All bolt assemblies used in this assembly shall be grade 8. The compression system shall be load adjustable and of sufficient strength to handle the weight of the wing moldboard and the tripping forces encountered. The tripping mechanism shall be located at the front (nose) end of the patrol wing.

4.6.2 MOLDBOARD

The moldboard shall have an overall length of 11′, a nose height of 29", and a discharge height of 38". The moldboard shall be fabricated from 8 Ga. H.R.S., the top of which shall incorporate an integral channel shaped continuation of the same so to enhance rigidity. The bottom cutting edge reinforcement shall be from not less than 6" x 4" x ¾" structural angle with 1/2" reinforcing gussets welded along its entire length.

The moldboard shall be provided with not less than five vertical reinforcing ribs from ½-inch-thick plate. Located between the two outside vertical ribs, at the discharge end of the moldboard, shall be four horizontal ribs also from ½-inch-thick plate (two upper and two lower); all with a series of vertically punched holes so as to provide a selection attachment points for the upper and lower stand-off arms. Additionally, the front nose portion of the wing shall include a selection of two 1 9/16" diameter holes for attachment with a 1½" hex head bolt at the front mast hinge. The wing plow shall have a safety chain that attaches the moldboard to the front mast in the event the moldboard is disconnected from the mast.

The wing shall be fitted with a ½" x 6" x 11′ C-1085 steel cutting edge punched on 12" A.A.S.H.O. centers and secured with ⅝" x 2½" grade 5 carriage bolts and locknuts. Included at the discharge end shall be a 10-degree moldboard shoe from abrasion resistant steel (minimum Brinell hardness of 360).

4.6.3 FRONT MAST

The front mast shall be fabricated from an 8" I-beam at 18.4 lb./ft. A double acting hydraulic cylinder shall be located on the hitch side of the front mast beam. This cylinder shall be connected to the wing slide at the top of the front mast beam. The wing slide and cylinder shall extend above the front mast when extended to raise the wing. The front mast shall not extend vertically any higher than possible.

There shall be a 7" x 4" x ⅜" wall rectangular, structural tube supplied to extend across the truck hitch. This tube shall connect the front wing mast to the truck hitch. The wing mast shall attach to this cross tube with four grade 5 bolts. There shall also be a minimum of two pipe braces included to attach front mast to truck hitch.

The front mast design shall allow for a 12ft front plow to be used without interference when both plows are in the transport position. The front mast shall be tilted rearward 7 degrees such that the top of the post is positioned aft of the bottom of the post.

4.6.4 REAR SUPPORT

The rear wing brace shall be a minimum of a single fixed hinge pin type with an adjustable bottom wing brace. The rear wing brace shall be equipped with a telescoping arm and an adjustable type tension spring. The rear wing mounting bracket shall be attached in such a way that it incorporates both frame rails in load distribution. The wing brace and hydraulics cylinders shall be capable of being removed for summer use.

The rear wing lift cylinder shall be single acting (4" X 13.25") but must be plumbed in a manner that provides hydraulic fluid on both sides of the cylinder piston for proper lubrication. A vented cylinder will not be allowed.

The adjustable arm cylinder (3" x 24") shall be mounted on the rear of the adjustable arm to protect the cylinder. The adjustable arm shall be manufactured of 4" box outer tubing and a 3" inner tube with wear pads.

4.6.5 PAINT

The moldboard shall be shot blasted and painted with (2 coats of primer and (2) coats of finish paint. Reference: Omaha Orange Dupont 31LF for shade purpose, all other components shall be painted with (2) coats of primer and (2) coats of black.

4.6.6 WING CONTROL

The wing shall be controlled from the same multifunction joystick specified in the electronic control panel section.

There shall be the addition of an emergency button on the face of the joystick that, when depressed, will raise and bring in the wing at the same time. When the emergency button is activated, all other hydraulic functions or demands will deactivate, until button is released.

The operating speed of the wing shall be settable and adjustable through the spreader controller programming screen.

4.6.7 WING HYDRAULICS

There shall be two additional valve sections added as part of the main valve assembly for supplying oil to the wing plow hydraulic cylinders.

