

-1-
SPECIFICATIONS
A-48-DH
059625

TRUCK, TANDEM, AUTOMATIC, PAINT, AIRLESS, WATER BORNE, ROPS

INDEX

I. GENERAL TRUCK SPECIFICATIONS:

- A. Intent Statement
- B. Weight Distribution
- C. Power Train Overview
- D. Vehicle Components
 - 1. Axle Front
 - 2. Axle Rear
 - 3. Brakes
 - 4. Cab
 - 5. Air Conditioning
 - 6. Chassis
 - 7. On Board Grease System
 - 8. Drive Line/Center Bearings
 - 9. Electrical
 - 10. Engine
 - 11. Exhaust
 - 12. Fast Lube Oil Change System (FLOCS)
 - 13. Frame and Frame Extension
 - 14. Instrumentation
 - 15. Paint
 - 16. Safety
 - 17. Steering
 - 18. Tank - Fuel
 - 19. Transmission
 - 20. Wheels/Tires
 - 21. Collision Avoidance System

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-2-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATION: (Continued)

E. Paint Machine Overview

1. Paint
2. Platform
3. Bumper
4. Toolbox
5. ROPS Rear Shelter and Equipment
6. Intercom System
7. Guidance System
8. Control Center
9. Spray Equipment Control Boxes
10. Electronic Skipline System
11. Data Logger
12. Spray Equipment
13. Paint Tanks
14. Paint Strainers
15. Paint Fill/Supply Pumps
16. Glass Spray Equipment
17. Glass Supply
18. Spray Gun Carriage Assemblies
19. Heating System - Paint
20. Piping/Valves
21. Air Compressor
22. Cleaner System
23. LED Message Board
24. Lighting/Warning
25. Night Lights
26. Hose Reels
27. Spare Parts
28. Miscellaneous Items
29. Optional Rumble Strip Avoidance
30. Optional Push to Talk David Clark For Rear Shelter

II. DRAWINGS:

III. MANUALS:

IV. TRAINING:

V. WARRANTY:

-3-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS:

A. INTENT STATEMENT:

It is the intent and purpose of this specification to describe a truck-mounted, airless, self-contained striping machine with ROPS. The machine shall apply reflectorized lines utilizing solvent or water borne traffic paint. The equipment must maintain and be capable of applying the paint and/or marking material at ambient temperatures as low as 50 degrees F, on a clean and dry surface. The machine shall also maintain and be capable of applying conventional or fast-dry traffic paint materials at speeds of up to 25 MPH at a maximum .015 millage/0.381 wet without beads. The intent is to comply with federal safety standards for noise, noise emission generated by the unit (and they shall not exceed federal regulations in the chassis cab, right rear operator's seat, and left rear operator's seat). The machine shall be capable of simultaneously applying three lines in two colors of the marking material in either a solid or skip pattern or combination of these patterns at the operating conditions specified above. All truck parts and materials shall conform to the truck manufacturer's recommendations and the applicable S.A.E., A.W.S. and A.S.M.E. minimum standards.

The maximum height of the paint striper and appurtenances **shall not exceed 11 ft 6 inch** in a working mode.

The vehicle shall have a grade ability of 15% when loaded to maximum G.V.W.R. without exceeding the engine manufacturer's recommended maximum R.P.M., based on maximum net torque. Painting speeds of 5 MPH to 25 MPH must be obtainable with cruise control and without erratic shifting of the automatic transmission. The ratio of the rear axle and transmission shall be geared to maintain a 65 MPH reasonable speed for inter job transporting on expressways without exceeding recommended engine R.P.M. of approximately 2100 to produce the most fuel-efficient unit possible without excessive engine R.P.M. and premature wear.

Pennsylvania Department of General Services PCID No. 1075, "*General Requirements for Bidding PennDOT Vehicles/Equipment*", most current version effective at the time and date of bid opening is included as a part of this specification. PCID No. 1075 may be reviewed and downloaded from the Department of General Services website, <http://www.dgs.state.pa.us>. Delivery as required per Department of General Service PCID NO. 1075 Section "G". All units must be delivered within **270** days after receipt of the purchase order by the successful bidder.

Awarded OEM vendor shall be responsible for contacting the Specification Section of the Fleet Management Division at (717) 787-1567 to set up a pre-build meeting for all chassis and body mounting component locations prior to chassis build. Any deviations to the specification must be granted in writing by the Chief of the Specification Section, previous acceptance will not be considered pre-approved. It shall be understood that any discrepancies/deviations between the specification and the completed unit(s), chassis or body up-fitter related, must be addressed and corrected prior to the delivery deadline and the Departments acceptances.

Unit shall be delivered clean, washed, with current PA state Inspection and a full tank of fuel.

All component manuals and weight distribution sheets shall be completed and supplied with the delivery of each unit.

Department representatives will review the final design of the unit before work begins on the pilot model. The successful bidder will provide detailed drawings of the various systems, i.e. heating, electrical, hydraulic, etc.

The Department reserves the right to have its representative(s) periodically inspect each unit during assembly at the successful bidder's assembly point.

-4-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION:

The complete unit in the full mode shall be weighed to verify that each G.A.W.R. is sufficient relative to the final product presented. The chassis weight and paint body weights shall be furnished separately. The C/G of "both" chassis and paint body shall be provided by means of an engineering drawing(s) at the pre-build meeting.

It is understood that the components specified are minimum and if the truck manufacturer's Engineering Department recommends or deems necessary, due to their particular weight distribution, a larger component or a larger GAWR totally, the burden of responsibility is hereby placed upon the manufacturer's Engineering Department to supply a unit that is totally engineered.

1. Frame
2. Axle
3. Tires
4. Steering unit components
5. Rims
6. Suspension
7. Brakes
8. Any other items as required

The power package required must be compatible with respect to the engine, transmission, axles, hydraulic system, and power steering in order to meet the requirements specified herein.

-5-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION: (Continued)

The following information is required:

TRUCK FRONT		TRUCK REAR	TOTAL
	Chassis Weight		
	Diesel Fuel Gal. @ 7 LB per Gallon		
325	Truck Driver & Misc. Weight		
	Body & Related Platform Components		
	Paint Payload @ 13.0 LB per Gallon		
	Beads Payload @ 7000 LB		
	Paint operators 2 @ 250 LB Each		
	TOTAL WEIGHT		

When fully laden with fuel, striping material and operators, the chassis manufacturer's axle and total GVWR ratings shall not be exceeded, or the unit may be rejected. The unit shall meet all current OSHA standards for noise levels at platform level and the operator locations.

Vendor shall submit this information and each unit shall be weighed by a certified weigh master and signed.

Chassis _____ Front Axle
Without Paint _____ Rear Axle
_____ Total

Truck GAWR's as Built

<u>Front GAWR:</u>	<u>Rear GAWR:</u>
Axle _____	_____
Tires _____	_____
Springs _____	_____
Rims _____	_____
Brakes _____	_____

-6-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

B. WEIGHT DISTRIBUTION: (Continued)

The successful vendor shall provide two (2) decals with the above information inside the truck operator door and the height information. A copy of the decals shall be provided with each unit.

Engineering Concurrence:

This specification and all specified components must be reviewed and approved by the successful Original Equipment Manufacturer (OEM). The installation of the specified components must be approved by the successful manufacturer's Engineering Department.

CHASSIS SECTION: SUGGESTED CHASSIS ARE THE AUTOCAR ACX, MACK TerraPro OR PETERBILT 520.

C. POWER TRAIN OVERVIEW:

ENGINE

Diesel, minimum 11 liter @ 375 hp at governed RPM, minimum peak torque of 1350 LB/FT torque. If additional HP is available, it may be included in an effort to give the Department the maximum available.

TRANSMISSION AUTOMATIC

ALLISON RDS 4500 6 SPEED

REAR AXLE

DANA DT463P
MERITOR RT46 -164 -P
MACK S462

Lubricants for front axle hubs, automatic transmission and all rear axle differentials 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. All axles shall have magnetic drain plugs.

-7-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS:

1. AXLE FRONT:

20,000 lb. axle manufactures standard wheel seal
MERITOR MFS-2
MACK FXL 20
DANA D-20000F

The front axle shall be rated at 20,000 LB minimum capacity. The front axle drag links and tie rods shall have grease zerks installed. Kingpin or bushings shall be grooved to permit grease flow. Sufficient tire clearance at maximum turning angles. Complete oil seal assembly, including hub, plug type window, and seal. Each unit shall receive a front-end alignment prior to delivery.

GAWR minimum relative to Engineering Department weight distribution chart.

2. AXLE REAR:

46,000-lb capacity, air ride suspension.
DANA DT463P
MERITOR RT46 -164 -P
MACK S462

Rear axles shall be rated at 23,000 LB. each.

Aluminum or lightweight housing is unacceptable. Only heaviest duty housing will be accepted.

All rear axles must provide axle shafts with a minimum diameter of 2.19 inch at the spline. All rear axle(s) shall have an extended breather tube to prevent debris buildup from entering axle housing. There shall be a torque-proportioning traction-assist device, which is full locking within the differential housing. The device shall provide maximum traction to the rear wheels when actuated and shall be a self-relieving designed to prevent gear damage and/or axle shaft breakage under extreme service conditions. The traction-assist device shall be driver actuated by a dash mounted traction control switch.

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

Stemco guardian or SKF Scotseal, Chicago Rawhide rear wheel seals, or approved equal. All axles shall have magnetic drain plugs.

This information shall be presented at the pre-build meeting.

Cruise control shall be enabled at speeds below 25MPH (5mph-25mph).

Rear axle selection shall be made after the award and may be a mix of ratios as required. The successful vendor/manufacture shall present three (3) computer runs showing the three most likely ratios for consideration for a top speed range of 65 MPH max. Gear selections shall include probable gear selection to maintain a 15- 25 mph speed during the line painting operation.

-8-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

3. BRAKES:

Full air antilock in compliance with the most current FMVSS requirements.

Air compressor with dash-mounted gauge(s).

The air tank or tanks shall be mounted as required by the paint machine manufacturer (inside frame).

Low air pressure indicator: Buzzer-type and dash light. Must meet current Federal DOT guideline requirements. Air gauge shall display in 5lb. increments. Digital numerical readout is acceptable. Air gauge and low air warning buzzer shall operate with key switch **on** and engine **off**. Function shall not have capabilities of being deactivated by the operator.

Parking brake warning light.

Spring-type, rear wheel-parking brake, size 30/30 chambers with proper brackets to obtain the following.

Rear brake chambers mounted forward or above axle to provide adequate road clearance for paint gun carriage clearance.

Automatic air tank drain valve with heater on the (first) tank. (Ref: Bendix). DV-2 drain valves with heater. Each of the remaining air tanks shall have a manual drain valve.

Air dryer: With heater, mounted away from road splashing and a minimum of 20 inches above road surface. Dryer shall be compatible with the body company clearance requirements for sub-frame, valve body, etc. Bendix AD-IP (**No substitute, standardization**) installation made in concurrence with the air compressor manufacturer's recommendations.

Air dryer shall be placed outside of frame rail to accommodate the changing of filter cartridges without disconnecting any hoses or removing dryer base from its mounting location.

Rear brakes: 16.5-inch x 7 inch "S" cam with quick-change type double anchor pin. Meritor Q+ (**No substitute, standardization**).

Steer-axle-brake: 16.5-inch x 6 inch "S" cam with quick-change type double anchor pin. Meritor Q+ (**No substitute, standardization**).

Drum brakes shall have automatic slack adjusters and they shall be clearance-sensing type only, with adjustment on application of the brake. (**No substitute, standardization**). Backing plates shall be installed on all drum brakes.

System shall be equipped with anti-compounding valve to prevent mechanical failure of the foundation brakes, slack adjusters, etc.

4. CAB:

Aluminum or steel cab (low tilting type).

One or two-piece windshield. The windshield shall provide optimum square footage of glass to ensure operator visibility.

Drivers and passenger windows and door locks shall be powered, if available from OEM.

Seats: Driver's seat and passenger seat shall be mid-back adjustable BOSTROM Air 905 Series with lumbar support with lumbar support with body cloth insert and three-point retractable seat belt (**Seatbelts shall be High Visibility Orange**).

Driver seat shall have a left side arm rest, if available from OEM.

Deluxe fresh air hot water heater, manufacturers highest output.

Halogen headlights, all other cab lighting other than Whelen light package shall be LED.

Dual windshield defrosters.

-9-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

4. CAB: (Continued)

Dual windshield wipers: Arctic wipers and heaviest, motor, arms and linkages available. Wiper blades, maximum length, shall follow windshield contours. They shall be minimum two (2) speed intermittent. Washer system shall be electric. Washer tank shall be a minimum capacity of two (2) quarts of washer fluid. It shall be filled with an anti-freeze type solvent. Washer fill point shall be located to be accessed from ground level, without overhead reaching. With unobstructed and unrestricted flow from a one-gallon jug.

Inside dome light(s)

Grab handles shall be supplied on all cab entry locations. Three points of contact shall be achievable at all cab entry locations. Handrails shall be coated with non-skid paint (non-skid tape is unacceptable) or have OEM anti-slip rubber inserts, both non-skid paint and rubber inserts must extend the full length of the grab handle.

Exterior grab handles shall be supplied if available from OEM.

Dual inside sun visor.

Mirror(s): Electrically adjustable (powered) on both sides. 6-inch x 16-inch minimum west coast type and with heated round convex mirrors. The wires shall be fitted in such a way that the mirror glass/element can be changed by unplugging the two-wire lead. Mirrors and arms shall be stainless steel, aluminum or chrome.

Dual electric horns and air horn.

Tinted safety glass throughout AST-I.

All controls and knobs shall be properly and permanently identified.

Areas likely to be walked or stepped on shall be serrated. The size and strength shall be in accordance with the truck manufacturer's step design, but the material shall be as noted above. Step design and material shall be the same design and material on the left and right side.

The cab floor covering shall be heavy-duty rubber with closed cell rubber or heavy felt backing.

CB power connectors, one (1) pair, dash mounted. Both male/female ends shall be supplied per EQN -78.

Emergency triangle warning kit, with hold down, (fastened) in the cab.

If air ride cab suspension is available, it shall be included.

Steering wheel diameter shall be 18-inch (approx.) manufacture's standard.

AM/FM radio CD with hands free cellular connection.

There shall be a permanent decal, 2-inch-high red letters on white background affixed by the driver side door handle stating the overall maximum travel height of the completed and unloaded unit.

(Example) HT-__' __" Ref. EQN-552

There shall be a permanent decal, "Three Point Contact" located at each entry point of the truck cab and at the bed ladder(s) or any area designed for entry per EQN – 552-1. Exact location to be determined at prebuild meeting.

5. AIR CONDITIONING:

Integral air conditioner with heater. Manufacturer's highest output available.

Cab and rear shelter shall be separate systems.

6. CHASSIS:

C.A. dimension and wheelbase shall be determined by the manufacturer to provide optimum weight distribution. The main frame shall be full length, including the required AF for paint gun carriage.

License plate bracket rear.

Splash guards per EQN-66

-10-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

7. ON BOARD GREASER SYSTEM

There shall be a centralized-on board chassis lubrication system installed, manufactured by SKF Lincoln Industrial Model# 94012 (**No Substitute, standardization**) Ref: EQN-501.

8. DRIVE LINE/CENTER BEARINGS:

Main driveline: Spicer Life HDXL or Meritor MXL Series. "**Factory balanced**" greaseable, (one zerk minimum). Heavy-duty driveline shall be engineered and be compatible to engine, drive train and transmission torque. Heavy-duty center bearing, if required, with due consideration to drive shaft angles, length, location, proper bolting based upon engine and transmission selection. Inter-axle driveline: Spicer Life XL or Meritor MXL Series.

9. ELECTRICAL:

Primary wire and battery cables shall be copper, negative ground.

Batteries: Three (3), heavy-duty, 12-volt, maintenance-free, BCI Group Size 31, with stud-type posts and anti-corrosion treatment on each terminal. 2500 total cold cranking amperes (CCA) at 0 degrees F. 540 minutes of total reserve capacity at 80 degrees F as per SAE.

Battery Mounting: It shall include the following:

- a) 0.25-inch-thick rubber shock pad under the battery(s).
- b) Box with cover. Cover shall be constructed of fiberglass, poly or aluminum. If aluminum is used, there shall be an insulating liner.
- c) Mounting bolts shall be grade-8 with self-locking nuts.
- d) Kalas terminals shall be located on battery box for remote access.

All OEM connections within the battery box shall have attached non-metallic embossed labels/tags.

Labels/tags applied with self-adhesives or stickers will not be accepted.

Mounting of accessories within the battery box is prohibited. Any connections that are essential in the battery box must be pre-approved by the Chief of the Specification unit at the Fleet Management Division in writing (717) 787-1567. Any circuit deemed necessary for connection in the battery box by the body up fitter or component manufacturer shall have attached non-metallic embossed labels/tags. Labels/tags applied with self-adhesives or stickers will not be accepted.

All circuits shall be individually permanently labeled.

Cables shall conform to RCC Practice 105 with "sealed" terminal ends for stud-type battery posts. Electrical system: Circuit-breaker-equipped, in easily accessible location, weatherproof.

Alternator: Shall be a Delco (No substitute, standardization) 200-amp minimum, high performance, solid state.

Starter motor: Delco 39 MT (No Substitute, Standardization) with thermal over-crank protection and high torque capacity. Suitable for the diesel engines offered as per starter manufacturer's recommendation.

Alternator and starter mounting bolts shall be Grade 8.

Electrical system: System shall be circuit-breaker-equipped, in an easily accessible location and weatherproof. Fuses acceptable in circuit so identified by manufacturer as safety factor. Any fuse or circuit breaker liable to be damaged during truck operation shall have an easily removable protective cover. All wire splices in the cab shall be insulated with heat shrink materials

Flasher: (All) heavy-duty electrical, Ref: Tridon Model EL 12 or OEM Heavy Duty Electronic Flasher.

If an audible alarm is supplied for the 4-way and turn signal circuit, it shall have on/off capability.

-11-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

9. ELECTRICAL: (Continued)

Radio Antenna: There shall be an antenna base, PCTEL Maxrad NMO-52-360-XX-N and a VHF StiCO Roof-FT-NITI-M whip shall be cut to 18.0 inches per manufactures cut sheet. Assembly shall be mounted to the stationary headache/cab protector, (to the street side, of the light bar) with the antenna cable routed (within protective conduit) to the floor area between the seats. There shall be a minimum of 4 feet of antenna cable coiled at the base of the floor to allow for connection of radio on spreader control pedestal. Antenna shall be prewired with a UHF MALE connection. **(No substitute, standardization)**. Antenna shall be mounted to not interfere with cab shield.

Power Distribution Center: There shall be a 4-way power/ground distribution center located near the console for connection of 800 MHz state radio. The lugs shall be labeled and configured in the following manner: (1) lug shall be a 30-ampere constant hot circuit, (1) lug shall be a 10-ampere ignition-controlled circuit. (2) lugs shall be chassis ground. All connections shall be enclosed in a weatherproof enclosure: EQN-562

Electrical wiring: Chassis and body wiring harness shall be protected at areas prone to cause chafing by installing convoluted plastic conduit and clamped using steel band clamps with rubber inserts. All exposed junctions: Waterproof and sealed against salt.

10. ENGINE:

Diesel, minimum 11 liters, 375 horsepower and 1360 ft. lb. of torque.

Replaceable heavy-duty, full-flow type filter(s) and oil filter(s) as recommended by the engine manufacturer, bearing a legible OEM part number.