The wing plow hydraulic valve sections shall be Rexroth M4-12 double acting proportional sections. Each valve section shall have electrical proportional coils with built-in overrides. Each valve section shall have manually adjustable stroke limiters.

4.7 10' STAINLESS STEEL DUAL AUGER BODY(OPTION 2)

General:

This combination dump body / material spreader unit shall consist of a hopper, dual discharge / feed augers, spinner disc, power drive, and all components necessary to make a complete operating unit.

This unit shall be factory ready to accept servo controls.

All stainless steel sheet metal used in the production of this unit shall be 304 4b finish stainless steel.

Any stainless steel plate used in the production of this unit must be 1/4" or thicker, and must be 304 stainless steel.

All fasteners used on the unit must be stainless steel, with an anti-seize compound applied during assembly to prevent galling or seizing.

The manufacturing and production of this unit shall be of the best commercial practices and only materials of the finest quality are to be used.

Bidders must submit with their bid complete specifications on the unit they propose to furnish.

All inside and outside joints on upper body are continuous welded for maximum strength.

Body:
Body shall have 6 cubic yard struck capacity, and 7.8 cubic yard struck capacity with sideboards(2" x 12" oak sideboards painted Omaha Orange to be included).

Body shall not exceed 99" overall width.

Body shall be constructed on heavy duty long sills made of .250" thick 304 stainless steel plate and shall be not less than 13.75" tall with a 3" formed bottom flange.

Body shall incorporate a fully-welded auger trough constructed of .250" thick 304 stainless steel plate and shall be 34" wide x 10.5" tall.

Body shall incorporate a sloped, one piece side/floor design and both shall intersect at and be solid welded to the top edge of the long sills

Side/floor shall be constructed of 7-gauge stainless steel.

Sides shall each be constructed from a single piece of sheet steel and shall include a formed 4" top flange. Sides shall also be formed with three 3/8" radius bends to produce a slope of 38 degrees to the auger trough to facilitate complete body cleanout without raising body.

Inside body length shall be 120" from headsheet to the tailgate.

Side height must be 43" tall, measured from chassis rails.

Sides shall incorporate a fully boxed, 5" deep X 10" tall, 7-gauge, top rail.

Rear corner posts shall be 10-gauge formed stainless steel, with integral 15" high flange-formed rear apron.

Each rear corner post and apron shall be full depth and must be one piece, no splicing.

The rear corner posts must be tied together with a .250" X 3.500" X 5.250" stainless steel cross angle.

The rear corner posts must be 7" deep, 16" wide, and 53.5" tall.

Each rear corner post shall include two stainless steel .375" X 3.5" X 4.5" chain retainers ears.

Headsheet shall be two piece design constructed from 10-gauge formed stainless steel. Upper and lower sections shall overlap a minimum of 1" and shall be solid welded. Lower section shall be formed to slope 30° to the auger trough.

Headsheet shall be 56" tall measured from the chassis.

Headsheet shall have a 2.5" J-brake reinforced top edge.

Headsheet shall have a 12" X 12" doghouse to recess the telescopic cylinder.

Sideboard pockets shall be constructed of 10-gauge stainless steel, and 2" wide.

Full length integral fenders to be constructed of 10-gauge stainless steel and shall be solid welded to the body sides and front rear corner posts.

Integral fenders shall be 27.625" wide with a 5.750" X 2" formed edge for added strength.

The integral fenders shall include a full length 4.5" X 4.5" V-crimp for increased strength.

Side / fender cavity shall be capable of accepting tool boxes or liquid tanks.

Tailgate:
The complete tailgate shall be constructed of 10-gauge stainless steel with fully a boxed perimeter utilizing formed stainless steel. Conspicuity required on the tailgate, Ref: EQN-122.

The design requires four full height vertical braces and three horizontal braces to create a six-panel tailgate.

The four vertical braces must be 7" wide, 4" deep, and 42" tall.

Horizontal support members will slope 50 degrees to eliminate debris build-up.

Upper hinge legs shall be 7.5" wide X 10" tall X 0.75" thick stainless steel for increased upper hinge pin wear surfaces, one piece, no laminating. Hinge legs shall come with a 1" diameter x 4" long rod welded to them for securing the tarp.

Upper hinge pins to be non-rotating, 3.75" long X 1-1/4" diameter with recessed grease fittings. They shall be fitted with a SS retainer chain welded to the rear corner post to prevent loss when the tailgate is being operated in the double acting position.

Lower latch pins shall be 1 1/4" diameter and rest in double 3/8" thick stainless steel seats backed up by 1/4" thick stainless steel plates welded to corner posts. A total thickness of 3/8" steel support.

The rear skirt must be vertical, and shall not extend beyond the end of the body floor.

Tailgate shall be double acting.

Spreader chains shall be 3/8" zinc plated.

Tailgate shall be equipped with a heavy stainless steel D-ring to aid in removal.

IMPORTANT NOTE: The design of the material delivery system shall eliminate the need for an adjustable or metered door in the tailgate. A single asphalt/coal chute, measuring not less than 17" wide X 8" tall shall be provided for summer season operations. The coal chute will provide for two positions; completely closed or fully open. Coal chute shall be designed with a spring loaded handle doe securing into the fully open position.

Air Operated Tailgate Latch:
Air tailgate latch shall utilize dual air brake chambers with 5/8" diameter push/pull rod. Air inlet port shall be 3/8" NPT.

Dual latch mechanism shall be over-center positive lock type. It shall not require air cylinder to support load required to keep tailgate latched.

Latch mechanism shall consist of heavy duty bell-crank supported on a 1-1/4" diameter pivot shaft. Crank and shaft assembly shall be welded to a heavy duty stainless steel plate which is welded to the body.

All latching components (excluding the brake chamber) must be constructed from stainless steel, NO EXCEPTIONS.

Tailgate latch switch (Clippard Part # MJTV-4) must be dash mounted with safety cover (Dell City Part# 73200) to prevent accidental activation and be mounted to the right of the steering wheel. Location will be determined at the mock up meeting.

Auger System:
The "dual auger" system shall consist of twin 7" diameter augers running longitudinally with the body. The augers will terminate flush with the inside of the tailgate panel, and feed material the full length of the body to a drop chute located at the rear and underneath the body of the conveyor floors.

The drop chute shall measure not less than 10" wide X 4.375" deep and shall extend down from bottom of the auger trough a minimum of 3".

The auger trough shall be continuous welded and sealed to prevent leaching of salt or brine onto the truck chassis.

IMPORTANT SAFETY NOTE: In the interest of protecting the operators and preventing accidental engagement with the feed augers, the auger trough opening shall terminate at a point not less than 36" forward from the end of body floor and tailgate. The body floor shall be smooth and uninterrupted after this point. NO EXCEPTIONS TO THIS CRITICAL SAFETY FEATURE WILL BE ACCEPTED.

The auger tube shall be constructed from 3.5" Schedule 40 pipe.

The flighting must be continuously welded the full length of the auger.

The flighting shall be 1/2" thick, with a 6" pitch, and counter-rotating.

The augers shall each be driven by a 63.9 cubic inch hydraulic motor direct coupled to the auger by a spline shaft coupling at the forward end.

The spline coupling must be continuously welded to the end of the auger pipe to prevent corrosion inside the auger pipe.

The couplings shall be equipped with grease fittings so that the motor splines and couplings can be lubricated.

The auger will include a 2" TGP idler shaft, welded to two .5" thick washers, which are welded solid into the end of the auger pipe to prevent corrosion inside of the auger pipe.

The idler ends of the auger shall be supported by two 4-bolt flange, heavy duty, dust sealed, self-aligning ball bearing.

These bearings must be able to be lubricated from the rear of the body and shall be recessed in the rear skirt of the body, and protected from material being dumped and spread from the body by a stainless steel cover.

Both augers MUST include full length hard surfacing equal or greater than HRC 40, the entire width of the flighting edge.

The auger must have a welded thrust washer on the pipe to eliminate a forward load on the drive motors and bearings.

A UHMW thrust bearing is required between the thrust washer and the front plate of the auger trough to minimize wear.

Free flow of material shall be restricted by using an anti-flow plate positioned at the rear of the body over the augers. The anti-flow plate shall extend inwards from the rear of the tailgate 21.75" and shall eliminate the need for any metered gate or other metering devices.