Diesel Fuel Filter: There shall be a DAVCO 382 filtration unit installed and mounted higher than the fuel tank per manufactures recommendations in a location to accommodate filter replacements, yet be protected from road debris **(No substitute, standardization)**.

Davco 382 Unit shall be equipped with engine coolant heat and 120-volt heater circuit. The 120-volt circuit and engine block heater shall be powered via the same electrical connection. **(No substitute, standardization)**.

Cooling system: The system shall be the largest factory engine cooling capacity, compatible with engine and transmission referenced for continuous high engine output under extreme temperatures and/or operating conditions due to prolonged operations in low gears. The water pump shall be adequately sized to provide proper cooling and be of sufficient size, to adequately handle the specified options. Shall be fitted with provisions for visually monitoring coolant without necessitating removal of the cap from the radiator or expansion tank (e.g. sight glass, transparent expansion tank). The antifreeze solution shall meet all applicable EPA requirements.

Radiator core and shell: Shall be manufacturer's heaviest construction grade radiator available.

The oil dipstick must have tubing and dipstick of sufficient length to provide reasonable access.

Coolant filter: Sized for and compatible with the cooling system and non-charged.

Air Cleaner: Air filter shall be manufacturer's heaviest duty air cleaner that meets all the requirements of the extended engine warranty.

Fan: Auto/manual controlled fan as per manufacturer's recommendations.

Cooler guard: Mounted in front of radiator, full width, and length to protect from stones and road debris. System to be approved by engine and truck manufactures.

Engine Heater: Immersion in-block type, for cooling system, with waterproof plug, flush-mounted in an accessible location at the front/side of the vehicle, outside the cab/hood, 110 volt, 3-prong plug. The electrical cable from the heater to plug shall be one piece and waterproof.

Air restriction gauge: Flush, dash-mounted with indicator slide for engine air cleaner, RE: FILTER MINDER, manufactured by Engineered Products Company. If the vehicle is OEM equipped with an electronic dash that incorporates an air restriction gauge or indicator light, it shall be acceptable.

-12-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

10. ENGINE: (Continued)

Cruise control: Factory and capable of being set to low speeds of 5-20 MPH.

Governor: Set at manufacturer's recommended maximum engine speed (rpm).

ECM shall be set to a maximum of sixty-five (65) miles per hour.

Automatic idle shutdown shall be set to five (5) minutes. An audible warning alarm shall be provided to alert operator prior to engine shutting down.

Hoses: Cooling system hoses under 1-inch OD may use factory-standard hose clamps as a minimum acceptable standard. Air intake hoses shall be 0.25-inch minimum thickness, molded hoses. Ref: GATES, GOODYEAR or equal. Silicone radiator and heater hoses.

Drive belts: Cog belts, or serpentine.

SAE #1 engine bolt circle to accommodate transmission specified.

Engine Alarm System: High temperature, low oil, and low water level shall incorporate a bell and light system.

Engine shall be equipped with a minimum 3 stage, full engine compression brake, Brake lights shall activate when engine brake is activated Ref: Jacobs.

11. EXHAUST:

Vertical tailpipe with elbow and muffler system or approved horizontal muffler and vertical tail pipe with elbow.

Chassis exhaust shall be directed away from air compressor air intake. Outlet elevated or directed to driver's side, not to exceed 11 feet 6 inch in overall height.

The muffler/DPF and tail pipe shall be shielded or insulated to protect personnel from burns when entering or exiting the cab and platform area. The shield shall be 180 degrees to 360 degrees and shall be of non-rustable material such as stainless steel or aluminum.

12. FAST LUBE OIL CHANGE SYSTEM (FLOCS):

This FLOCS system shall be installed with all fittings, brackets, clamps and hoses. Hose from oil pan to FLOCS fitting shall be hydraulic hose with a 100R2 rating and properly secured. The system shall be compatible with all fittings presently used by the Department. The final placement of the male half of the snap coupler, on the equipment, shall be determined at the pre-build meeting. Ref: EQN-351A.

There shall be a "FLOCS connections" decal to direct the operator.

13. FRAME AND FRAME EXTENSION:

The Resisting Bending Moment (RBM) shall be a minimum of 1,000,000-inch LB per rail, for the entire length of the frame including any frame liners, except where engine and radiator adjustments are required. Frame material shall be of at least 110,000 PSI yield strength. (Drop frames are not acceptable).

Minimum frame RBM shall be approved by manufacturer's Engineering Department.

Main frame and any required liners shall be either straight channel or offset channel, full length. No welding shall be done, and no holes drilled on the main frame rails without approval of the frame manufacturer.

There shall be no front or rear frame extension. Bolt-on or welded extension will not be accepted. The vendor shall select main frame rails of adequate length to suit the body/platform.

Front bumper shall be steel. Bumper shall be directly mounted to the frame.

-13-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

14. INSTRUMENTATION:

All instruments illuminated and dash-mounted except where specified otherwise.

All standard instruments shall be supplied, including but not limited to the following:

Gauges: Oil pressure gauge with warning light or audible alarm.

Air pressure: gauge(s) for dual circuit, dual indicator with low-pressure audible alarm.

Coolant temperature: with warning light or audible alarm.

Transmission oil temperature: for automatic transmission only, with warning light or audible alarm.

Hour meter that records only when the engine is running, Ref: DATCON or equal shall be readable from the driver's seat.

Speedometer with odometer.

Digital speedometer shall be mounted on driver's left side corner cab post.

Tachometer

Voltmeter

Parking brake indicator light.

15. PAINT:

Cab shall be painted with OEM manufactures standard painting process PENNDOT yellow Ref: DuPont F9885, PPG 85246, Sherwin Williams 73266, Sikkens 4017 and NAPA 73266 for shade only. Entire cab except for glass, rubber and those metallic accessories or fixtures constructed of rust-resistant (Aluminum and Stainless Steel) or plated material not normally painted. Base coat and clear coat. Ref: Axalita Imron for durability

OEM frame, front bumper and all underside components, manufactures standard procedures shall be acceptable, all underside and attached components shall be ground to eliminate weld splatter, scale, sharp edges, rust and oils prior to a rust preventive primer and topcoat of black paint. Powder coating is acceptable.

16. SAFETY:

Grab handles shall be supplied on all cab entry locations. Three points of contact shall be achievable at all cab entry locations. Handrails shall be coated with non-skid paint (non-skid tape is unacceptable) or have OEM anti-slip rubber inserts, both non-skid paint and rubber inserts must extend the full length of the grab handle.

Exterior grab handles shall be supplied if available from OEM.

ECCO 450 grommet mounted back up alarm, no substitute, standardization.

All steps shall be serrated. The size and strength shall be in accordance with the truck manufacturer's step design. The outer step edge must be serrated in lieu of plain, smooth metal edge.

Top of the first Step shall be approximately 21 inches above the ground.

There shall be one (1) warning light mounted on a pedestal just aft and above cab. Light shall be visible for on-coming traffic. Mini light bar to be wired in conjunction with front (grill), side (middle of deck) and rear (Shelter) warning lights. The lights shall be per EQN-120Q (with hole in bracket for mounting of Department State Radio).

Triangles, storage box and bracket shall be included Ref. EQN-66A.

Conspicuity requirements per EQN-127A.

Wheel chocks shall be provided and mounted within easy reach. Per ENQ-82

Fire extinguisher: Rechargeable with vehicle mount and shall be mounted in the cab or externally in close proximity to the chassis cab (if external, it shall have a red weatherproof cover) for easy and quick access. Ref: 3A:40B: C.

-14-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

17. STEERING:

Power steering: Dual integral or single integral types hydraulic with right wheel power assist cylinder. With stops to prevent damage to system.

GLIDECOAT steering shaft or equal.

Steering system (e.g. flow, pressure, relief valve etc.) shall be selected considering the full front axle loading. Ref: ROSS, SHEPPARD or TRW gear assembly.

Hydraulic supply pump: Vane type or roller type, with sufficient oil flow to permit one (1) steering wheel revolution per second, in a "park" condition.

Power Steering Reservoir: "Remote-mounted", and factory-mounted, minimum two- (2) quart capacity, incorporating a filter, which is easy to remove and replace.

18. TANK - FUEL:

Safety - type fuel tank(s) as per the requirements of FMVSS.

100-gallon minimum total usable capacity, single, mounted tank Cylindrical shaped with formed sump.

Aluminum or stainless steel unpainted.

Tank mounting hardware and brackets shall be stainless or aluminum heavy duty brackets with rubber gaskets.

Dual tanks are unacceptable.

19. TRANSMISSION: See POWER TRAIN OVERVIEW for acceptable transmission.

The transmission must be capable of maintaining a constant speed of 5 to 20 MPH without up shifting or downshifting.

Console control shall incorporate all hold identifications.

Oil cooler for transmission as required due to prolonged transmission converter operation in second gear, maximum cooler size must be provided to keep oil at acceptable operating temperature. (Water to oil type cooler).

Automatic transmission cooler lines shall be stainless steel.

The transmission and rear axle shall be geared to provide a road speed of up to 65 MPH.

The truck transmission and rear axle shall be geared for efficient operational speeds of between 5 and 20 MPH at a maximum grade of 15%. The transmission hold system shall be furnished to provide these operational speeds without the transmission over shifting and seeking a new gear as these needs vary regardless of highway gradient.

Transmission shall require a brake application to shift into any gear from neutral with parking brake in the "OFF" position. Transmission shall stay in gear while parking brake is set to "ON" for a "Pull Test".

-15-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

D. VEHICLE COMPONENTS: (Continued)

20. WHEELS/TIRES:

The truck/s shall be equipped with Accuride 10-hole hub piloted steel disc wheels for radial tubeless tires front and rear.

The wheel end shall be equipped with outboard cast brake drums.

All tires will be radials (straight Tread, Steering type) minimum 25/32 tread depth, no substitute.