The anti-flow plate shall be not less than 34.75" wide X 21.75" deep and shall have a formed flange sloping 45° towards the auger trough.

A protective grate consisting of 1/2" 304 stainless steel round bar shall be placed over the exposed auger inside the hopper and shall extend in 12" forward from the anti-flow cover. Access to the augers shall be restricted for a minimum distance of 32" from the rear of the body.

The 1/2" 304 stainless steel round bar shall have 3" X 4" openings and shall be solid welded at all intersecting points with the body.

Rear Mounted Spinner:
The spinner assembly and mounting tube shall be constructed from stainless steel.

Spinner assembly shall be mounted to the rear hinge, not the body.

IMPORTANT NOTE: In the interest of eliminating conflict with towed equipment such as trailer mounted attenuators, no portion of the spinner mounting hardware may extend beyond the pintle plate.

Spinner shall remain in place with body raised, spinner to remain level.

To eliminate corrosion, the spinner disc shall be 24" in diameter manufactured from 10-gauge stainless steel.

To eliminate corrosion, the spinner vanes must be manufactured from 10-gauge stainless steel.

The spinner shall have "formed vanes" bolted to the spinner disc with stainless fasteners for easy replacement.

The spinner shall have a conical safety shroud above the disc to protect the chassis and surrounding area from flying aggregates.

The spinner guard shall extend approximately 2/3 or 135° of the way around the circumference of the spinner and shall measure not less than 6.25" tall.

The spinner assembly shall mount to a 2" OD DOM stainless steel tube to allow vertical adjustment, a horizontal swing-away function, and a horizontal telescopic adjustment.

The spinner assembly shall have 6" of vertical adjustment, eight pinned positions for accurate spread pattern control, and eight pinned positions, in 1/2" increments, for adjusting material drop location onto the spinner disc.

All adjustments shall be made from the rear of the spinner support tube, ensuring ease of access.

Hoist:
The hoist shall meet NTEA Class 50, with a minimum 17.8 ton capacity.

The cylinder is to be trunnion mounted telescopic and double acting.

The lower cylinder trunnion pins shall mount into a heavy duty lift frame constructed from .25" and .50" carbon steel. Lift frame shall include two 2" thick X 9" long X 4" tall lift blocks solid welded into the frame to accept the lower trunnion pins.

Each lower trunnion pins shall be captured with a retainer weldment constructed from 1" thick X 1.5" wide X 4.75" long carbon steel secured with 5/8" hardware. Retainers shall be equipped with grease zerks.

The upper cylinder trunnion pins shall mount into a heavy duty lift frame constructed from .375" and .50" carbon steel. Lift frame shall include with two 1.25"" thick X 11.625" long X 3" tall lift blocks solid welded into the frame to accept the upper trunnion pins.

Each upper trunnion pins shall be captured with a retainer constructed from 1.25" wide X 2" tall X 5" long carbon steel secured with 1/2" grade 8 hardware. Retainers shall be equipped with grease zerks.

Upper trunnion lift frame weldment shall be recessed into the body dog house and shall be bolted to the body with a minimum of ten 3/4" grade 8 bolts.

Lower lift frame shall include an integral safety body prop. Prop shall be secured into the vertical position exactly perpendicular to the frame with a 1/2" diameter X 3.5" clevis pin. Pin shall be secured to lift frame with stainless steel chain to prevent loss.

Telescopic cylinder specifications:
All tubing used in the manufacture of this cylinder shall be honed D.O.M. tubing and must have the corresponding mill specs sheets from the run under which it was produced.

After machining, the tubes and glands shall be submerged in a liquid salt bath
nitriding process, polished, and submerged a second time to enhance the mechanical properties of the tubing. The nitrided tubes shall have ten times the corrosion resistance of hard chrome plating, twice the fatigue strength of untreated carbon steel tubing, and a Rockwell hardness of C60-C65.

For simplicity and longevity there shall be no brass, or phenolic wear parts in the cylinder.

The cylinder shall be U-cup type, positioned in the gland nut as a rod seal to wipe against the OD of the tube passing through it. As the cylinder retracts, foreign materials will be removed by means of a wiper, also located in the gland nut, and the tube will be surrounded by oil below the seal. An outer cover shall enclose the cylinder while not in use.

Through means of an oscillating collar near the bottom of the cover, the body can be offset 5 to 7 degrees from side to side without side loading the cylinder. The trunnion pins on the oscillating collar will provide the means for lifting the body at the bottom, which will increase stability.

The cylinder shall mount with the largest section at the bottom.

Cylinder shall include a two year warranty.

The hoist package shall include 1/2" and 3/4" stainless steel hydraulic tubing running from the rear of the body forward to the hoist cylinder.

Cabshield:
Shall be constructed of 10-gauge stainless steel and extend forward of body 24".

Shall be 84" wide, as to allow the end plates on cab shield align with front edges of the body sides for maximum support. The end gussets tie the end plates to the front edges of body sides.

Forward edge shall be "C" formed with 4" section height.

Shield pan shall slope 2 degrees for shedding water, and double ribbed on the underside of cab shield to minimize flexing.

End gussets shall be reinforced with formed angles that also serve as wire chase for cab shield lighting.

Note: The Cabshield, if the standard lighting option is chosen, will be of a design in which the flanges and gussets are below the horizontal cabshield sheet. The design of this cabshield shall be submitted and approved by the PTC Fleet Representative prior to the manufacturing of the bed.

Auger Trough Cover Plate:
Cover plate shall be .250" thick stainless steel that covers the entire auger trough.

It shall attach at the rear with stainless steel bolts and be captured at the front of the body and contain a heavy duty stainless steel d-ring to aid in removal.

Top Grate Screen:
The main center support shall be constructed of stainless steel box beam.

The top screens shall be constructed of 3/8" stainless steel rods welded to form a 3" square mesh, which is framed by 1/4" x 1 1/2" flat stainless steel edge supports and reinforced by 1/4" x 1" flat stainless steel bars.

The top screens shall be constructed in a manner that will interlock all screen sections by means of a single bolt in the rear screen section on each side of the body.

Top screens shall be removable and use the "Drop and Lock" type hinge, as screens utilizing hardware may become damaged, and fail.

Ladder
Ladder shall be a six-step design of stainless steel construction. Ladder shall consist of an upper portion bolted between the side and the fender, and a lower portion that pulls out from a stowed position under the fender.

Two stainless steel grab handles (one on each side) shall be positioned at the top of the ladder and be coated with an industrial strength anti-slip coating.

Pre-wet tanks
Two side mounted tanks with a minimum of 200 gallon on-board capacity.

The tanks shall be rotational molded polyethylene with a .300" wall thickness.

RH and LH tanks shall be connected with a stainless steel pipe crossover plumbing for level filling and emptying.

Shall include 1-1/2" female quick fill fittings on each tank.

Each tank shall be secured to the body with no less than two stainless steel straps.

Each tank end shall be held in place with a stainless steel angle fitted with a rubber insulator to prevent chafing of the tanks.

NOTE: Mounting design and method must ensure the tanks will be secured to the body and protected from the effects of vibration and daily use. All plumbing must be properly supported as to prohibit strains and twists on tanks and fittings.

Pre-wet Application LANCE

There shall be a stainless steel lance plumbed directly into the auger trough for the purpose of internally mixing pre-wet liquids into the granular aggregates within the auger trough.

A 3/4" stainless steel injection lance of not less than 82" in length shall be provided and have application holes sized appropriately to apply 7 GPM at 50 PSI.

The stainless steel plumbing must be removable from the rear for cleaning and servicing.

The stainless steel plumbing shall be shielded from the granular material to prevent clogging and potential damage by means of an inverted vee positioned above the injection lance and below the auger safety grate.

The inverted vee shall be at least 2.75" X 2.75", constructed from 7 gauge stainless steel and shall run the entire length of the auger trough.

Inverted vee shall be mounted under 1/4" thick cross supports. Inverted vee and cross supports shall be solid welded to the body.

Pre-wet Pump

The pre-wet power unit shall consist of a bronze gear pump, hydraulic motor, relief valve and flow meter all housed in a stainless steel enclosure.

The bronze gear pump shall be capable of delivering a minimum of 8 gpm at 1800 rpm and handling up to 100 psi.