The front tires shall be 425/65R22.5 (Load Range L) while satisfying all OEM requirements.

The rear tires shall be 11R22.5 (Load Range H) while satisfying all OEM requirements.

Truck and Body Company shall ensure proper sized tires and wheels for GVWR provided.

Wheels shall be painted grey, white or argent in color.

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 dual and the brake drum and between the inner and outer duals.

21. COLLISION AVOIDANCE SYSTEM:

There shall be a CAS installed. Monitor 7-inch LCD color monitor min. shall be cab mounted.

Camera shall be mounted on the rear of the truck. CAS shall be weatherproof and have low light vision. Ref: MS Foster & Associates, Inc. 1-219-879-9925 or msfoster@msfoster.com

-16-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW:

1. PAIN T:

Body up fitter prior to painting **all** body and upfit attachments shall be ground to eliminate splatter, scale and sharp edges. All metal surfaces shall be cleaned to eliminate rust and oils prior to primer and final painting.

The complete machine and all components, including tanks, compressor, etc. above the platform shall be primed and painted, except for glass, rubber and those metallic accessories or fixtures constructed of rust-resistant (Aluminum and Stainless Steel) or plated material not normally painted shall be coated with one (1) coat of a rust preventive etching primer, (1) coat of epoxy primer and two (2) coats of the body up fitters lead free Acrylic urethane yellow paint. shade Ref. DuPont F9885, PPG 85246, Sherwin Williams 73266, Sikkens 4017 and NAPA 73266.

All components below the platform shall have (1) coat of a rust preventive etching primer, (1) coat of epoxy primer and two (2) coats of the body up fitters lead free Acrylic urethane gloss black paint to match chassis frame.

Aerosol can touch up paint and primer will not be accepted and will be rejected at the time of delivery inspection.

2. PLATFOR M:

The vendor shall supply and install on the chassis a steel platform of adequate size to accommodate all relevant equipment. The platform framing shall be constructed of a minimum 4-inch steel structural channel to support all required equipment mounted on it, spaced on approximately 16-inch centers. The spacing of these cross members shall not exceed 17 inches.

The platform shall be supported by two (2) structural steel "C" channel. "U" bolts or grade 8 bolts with self-locking nuts and two (2) shear plates shall be utilized to secure the platform to the truck chassis frame. Mounting practices in accordance with N.T.E.A. standards.

The platform shall be fabricated to provide adequate spacing for servicing and maintenance of the paint supply lines, fittings, and valves. Spacers utilized between the truck frame and body longitudinal shall be manufactured to support a fully loaded platform without flexing or twisting.

The platform ladders and handrails shall be steel. The platform shall be a minimum 8 GA non-skid steel safety tread surface. All handrails shall be covered with anti-skid paint. A minimum of four (2 per side, 1 front side and 1 rear side) ladders shall be furnished to provide easy access to the platform. Ladders shall be steel. The outer step edge must be serrated in lieu of plain smooth metal edge. Ladder/s safety chain shall be no more than 72 inches from ground level. (Ladder location to be determined at pre-build meeting).

There shall be a permanent decal, "Three Point Contact" located at each entry point of the truck cab and at the bed ladder area per EQN – 552-1. Exact location to be determined at prebuild meeting.

Rear wheel fenders, aluminum, for protection of the rear axle tires, shall be affixed below the platform. Fenders shall be constructed in accordance with the Commonwealth's vehicle inspection requirements.

A 1-1/4-inch minimum steel square railing shall be installed around the platform where necessary and bolted in place. The height of the railing shall be a minimum of 42 inch. Railing shall be properly supported (e.g., plates and/or gussets) at its base to eliminate flexing of the deck.

-17-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

3. BUMPER - REAR:

The rear bumper shall be a minimum of sixteen (16) inches wide and extend across the rear of the truck platform. It shall be mounted to provide adequate road clearance and have a steel open grip strut surface. The bumper support shall be at least 4-inch x .1875 inch-channel steel on both sides and the bumper should be of (minimum).250-inch-thick steel channel with welded end section forming a strong box section. Piping shall not extend below rear bumper.

A spring-loaded break away step to maintain 21 inches from ground to top of the rear bumper tread on level surface shall be incorporated to the rear bumper Ref. Sauber MFG CO Safety Swing Step.

4. TOOLBOX:

Three aluminum weatherproof, lockable toolboxes, 16-inch x 19-inch x 18-inch (approximately) shall be supplied. The boxes shall have a drop door with a safety latch. A fourth box 21-inch-deep x23 1/4-inch-wide x 7 3/4-inch-high shall be located under the rear shelter step, with a drop door and a sliding tray. Any special tools needed for adjustments or disassembly of the various machine components shall be furnished in these boxes. Final locations of these toolboxes shall be decided at the pre-build meeting.

5. ROPS REAR SHELTER AND EQUIPMENT:

All units furnished under this specification must meet A.N.S.I. and O.S.H.A. Safety Standards required for this type of equipment.

A Roll-Over-Protection (ROPS) Certified (S.A.E. Standard J1040 APR 88) rear operators' enclosure, with no less than two (2) entry / exit doors, shall be provided that will completely house the operators and the operators' controls. Certification of the enclosure for the full chassis GVWR and meeting the latest amended requirements of S.A.E. Standard J1040 APR 88, must be submitted with the bid.

The enclosure shall be approximately 96 inches in width and 69 inches in depth, with an overall maximum height of 11' 6" from ground level (no roof-mounted accessories). The enclosure shall be of formed aluminum, welded modular construction, utilizing 10-gauge sheet. The roof and walls (except where safety glass is specified) shall be two-layered with an air space or insulation in between and shall be reinforced with an extruded aluminum channel section. The enclosure shall be securely bolted to the rear of the platform and sealed weather tight.

Inside bulkheads and roof shall be insulated. (Ref. D B Engineering "tan" cab insulation, Tel:(214) 484-8890, or equal. All edges shall be sealed with a silicone sealer.

Vinyl-clad foam insulation shall be installed on the interior of the cab for both insulation and sound deadening properties. In addition, the floor of the cab shall be clad with a thick rubber mat for sound suppression.

All windows shall be tinted safety glass AST-I with rounded corners for strength and safety. All windows shall display proper identification marks. Square corners will be unacceptable for this application. Plexiglas bubble windows shall have their upper surfaces tinted as dark as possible. All fixed window panels shall be mounted using continuous, vibration-proof rubber grommet.

There shall be two sliding safety glass windows, double track in the front approx. 18-inch-wide and 24-inch-high, of the enclosure, and two in the rear approx. 29-inch-wide and 24-inch-high, located directly in front of, and behind, each operator's station for ventilation.

There shall be a vertical double track sliding windows located directly beside each operators' station, centered, approximately 33-inch-wide and 54-inch-high.

-18-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

5. ROPS REAR SHELTER AND EQUIPMENT: (Continued)

A plexiglass bubble window shall be installed on each outside of the enclosure adjacent to the operator's seat in upper and lower tracks capable of sliding forward or backwards for viewing the spray guns. A flat safety glass window approximately 17-inch-wide and 54-inch-high to be installed on each side to the front from the vertical window of the shelter.

Front and rear access doors must be waterproofed and lined with bulbous weather stripping.

There shall be a sliding front access door centered to paint deck, top shall be protected to prevent leakage.

Rear hinge door shall be centered in rear of cab with holdback.

Control panel shall be located centered and to rear of ROPS post to afford a walkway to the front of shelter.

Rear of control panel shall provide quick access.

There shall be a shelter operated emergency paint shut-off for the paint supply.

Seats: Two (2) shall be high back adjustable with lumbar support with body cloth insert and two-point retractable seat belt (**Seatbelts shall be High Visibility Orange**). A bellow-type protective skirt shall cover the seat air suspension mechanism. There shall be one armrest for left/right side, mounted to the inside shelter wall at each window. The seats shall be able to swivel so the operator can turn to the left or right, and lock at 1/4-inch intervals. REF. National Captain 2000 Series or BOSTROM equal.

Floor mount, tilting and telescoping steering column shall be located for each operator. Steering column shall allow all adjustment via foot pedal at floor level. Both steering wheels shall include a steering knob. The power steering control and all hoses shall be located under the shelter platform floor.

Switch controlled dome lights shall be installed over each operator's station. Night lighting shall be provided in the cab. The control center shall be lit in addition to an overhead dome light.

There shall be an AM/ FM weather band radio with CD player and audio jack and two speakers in the shelter.

C.B. power connectors: (2 pair) in rear operator's cab per EQN-78. (CB shall not be supplied).

The cab shall be cooled by a wall mount air conditioning unit powered by the diesel auxiliary engine or the chassis engine. The air conditioner shall have a minimum rating of 25,000 BTU with R134 refrigerant and heated with a minimum 40,000 BTU heater with duct work to both operators.

Heater with fan shall be provided with controls in the paint operator area. A summer by-pass valve shall be provided to eliminate heat in cab in summer months. Hoses shall be protected against burst; hoses shall be covered with hose sleeving (full length of hose) to protect operators against burns from hose rupture. Silicone heater hoses shall be utilized with constant velocity spring type hose clamps.

Heater shall be copper cored and have sufficient BTU output to keep this area comfortable.

The steps entering the rear shelter, from the rear step bumper shall be approximately 7 inches deep.

There shall be a permanent decal, "Three Point Contact" located at each entry point of the truck cab and at the bed ladder area per EQN – 552-1. Exact location to be determined at prebuild meeting.

Grab handles shall be supplied on all cab entry locations. Three points of contact shall be achievable at all cab entry locations. Handrails shall be coated with non-skid paint (non-skid tape is unacceptable) or have OEM anti-slip rubber inserts, both non-skid paint and rubber inserts must extend the full length of the grab handle.

Exterior grab handles shall be supplied if available from OEM.