The hydraulic motor shall be direct coupled to the pump by use of a lovejoy coupling. The hydraulic motor shall be supplied with hydraulic oil directly from a dedicated valve section in the main hydraulic valve assembly. The motor shall be of the orbital design and have a displacement of 12.5 cubic centimeters.

There shall be an adjustable relief valve installed on the pump outlet. The relief valve shall be plumbed so that when the relief valve opens, it will divert excess flow to the inlet of the pump.

There shall be a paddle wheel style flow meter installed in the pump outlet line. The flow meter shall be used to send flow information to the spreader controller. The spreader controller will use this information to monitor the accuracy of liquid flow, liquid calibration and to determine whether or not liquid is actually flowing through the system.

The enclosure shall be constructed of all stainless steel and have a removable lid. The lid shall be secured with a single rubber latch. The enclosure and lid shall also have a separate tab for securing the lid with a single type 304 stainless steel bolt and type 304 stainless steel nylock nut.

There shall be a strainer installed in the plumbing between the liquid tank and the prewet power unit. The strainer shall have a replaceable 50 mesh element.

A 1 ½” cam lock style coupling shall be installed for filling of the liquid tanks.

There shall be a ¾" cam lock style quick disconnect in the spray nozzle line near the rear of the truck to facilitate the removal of the spray nozzle. Located between the prewet power unit and this disconnect shall be an inline check valve to prevent siphoning.

NOTE: Location of pump and enclosure shall be determined at prebuild with consideration to ease of access for servicing components.

Material Vibrator

A Vibco Cougar DC-2500 vibrator shall be mounted to the front of the curb side long sill.

5.0 WARRANTY, VENDOR RESPONSIBILITIES, AND TERM

5.1 INSPECTION

Vehicles shall be inspected to conform to the latest Pennsylvania Motor Vehicle Code. License plates shall be issued by the Pennsylvania Turnpike Commission.

5.2 STATEMENT OF ORIGIN

A Statement of Origin and completed MV-1 form to be furnished by the vendor.

5.3 PILOT MODEL

The Contractor shall coordinate a Pre-build meeting of all vendors involved in the main components of the truck and upfitted components prior to the manufacturing of any components. A chassis pilot of all models and wheelbases shall be held for PTC Fleet Representatives to accept the cab and chassis. A mock-up of each model of truck shall be held. During this stage of the build, this contractor shall have the bed and hoist, hydraulic tank, valve enclosure, armrest mount, pre-wet tank and box, air dryer, fuel filter, lube system, and plow mounts installed for inspection. The location of all components will be discussed prior to the Mock-up inspection. The Contractor shall not make delivery to the Turnpike Commission until a complete pilot model has been approved by the Commission. The Commission will cooperate with the contractor to the extent of inspecting the pilot model at the manufacturer's plant and/or at the contractor's place of business depending on the need. The contractor shall furnish a pilot model truck with body and hoist mounted, as well as the snow plow attachment, hydraulic equipment and controls mounted and in operating condition, painted and complete in every detail of these specifications for the inspection and approval of the Turnpike Commission or an authorized representative.

5.4 FACTORY WARRANTY

All vendors shall provide a basic warranty, without cost to the Pennsylvania Turnpike Commission, covering 100% parts and labor. Copies of all warranties to be submitted with bid.

5.5 OPTIONAL EXTENDED WARRANTY

5.5.1 ENGINE WARRANTY

All vendors will provide detailed coverage of an 84-month/100,000 miles non-deductible extended warranty option to include engine, engine sensors, exhaust after treatment system, exhaust after treatment harness.

5.5.2 HVAC WARRANTY

All vendors shall provide detailed coverage of a 60-month/100,000 mile non-deductible warranty option on the HVAC system.

5.5.3 TRANSMISSION WARRANTY

All vendors shall provide detailed coverage of a 60-month/100,000 mile non-deductible warranty option on each of the transmission options available (Manual, Allision Automatic, and Automated Manual-including clutch).

5.6 MANUALS / PARTS & COMPONENTS LIST

A web based VIN specific parts and service portal shall be provided. The body up-fitter shall supply six copies of schematic and parts lists in binder or CD-ROM form for: the hydraulic system, dump body, spreader control system, pre-wet system, and mounted optional equipment.

NOTE: All manuals, part lists and schematics for the truck, hydraulics, and up-fitted equipment shall be delivered to the PA Turnpike Commission within 30 days of the final acceptance of the pilot model truck.

5.7 OPTIONAL TRAINING

The vendor shall provide cost for training to include, but not limited to: Engine Diagnostics, Electrical, ABS Brake System, Automatic Transmission, Fuel System and General Maintenance. Location will be at vendor training facility. Training will cover similar material as dealer mechanics receive. Training topic specifics will be agreed upon between the vendor and the Commission. The training will be performed on an annual basis to coincide with each truck order. The training may be split into sessions to accommodate the training facility size. The training shall be priced as a cost for a mechanic/day of training. It shall be known that we may have up to 60 mechanics for a one week period.

5.8 MISCELLANEOUS

The vendor is responsible to furnish a vehicle that is properly engineered and that conforms to all and any laws governing such equipment and shall certify that the equipment, its various systems and sub system have been in general use in the maintenance industry for at least twelve months prior to the bid date.

5.9 DELIVERY

Bidders must specify delivery time in their bid. Phrases such as “as required”, “as soon as possible”, or “prompt” have no meaning and may be cause for rejection of the bid. A pilot model shall be inspected at the vendor prior to delivery. The vendor shall deliver the finished units at a rate of not less than five to eight units a week beginning no later than 60 days following written approval of the completed pilot model.

All units must be delivered within 270 days after receipt of the purchase order by the successful bidder. It shall be assumed by the parties that the successful bidder received the purchase order on the third business day following the date of the purchase order, unless the successful bidder provides credible evidence that the order was received on a later date. The successful bidder shall deliver at ground level the complete unit(s) to the Pennsylvania Turnpike Commission, 2715 South Front Street, Steelton PA 17113. All deliveries shall be made on a working day between 7:00 AM and 2:30 PM.

The successful bidder shall submit to the Pennsylvania Turnpike Commission, "on a continuing basis", all service bulletins and technical letters as regularly issued by a manufacturer to dealers or large fleets. All the relevant information shall be supplied for the unit(s) forwarded to the Pennsylvania Turnpike Commission of any improvements, changes and/or problems concerning the unit and its component parts. This information shall be addressed to The Pennsylvania Turnpike Commission P.O. Box 67676 Harrisburg, PA 17106 c/o the Fleet Resource Operations Manager. The Pennsylvania Turnpike Commission reserves the right to have its representative(s) periodically inspect each unit during assembly at the successful bidder's assembly point.

5.10 INVOICE
The vendor shall invoice each unit separately dated the day of acceptance.

5.11 TERM
Contractor shall commence providing trucks not before June 1, 2018. The initial term will be for one (1) year from the date of service commencement ("Initial Term"). Approximately 30 – 40 trucks of any bid model will be ordered in a given term.

5.12 RENEWAL OF CONTRACT
This Contract may be renewed at the sole discretion of the Pennsylvania Turnpike Commission, for up to two (2) additional one (1) year successive annual periods (each a "Renewal Term") under the terms and conditions of the original Contract with a 2.5% escalator for each additional renewal term. Written notice of the PTC's intention to renew shall be given no less than ninety (90) days prior to the expiration date of each term. Renewal terms shall not be awarded unless all obligations of the previous term are fulfilled.

6.0 DRAWINGS (for reference only)

Available from Pennsylvania Turnpike Commission, Maintenance Department, 717-939-9551 ext. 3735 or 5101. Bidder is responsible to obtain the most current version of the referenced drawing at the time of bid.

PENNDOT DRAWINGS
EQN-6 PTC Modified
EQN-32 PTC Modified
EQN-76 PTC Modified
EQN-50 Pages 1-4
EQN-62 Pages 1-2
EQN-63
EQN-64 Pages 2-4
EQN-76 Pages 2-8
EQN-78A Pages 1-3
EQN-82
EQN-122
EQN-124

EQN-127
EQN-351A Pages 1-2

PENNSYLVANIA TURNPIKE DRAWINGS:

PTC-80A
PTC-80E
PTC-81S
PTC-84
Appendix A

Approved:

_____ _____

Dale Hall Date
Director of Maintenance
Pennsylvania Turnpike Commission