Rear panel of shelter and rear bumper shall have Chevron decal added Ref. EQN-122

FIRE EXTINGUISHER SYSTEM:

There shall be four (4) strategically placed rechargeable dry-chemical 10 ABC-rated fire extinguishers (1 per I.D.17 and in or within close proximity to the rear shelter) with charge condition indicator gauge.

Extinguishers shall be in compliance with NEPA #385 and federal motor carrier safety regulation.

If mounted on the exterior they must be protected with removable red waterproof covers for easy and quick access.

-19-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

6. INTERCOM SYSTEM: (Continued)

DAVID CLARK MODEL #9900 INTERCOM SYSTEM (No substitute).

A David Clark Model 9900 intercom system shall be provided in apparatus, it shall be the sole responsibility of the successful vendor to ensure compatibility with the Department's Radio system, the system shall be interfaced and include all cables and hardware needed to be completely operational with the Departments two-way radio system before delivery. (Note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way). For information on the department's radio system contact the Fleet Management Division at (717)783-2889.

HEADSETS & Belt Stations FOR DAVID CLARK SYSTEM

The intercom system shall include:

Four (4) model H9940 under-helmet radio transmit headsets shall be furnished for the system seating locations in the cab. The headsets shall have M87-type noise-canceling microphone, immersion-proof, all hardware marine-grade stainless steel, and Dynamic earphones with stainless steel retainers, adjustable head strap, and a hybrid-style boom which rotates for left or right placement. The intercom headsets shall have adjustable volume controls in both ears. The sets shall also have comfortable gel ear seals. All users shall have a U9910-BSW, VOX Intercom belt station, with radio PTT function, and easily accessible battery compartment with removable Li-Polymer battery.

One (1) model H3492 single-ear headset shall be supplied, to be used by the driver.

System Wireless Gateway

The system shall have a U9922-G38 wireless gateway capable of hands-free, full-duplex intercom. The gateway shall provide a range of up to 300 feet (line-of-sight) to all linked Belt Stations. The gateway shall be capable of radio interface, provides radio monitor and transmit capability for all wireless users. Shall have (2) SMA Antenna connectors for whip antenna, or remote antenna connection.

Wired Station / Radio Interface:

The U3800 **wired** Master Station accommodates up to (2) wired headsets that communicate with the wireless headsets via the U9922 Gateway to be installed in the cab of the truck. The U3800 Master Station is to include one U3815 radio interface module to allow two-way radio interface, one C3821 Radio interface harness, and one C3820 power harness. (Note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way).

Battery Charging System

A 12V DC charging unit, 4-bay, shall be provided capable of accommodating up to 4 each 3.7V Li-Polymer batteries, used in Series 9900 Belt Stations. The charging system will provide constant thermal monitoring of battery thermistors, and LED indicators for individual visual charge status. There shall be four (4) additional batteries supplied as backups while one set is being charged. Charger shall be mounted in rear shelter.

-20-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

7. GUIDANCE SYSTEMS:

An optical sight shall be mounted inside of the chassis cab. The sight shall include the necessary light source, lens system and mirrors to project a virtual image of a luminous sighting pattern onto a distant target. A housing, mounting and adjustment linkage shall be provided for positioning and clamping the optical sight in the best location for the vehicle operation. Two (2) pair Glasses to improve/enhance visibility.

LASER DOT GL-3000-P on cab roof. There shall be supplied a GL-3000-P Laser System using an ultra-high visibility green laser to establish visual line control for the paint striping machine. The operator adjusts the laser spot to the desired reference point on the road via a remote-control panel located in the cab of the truck. Ref: MS Foster & Associates, Inc. 1-219-879-9925 or msfoster@msfoster.com

The laser, all optics, mechanical mechanisms, and electronics shall be located in a rugged, weatherproof housing that is typically mounted to the roof of the truck. This permanent installation shall eliminate the need to remove the laser at the end of the day. Two cables shall run from the laser housing, one for 12V DC power, the other for system control in the cab. Roof mount shall be designed to support laser without negativity weakening the structural integrity of the chassis cab roof.

8. CONTROL CENTER:

Aluminum or steel control center shall be provided. The control center shall be mounted inside the rear shelter in a manner to allow ample access for servicing and repair.

Control panel shall be mounted in an inclined position, so that it can be observed from either operator's position.

Each gauge and valve on the control panel will be identified with a photosensitive label, metallic type and/or engraved laminated plastic.

A removable plate shall allow access to the interior for service; it shall tilt outward via a piano hinge.

A 125 PSI safety valve shall be located on the rear of the panel air manifold.

9. SPRAY EQUIPMENT CONTROL BOXES:

The spray equipment shall be electrically controlled by means of solenoid valves and individual toggle switches.

The switches shall be mounted in a portable control box at each operator's position.

The holder shall be made of material to withstand heavy use.

The entire switch assembly shall be removable from the control box holder for servicing and is attached by a pin connector type harness (phone jack type plug) to an electrical junction box.

Control box shall be mounted with ball and socket system near the steering wheel at each operator's location, two (2) on right side. Ball and socket shall be mounted to the side of the shelter ahead of the vertical window and allow adjustment of control box without any hand tools.

Each striping machine supplied shall be provided with one additional control box for use as a spare.

A plug, coiled cord and thumb-button control for manual restriping shall be provided at each location.

Wiring harness shall be connected to control boxes by means of a male, female type connector (phone jack type plug) for quick replacement of control boxes, two (2) connections at the right side.

All line pattern combinations skip line mechanism actuation and skip line combinations can be obtained by activating only one switch that also simultaneously activates or resets the skip line mechanism.

-21-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

9. SPRAY EQUIPMENT CONTROL BOXES: (Continued)

The remaining toggle shall be an off switch (master), connected in such a way that when activated, it will turn off and cancel any of the above selected patterns, as well as automatically reset the skip line mechanism to a ready position. Provision shall be made so that sphere gun(s) may be controlled by activating a switch on the portable control box for independent and/or simultaneous binder and glass sphere operation.

There shall be a pin connector type harness (phone jack type plug) on the right side to connect the control box from the left side for the capability to operate the left side carriage patterns from the right-side operator seat.

There shall be a bracket on the right side to mount the left side control box above the right control box for operation when there is only one operator in the rear shelter.

10. ELECTRONIC SKIP LINE SYSTEM:

The electronic skip line system shall be the most current version available from Skip Line Inc.

Two skip line systems shall be included in the striping unit that will allow remote application of various pre-selected line patterns on the fly.

NOTE: SKIPLINE SHORT & LONG FOR BOTH SIDES SHALL WORK INDEPENDENT OF EACH OTHER.

Digital speed meter system: A digital speed meter shall be included on the striping unit that will allow the truck operator to read his speed in three digits to aid him in maintaining a desired speed.

It is the stated intent of this specification to describe a highly reliable, easy to use, simple to install, compact skip-setting mechanism that requires little or no maintenance and no clutches, cams, gears, bearings or devices that must be adjusted while at rest.

For high reliability the skip-setting mechanism shall be all electronic and shall utilize solid-state components for all active internal functions. It must process electrical pulses derived from the vehicle motion sensor and must drive 12-volt 1 ampere solenoid valves.

Inductive arc suppression, electronic current limiting, and thermal shutdown shall be included for each solenoid driver. Solenoid drivers must be capable of being programmed to detect and report wiring faults and short circuits.

All guns shall be operated by applying a ground signal to activate them.

The skip-setting mechanism must generate the selected repetitive pattern without utilizing any internal or external moving parts, except operator adjusted switches for establishing pattern size, placement and calibration.

The skip-setting system shall not use or require use of internal or external electromechanical relays. There shall be one switch each for the CYCLE LENGTH adjustment, and the STRIPE LENGTH adjustment. Switches with thumbwheel or push-button type selector switches shall not be acceptable. An index switch shall allow the operators to have a cycle start with the paint portion first or the skip portion first.

There shall be one push button switch for each paint line on the vehicle.

There shall be one toggle switch to turn off the glass BEAD guns without turning off the PAINT guns.

An alphanumeric display shall be provided to display stripe and cycle settings.

Said display must be capable of concurrently displaying at least 48 characters of text or digits. The display must be a liquid crystal type, with industrial temperature range fluid, and back-lighting.

-22-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

10. ELECTRONIC SKIP LINE SYSTEM: (Continued)

All indicator lamps must be solid-state light-emitting diode types.

To conserve space and weight, each skip-setter shall be no larger than 7 1/2" X 7 1/2" X 3 1/2" excluding dials, switches and connectors; and be of the die-cast metal type box, and weight no more than 5 pounds. The skip-setter must have master pattern length controls with adjustable offset for paint and beads.

To conserve power the skip-setter must draw less than 1 ampere at 12 volts for internal circuits, excluding gun solenoid current.

For ease of operation the skip-setter must have direct reading digital dials and must provide pattern capability from 1 to 999.9 ft., adjustable by 0.1 ft. increments at any time whether at rest or in motion, without generating spurious patterns. When changing patterns, simple dial changes must suffice without resorting to "data complete" or "enter data" type controls. Also "start" indexing (reset to zero) must be instantaneous.

To aid in registration of new paint with previously painted patterns, the "ADVANCE" or "RETARD" (phase correction) system must alter the pattern length no more than plus or minus 20% while activated (not more than every fifth motion sensor pulse shall be added or omitted), and the system MUST be provided with a means of AUTOMATICALLY adjusting the Cycle length by .1 foot increments if the ADVANCE or RETARD control is invoked repeatedly.

Basic electrical accuracy of the skip-setter (excluding response time of customer supplied solenoids and paint guns) shall be within 0.2 ft. for any combination of the following factors:

1. Speed from one to forty miles per hour.
2. Supply voltage from eleven to sixteen volts D.C.
3. Temperature variations from 0 to 60 degrees Centigrade.

Calibration must be provided to ensure that control dials agree with actual electrical output patterns. Calibration shall be done by driving a known distance and adjusting the odometer to equal the distance that was driven.

To reduce glare skip-setter shall be finished in flat black with a black front panel.

The motion sensor shall be an electromagnetic type which generates or modulates electrical pulses in conjunction with travel of a load-bearing vehicle wheel (one pulse with each approx. 0.1 ft. of vehicle travel). The motion sensor must require no lubrication.

BUILT IN PERFORMANCE MEASURES

The skip-setting mechanism must have the following Built-in Performance Measures

Footage counters for each paint gun separated for SOLID and SKIP

Odometer for distance measuring and total job distance

Totalizer of all guns separated for SOLID and SKIP

Calibrated Stroke Counters for calculating gallons used.

(Stroke Counters apply only to "positive displacement" pump systems.)

All functions shall be individually reset-able

-23-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

10. ELECTRONIC SKIP LINE SYSTEM: (Continued)

All Performance Measures data shall be retained by means of non-volatile RAM to ensure indefinite retention of all programmed information regardless of power loss to the controller. Ram chips shall not require batteries to save information. The skip-setter must be capable of outputting all performance measures to a printer, or a laptop computer as follows:

Time and Date

Spaces for entry of Job #, Highway, and Milepost

Footage counter data for each paint gun separated for SOLID and SKIP

Odometer for distance measuring and total job distance

Totals of all guns separated for SOLID and SKIP

Gallons used based on strokes of a positive displacement pump.

ADDITIONAL SPECIFICATION:

The skip-setter must meet all above specifications and in addition provide a means to compensate for registration errors between paint and beads. Controls must be provided on master control panel of skip-setter to independently activate "paint" and "beads." Separate controls must be provided to individually register leading and trailing ends of the bead pattern.

Control Panel, Solenoid driver, optional printer, and optional large-digit speedometer must each communicate into a serial RS-485 network environment, using simple data cables of 6 conductors or less. Solenoid drivers must utilize latching plugs with individual setscrews for each solenoid output connection.

The signal source shall be a logic level pulsating unit driven by the driveline. The 12 VDC power for the system shall be provided by the truck alternator and be separately fused.

11. Data Logger:

The most current version data logger available shall be installed.

The data logger subscription shall be set to activate April 1st unless it is mutually agreed to for a different date to coincide with delivery of the completed unit.

1. The Data Logger system shall connect directly to the Skip-Line brand Serial Timing System without additional wiring to the solenoids.
2. The Data Logger system shall utilize wireless communications from the peripheral sensors to the Data Logger.
 - a. Wireless system used for ease of installation wiring, reliability, interchangeability.
 - b. Only 12-volt power supply is required.
3. Each Data Logger will include all hardware and software needed for full operation to enable remote upload of all data. The system is not to be activated for remote viewing prior to delivery to the field. The receiving location, at their discretion, will be responsible for system activation and all subscription fees to enable a fully remote operating system. Upon activation the system will send live data to a secure hosted internet site for collection, storage, mapping, and report generation / viewing / file download:
 - a. All data shall be password protected.
 - b. Secure web-based back-up storage retention.
 - c. Records can be stored indefinitely on the truck, pending viable cellular coverage areas.
 - d. Mapping capability allows for web-based visual display of patterns painted, material usage, and application rates per section.
 - e. Exception reporting for each section can be selected and printed.
 - f. All reports can be saved or printed for future reference.
 - g. Summary reports for end of day, job, week, month, year, are easily selected.
 - h. Data from contractors can be required in compatible format for comparison and inspection.

-24-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

11. Data Logger: (Continued)

4. Without activation, system will store data in database format, capable of creating reports including the following parameters:
- a. Total distance painted per pattern, per color, per side of the vehicle.
 - b. Total gallons used per color.
 - c. Total pounds of beads used.
 - d. GPS coordinates and heading of each pattern change as well as regular interval reporting.
 - e. Average vehicle speed while painting.
 - f. Application rates per section:
 - i. Gallons per mile (wet mil. thickness) per color.
 - ii. Bead Pounds per gallon. (Pounds per mile, pounds per 100 sq. ft.)
 - g. Metric / U.S. conversion
 - h. Start time / Stop time, Date
 - i. JOB name or number (Road number, route, section etc.)
 - j. Calibration numbers for distance, gallons counts, etc. (All calibration numbers should be checked and verified regularly.)
 - k. All reports capable of export to Excel (.xls) format via USB flash drive (thumb drive).
 - l. All reports capable of export to CSV data format compatible with ESRI (GIS) import requirements.
 - m. Data to be stored (sensors installed): will include the following.
 - Average AMBIENT temperature
 - ii. Average ROAD temperature
 - iii. Average PAINT temperature per color
 - iv. Average RELATIVE HUMIDITY
 - v. Average DEW POINT
 - n. Data to be manually entered by operator
 - i. Paint batch number (per color)
 - ii. Bead batch number
 - Direction of painting
 - iv. Notes
 - v. Other parameters as required

5 The Data Logger will include a laptop mounted in the rear paint control cab, to show the operators the following:

- a. Real-time application rates
 - i. Gallons per mile (per color/per gun)
 - ii. Wet mil. Thickness (per color/per gun)
 - iii. Bead Pounds per gallon.
- b. Vehicle speed
- c. Tank volumes, and/or amounts used.
- d. Time and Date
- e. All sensor data.
- f. Operator input of JOB names/numbers.
- g. Operator input of manual data
- h. Operator entry of gun application width (For mil thickness calculations).

-25-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

11. Data Logger: (Continued)

6. Additional equipment:

- a. System will have a second monitor for remote viewing; a tablet shall be installed in the chassis cab in a location that will allow the operator to clearly view the stripping operation information and data.
- b. Include an on-board printer capable of printing data reports on 8.5" x 11" plain paper for daily printouts, installed in the rear shelter.

12. SPRAY EQUIPMENT:

The paint spray guns shall be Kamber Model 50-A airless type, capable of processing paint in quantities which will yield a 4 inch and 6, 8 inch (adjustable on the fly) wide line of 0.015 inches (15 mils) wet film thickness and be put down at speeds of 5 to 20 MPH, 15 MPH being the target speed.

The paint guns shall have an air powered opening and air powered closing with a spring assist of the gun with a built-in exhaust port on the gun to ensure immediate and complete shut off of the gun. (No exceptions) This guarantees a flat beginning and end to the line.

Each paint gun shall have two (2) tips supplied with each truck

- 163461 for 4-inch, total of 12
- 163661 for 6-inch, total of 8

Line blowers – Shall be installed at the front of each row of guns. Manufacturer's standard.

13. PAIN T TANKS:

This machine shall have paint storage capacity of a minimum 1000 GAL in an un-pressurized container designed for two-color paint application.

One compartment baffled for yellow, minimum 600 GAL.

One compartment baffled for white, minimum 400 GAL.

The entire top of each compartment shall be painted (Tape is unacceptable) with anti-skid surface to prevent foot slippage when wet or damp.

A serrated edge type steel tread stepladder with handrails covered in anti-skid paint (Tape is unacceptable) shall be affixed to the platform side of the paint compartment for access to the inspection lids.

Liquid Level Calibration Rod - Two inverted aluminum direct reading rods calibrated in gallons shall be provided to indicate the paint quantity in each paint compartment. There shall be provisions made to store these rods vertically for traveling with a removable paint cup catch basin.

The container shall be constructed of minimum 10-gauge, 300 series, and stainless-steel sheet.

Appropriate baffling shall be installed inside each compartment.

The bottom of the container shall be constructed of .1875-inch type 300 series stainless steel sheet sloped to allow drainage from each compartment.

The internal structure of the paint tank shall include removable stainless splash plates beginning a minimum of 2 inch from the top of tank.

The two compartments shall be fitted with individual removable top inspection openings.

Minimum diameter of the inspection opening shall be nine (9) inches.

The top of the storage containers shall be removable for ease of cleaning.

There shall be holes cut into internal baffles to facilitate pressure equalization.

There shall be 6 inch remaining at the top of the tank providing a splash area for sudden stops thus preventing paint from getting on lid gaskets or splashing on the platform.

Stainless steel formed channel, horizontal bracing shall include 10-gauge, 1.750-inch x 20 inch, gussets spaced approximately 10 inches between the formed channels, and fitted with a removable top.

-26-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

13. PAIN T TANKS: (Continued)

Provisions shall be made for recirculation of heated paint in and out of each paint heater. The system shall include stainless steel valving and gauges to regulate the recirculating flow from the rear control panel. Paint circulation shall be bottom draw top center return, paint tanks shall have a stainless-steel return standpipe with elbows to direct paint back to top center of paint tanks.

The material supply system shall be so arranged as to permit the simultaneous operation of one to four spray guns on the left carriage and one or two spray guns on the right carriage.

There shall be a shelter operated emergency paint shut-off for the paint supply.

14. PAIN T STRAINERS:

A stainless-steel strainer shall be inserted in each low-pressure paint system. The strainer shall have a cylindrical clean out with a pipe threaded sealed cap type in design and made from a #16 gauge perforated stainless steel material. The perforation shall be 1/8 inch in diameter and on approximately 3/16-inch centers (33 holes per square inch). No wire strainers are acceptable. The strainer shall be easily accessible and where necessary, valving shall be provided to isolate the strainer from the feed line for cleaning.

The strainer assembly shall be connected to the paint supply lines by means of a union coupler. Valving shall be provided to isolate the strainer from the feed line for the cleaning of all piping, strainer, valves, and clean out fittings. The intent of this submission is to ensure that the paint machine is plumbed such that: all valves are readily accessible to operators, a clean out fitting is provided at each junction and strainer clean outs are conveniently located for periodic maintenance.

At the high-pressure outlet port of each high-pressure paint pump, there shall be high capacity, high pressure paint filters, and two guns per filter.

15. PAIN T FILL / SUPPLY PUMPS:

Two air driven pumps, one for white and one for yellow shall be furnished to transfer paint at the rate of 25 GPM from the storage containers to the paint tanks on the striping unit. The pumps shall be model "Wilden" PV-800(**no substitute, standardization**). Proflow anti stall air diaphragm type using stainless steel wetted parts. The pump housing shall be of stainless steel. The pumps shall be plumbed for 1-inch pipe and equipped with Neoprene diaphragms and quarter turn bolted type ball valves.

The pumps shall be supplied with mufflers.

There shall be an additional oiler line and filter to dissipate moisture in the pump.

The Schmidt air drier be included in the air system prior to all pumps, spray and glass bead equipment.

Valve seats and clamp bands shall be stainless steel.

Pumps shall have stainless steel wingnuts included at all accessible connections available.

The pumps shall be mounted at a highly accessible location and plumbed by means of unions (barbed fittings with hose clamps will not be accepted) to provide pump repair, replacement or clean out of the suction and discharge hoses.

The quick attach system must be provided for both pumps, to be removed from both sides.

The "loading" pumps shall double as priming pumps for the heat exchangers in the paint heating system.

Two (2) 12-foot sections of 2-inch diameter suction hose shall be supplied with quick disconnect fittings, caps and plugs.

There shall be two locations for pump shut off, one (1) ground level, and one (1) on platform by tanks.

Location of pump shut off and hose storage tank to be determined at the pre-build meeting.

-27-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

15. PAIN T FILL / SUPPLY PUMPS: (Continued)

Two (2) air driven, ARO 15 GPM @ 1500 psi airless pumps, one for yellow, one for white shall be provided and plumbed to deliver paint to the spray guns.

A minimum two-quart high pressure surge tank shall be incorporated into the paint plumbing design after each high-pressure pump. This accumulator tank shall minimize any hour-glassing of the painted line on the road.

The pumps shall have means to control the paint pressure to provide the required line width and wet film thickness of .012 inch to .015 inch. When operating in the range of 10 to 20 MPH.

A grounding strap shall be installed on the vehicle to discharge any static electricity build-up from the airless pumps.

16. GLASS SPRAY EQUIPMENT:

The glass guns shall be Kamber Model 90HO, except the diffuser (shroud) shall be chrome-plated and mounted behind the paint spray guns. Glass to gun hoses shall be minimum 1-inch diameter.

Gun outlet shall be fitted with a closed spooned glass deflector with adjustable side curtains to ensure precise adjustment of beads on the paint line, thus minimizing waste of glass outside the paint line.

The closed spoon material deflector must also be equipped with a hardened steel replaceable insert (either circular or rectangular shaped) to prevent wear of the deflector at the material outlet.

The glass guns atomizing air by-pass (coupling tube assembly) must be constructed of brass (plastic will not be acceptable). This assembly must also house a filter screen to prevent glass beads from being trapped in the atomizing air system.

In order to prevent glass from migrating into the air operation chamber, the gun shall employ a dual sealing system; this shall consist of a wiper seal, backed up by a needle "O" ring. The gun must also be equipped with internal stainless-steel springs to prevent rusting due to condensation within the gun.

All gun inlets must be threaded (not soldered) to allow replacement of such parts due to wear or other damage.

The automatic sphere guns shall be capable of dispensing 35 LBS of spheres per minute with 40-60 LBS air pressure on the glass tank.

The bead guns must face rearward and be mounted in a vertical position as close to the paint guns as possible while allowing room to work on all guns.

To ensure the proper angle of entry of the glass sphere spray into all types of fast-dry paint spray and to ensure maximum sphere dispersion and retention the distance between the spray gun orifice and sphere gun orifice must be adjustable forward and rearward.

The glass guns must be equipped with an interchangeable material tip system.

Each glass gun shall be supplied with two 10mm tips for each truck, total of 10.

Tips must be constructed of hardened steel to prevent excess wear.

The spray equipment shall be controlled by means of solenoid valves and toggle switches mounted in lightweight, portable control boxes, assembled in such a manner that various standard line combinations can be obtained by one, but not more than two toggle switches. The glass guns shall be coordinated with the binder guns for simultaneous operations to provide complete coverage to the paint line as the vehicle speed varies.

An individual control switch shall be incorporated in the glass system for independent operation of each glass gun. An emergency recessed shutdown switch activating a ball type valve through an air-operated cylinder shall be mounted within the reach of each operating station, or a single system "main valve" shutdown system.

Solenoids shall be mounted in a way to provide easy accessibility.

There shall be air regulators for each individual glass bead gun mounted on the carriage with easy accessibility.

-28-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

17. GLASS SUPPLY:

One (1) A.S.M.E. pressure vessel shall be supplied having a minimum total capacity of 7,000 LBS of glass spheres.

The container shall be tested for 110 PSI working pressure; hydrostatically tested at 165 PSI. Be of all steel construction and shall have a top opening not less than 24-inch diameter. It shall be equipped with an air release valve, a 0-160 PSI pressure gauge and a 110 PSI pressure relief valve. Pressure vessel shall be piped in such a way as to ensure that total capacity can be utilized. A filter shall be sized (volume) at system requirement plus 50% to allow for quick delivery.

A vacuum glass fill unit having a minimum capacity of 250 LBS of glass per minute, under a 20 in/50cm suction lift at 20% humidity with dry beads. By creating a vacuum in the glass tank, glass shall be drawn into the tank without contaminating the vacuum unit. The glass spheres shall be conveyed under pressure to automatic glass sphere dispensing guns through 1-inch rubber pressure hoses. A heavy-duty self-evacuating oil and moisture remover shall be installed in the airline after a finned after cooler extending from the compressor to the air control center.

The glass filling system on this unit shall include a 2-inch I.D., 16-foot-long fill hose with all the necessary fittings, including quick disconnect fittings and cover caps when not in use.

Each bead manifold shall have an end cleanout plug of at least 2 inch in diameter.

There shall be a bead shut-off valve (quarter turn) at the manifold for each bead gun.

There shall be a minimum 1 1/4-inch I.D. line from compressor to jet pump to allow for increased vacuum for beads.

There shall be a bead exhaust muffler system mounted in a way, not to interfere with the spray operation and away from personnel.

18. SPRAY GUN CARRIAGE ASSEMBLIES:

Two-gun carriage assemblies shall be supplied, mounted behind the vehicle's rear wheels to support and align the spray guns.

The main carriage, mounted on the left side of the vehicle, shall have provisions for attaching six (6) single color spray guns, and three (3) glass sphere guns.

Dual pneumatic lift cylinders electronically controlled from the operator's position shall be used to raise the carriages and a safety chain shall be installed to support it during transporting. Carriage shall have automatic reverse sense to raise when transmission is placed in reverse, to eliminate carriage damage.

The heavy-duty paint carriage design shall be improved for strength/durability or placement of paint/glass guns be altered for weight distribution. Carriage shall still retain a centered single axle mount with heavy duty dual tire/wheel.

Carriages shall be open, adjusted to provide maximum ground clearance.

Trucks shall be able to paint 4 inch and 6-8 inch (adjustable on the fly) wide lines.

The cross slide supporting the carriages shall allow the carriages to be positioned for transport within the width of the vehicle platform and permit its use anywhere from this location outward for a distance of 60 inches. The slide mechanism shall consist of a square tube within a square tube telescoping design with adjustable UHMW, self-lubricating material bearing areas. The outer tubing shall contain a two-channel bearing material configuration, mounted on a retainer, which will permit adjustment as the material wears. The inner slide will have four pads of the UHMW material bolted and shimmed to its innermost slide section. The pads shall allow shimming of the pads, as the pads wear, without disassembly of the slide. Both left and right carriages shall be steering wheel controlled. Each carriage slide shall be equipped with a hydraulic cylinder for moving the carriage to any point within its operating range. The cylinder shall be double action, controlled by a power steering control, and controlled by a steering wheel with check valves.

-29-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

18. SPRAY GUN CARRIAGE ASSEMBLIES: (Continued)

Steering wheels shall be centered (side to side) with the operator's seats, and adjustable (front to back) to conveniently locate it for the operator without moving the seats forward or backwards.

Left carriage shall have two 4:10 X 3.50 X 6 wheels with heavy duty bearings, mounted on a single caster axle, at the front of the carriage. It shall support the carriage and maintain it at a fixed height from the road surface. A parallel system shall connect the carriage to a cross slide and maintain the spray guns normal to the road surface at all times.

The second spray gun carriage shall be provided and mounted on the right side of the striping unit approximately on the same lateral axis as the main carriage to align and support four (4) single color spray guns and two (2) glass sphere guns. The design of this carriage shall also extend 60 inch from the edge of the platform.

Two 4:10 X 3.50 X 6 wheels with heavy duty bearings, mounted on a single caster axle, mounted on the right front carriage and shall support the carriage and maintain it at a fixed height from the road surface.

Hydraulic power for the operation shall be supplied by a high-pressure hydraulic pump driven by the auxiliary engine. Each side is to work independently as to not create a hydraulic bind.

Stacked body, quick acting solenoid valves with a manual override feature shall be mounted on each carriage. Valves shall be equipped with balanced spool design to minimize back pressure or restriction in exhaust. The valves shall be of a one-piece aluminum design body and mounted inside a weatherproof steel box with a removable lid for servicing.

All bearings or pivots on the carriage, linkage or slide, where relative motion occurs, shall be fitted with replaceable, anti-friction bearings or replaceable bearing and pressure lubrication fittings.

With both carriages extended a span of 17 feet between the inner edges of the two lines shall be obtained.

Each carriage shall be provided with L.E.D. safety lights (amber –forward, red - rear).

Tandem guns that will turn on automatically at an operator set MPH (Front-Both-Rear).

LEFT CARRIAGE		BERM CARRIAGE		
A	A		A	AIR NOZZLES
W(6")			W(4")	PAINT GUNS
W(6")			W(4")	
Y(4")	Y(4")		W(6")	PAINT GUNS
Y(4")	Y(4")		W(6")	
G(6")			G(4")	GLASS GUNS
G(4")	G(4")		G(6")	

-30-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

19. HEATING SYSTEM - PAINT:

The paint heating system shall be capable of maintaining a paint temperature of 120° Fahrenheit at the paint spray guns, at an ambient temperature of 70° Fahrenheit.

The heat source shall be a heat exchanger which extracts heat from the air compressor engine cooling system.

The paint heating system shall include two shell and tube type heat exchangers, having stainless steel tubes, and end bonnets. They shall be 4-pass type units each having a minimum heat transfer area of 64 square feet. Individual structural steel brackets shall be provided for mounting the exchangers in a vertical position. Aluminum covers shall be provided for each heat exchanger.

A separate intermediate heat exchanger shall be incorporated into the heating system to eliminate the possibility of paint contamination in the coolant system of the air compressor engine.

The manifold shall be mounted in a vertical position and not located over any operating part of the machine so that no paint will fall on a component during the draining and cleaning of the strainers in the manifold.

Three, 12-volt, DC electric motor driven circulating pumps shall be provided. The pumps shall have a minimum rating of 25 GPM when pumping the heated water/ethylene glycol solution. The pumps shall control:

PUMP A: Circulation to the white paint heat exchanger

PUMP B: Circulation to the yellow paint heat exchanger

PUMP C: Recirculation system.

A digital thermostatic heat control shall monitor the paint temperature in each heat exchanger. These controls shall turn off or on the pump feed to the heat exchangers on the temperature setting required by the paint manufacturer. Shields shall be installed to protect wiring at heat exchangers.

Incorporated in the water/glycol system will be an expansion tank at a convenient location to either fill or check the fluid level of the system. A 14-pound automotive type pressure cap shall be used to regulate the system. An overflow tube from the cap neck down through the platform shall safely vent any overflow to the ground.

Three (3) automatic air vents shall be installed in the heating system to vent any excess air that gets trapped into the heating system. One air vent shall be in the expansion tank line and one on each heat exchanger. (MANUAL AIR VENTS WILL NOT BE ACCEPTED).

-31-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

20. PIPING / VALVES:

All plumbing on the low-pressure side shall be constructed of industrial style, stainless steel, 2" tube process-clamp type piping, fittings and quarter turn, bolted ball valves, with at least one-bolt clamp on the low-pressure side. All elbows shall be smooth 90° long radius style. Use of pipe thread fittings shall be minimized. Any high-pressure hoses will be rated to adequately provide a proper safety margin for high pressure spraying operations.

All plumbing on the high-pressure side shall be schedule 80 stainless steel threaded plumbing with full port quarter turn, bolted ball valves.

All hoses, pumps, fittings and valves that are in contact with the traffic paints shall be impervious to any petroleum based or water based solvent capable of constant pressures to 600 psi. Paint plumbing shall be stainless steel. Valves will be quarter turn ball type with Teflon seals, and valve construction on the low-pressure side shall be stainless steel with 4-bolt construction.

All piping, tubing or hosing used on the vehicle shall be firmly attached to the frame or bed, except where flexible conduits are required for proper operation or service. Non-rigid paint conductors shall be flexible Teflon solvent resistant material of at least .375-inch ID and shall be capable of withstanding pressures up to 200 PSI.

Additionally, all nipples, plugs, reducers shall be stainless. Insulated piping between the pump and heat exchanger shall be 2 inch (min). Nylon braided Teflon lined hosing shall not be incorporated. Hard pipe with insulation shall be used.

All external-atomizing airlines shall be at least .3750-inch Teflon or nylon tubing.

The pumps, hoses, fittings, valves and all components that are in contact with the marking materials, solvent trays, water tank(s) and lines shall be stainless steel and impervious to the standard paint solvents, including: (1) V M & P Naptha, (2) Acetone, (3) Lactol Spirits, (4) Hexane, (5) Methyl Ethyl Keton and (6) Water.

The paint fill supply piping shall be furnished with 2-inch quick coupler male fittings and cover caps when not in use. Two 16 feet hoses with 2-inch standard pipe shall be furnished with female quick couplers on both ends compatible, with the male fittings. Female quick couplers shall be one piece.

All paint fills shall be at curbside.

Piping valves shall be designed for quick disconnect. All 2-inch valves shall be a full 2-inch inside dia.

Pipe threads shall be sealed with a soft type thread sealer to ease separation during service.

Quick disconnect connectors shall be utilized at the carriages.

21. AIR COMPRESSOR

The air compressor shall be a Boss DUS unit capable of supplying at least 250 cubic feet of free air per minute at 100 psi.

All containers shall be A.S.M.E. approved for 100 psi working pressure. All necessary safety valves, piping and fittings shall be included.

The compressor engine shall be diesel powered, liquid-cooled, four-cycle, four-cylinder, overhead valve construction, heavy duty industrial type. It shall include as standard equipment: a fin-tube type radiator, lubricating oil filter, 12-volt electrical system, pushbutton starting, and recommended air filter to be shared with the compressor air intake. The air compressor engine and chassis engine shall have a common fuel tank.

The compressor shall have an external mounted muffler to reduce heat buildup in the cabinet. Chassis engine exhaust shall be directed away from compressor and compressor engine air intake.

A heavy duty, high-capacity water separator shall be installed in the air line after an 8 ft. long finned after-cooler.

-32-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

21. AIR COMPRESSOR: (Continued)

A common skid base shall be provided under the engine and compressor, so they may be handled and mounted as a package unit. The compressor shall be mounted to the platform longitudinal members. A complete cover with removable access panels shall be supplied for weather protection.

The operating control panel shall be located at the end of the compressor unit and the unit mounted so that it is at the curb side of the vehicle and include, in addition to operating controls, gauges showing oil and air pressures, water temperature, and voltmeter and an electric hour meter.

The unit shall also be furnished with the following accessory items as a standard part of the package: oil level gauge, automatic moisture trap for controls, automatic blow down valve, minimum pressure valve and a hydraulic pump.

This system shall be installed with all the fittings, brackets, clamps and hoses as per EQN-351A. The system shall be compatible with all fittings presently used by the Department.

There shall be a "FLOCS connections" decal to direct the personnel.

22. CLEANER SYSTEM:

An air operated gun cleaning system shall be installed on the striping machine.

It shall consist of one (1) 40-gallon A.S.M.E. stainless steel pressure tank with safety valve and valves and piping necessary to introduce cleaner into each paint line.

A solvent injector system shall be piped into the paint hose after the main line valve at the outlet of the high-pressure pump. This system must be as close as possible to the outlet of the high-pressure pump to clean the paint manifolds and hoses for overnight storage.

There shall be a drain line for each tank one on left and one on right side of the truck.

All piping is to be solvent resistant type. The tank construction shall be with a 4-inch threaded top opening and a full steel skirt support. And mounted out of the rear operator's line of sight.

23. LED MESSAGE BOARD:

The striping unit shall have a full matrix, all LED, programmable message board that is changeable by a wireless controller located in rear shelter, 36-inch x 72-inch (approximate) in size, mounted on the rear area of the equipment platform.

The message board shall be capable of displaying messages in either alphanumeric text or symbolic graphic representation and has the capability of retaining in memory preprogrammed and user generated messages, MUTCD Part VI construction signs, and all arrow board functions.

The board shall be mounted in a fix horizontal position for operation.

The structural frame shall be at least 3-inch by 2-inch by 11-gauge rectangular tubing. The board shall be mounted so the highest point is less than 11 feet 6 inches from the ground.

For support, four mounting points shall be supplied, two on the rear of the platform and two on braces bolted to the platform railing.

- Message board manufacture must have a repair facility within the Commonwealth.
- Unit must be approved and listed for use on PA Bulletin 15.

-33-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

24. LIGHTING/WARNING:

All lights provided on the paint body shall be LED and meet the Pennsylvania Motor Vehicle code and all wiring shall be run in tubing with screwed junction box connections. Wiring shall conform in gauge and color with ATA standard. Turn signals, brake lights and rear warning shall be Whelen. Side marker lights and reflectors, as manufactured by Grote or Trucklite, shall be rubber shock mounted. No splices shall be made outside of a sealed junction box.

The location of this junction box/s for service access will be decided at the pre-build meeting.

Whelen Model # PAINTSTRIPERPADOTSY8 kit contains the following

- (2) PN# 01-0687181A1PA (R10PADOT) R10-Mini Bar Warning Ref. EQN-120Q
- (4) PN# 01-066A797-A1H (M6AD) M6-Amber Warning with Deutsch Connector - (rear shelter)
- (2) PN# 01-066B1866R1J (M6BTDD) M6-BU with Deutsch Connector
- (2) PN# 01-066B160112G (M6BUWD) M6-BU with Deutsch Connector
- (8) PN# 01-046C334-000 (M6BRUSH) M6-Brush Guards
- (4) PN# 01-066C747-13G IONAD -Amber with Deutsch Connector - (2 in grill, 2 center/middle one each side of platform.
- (4) PN# 01-046D378-00B IONGROM -Grommet Kit
- (10) W441D –Harness side mating Deutsch connectors

Lights shall be mounted vertical in a row from top to bottom with M6AD M6-Amber Warning on top, M6BUWD M6-BU in middle and M6BTDD M6-BU at the bottom, to each side of rear shelter

- (4) IONAD -Amber shall be mounted, one to each side in front grill, and one to each side centered in platform. Ref. EQN-120Q

There shall be a Truck-Lite Model# 36140C LED license plate light with light bracket PN# 36710. (Installed) OEM/builder to provide remaining chassis/body harness and marker lighting shall be Grote, Trucklite or prior approved equal.

25. NIGHT LIGHTS:

Floodlights shall be LED. Switches shall be labeled and lighted to indicate when the light(s) are on.

Seven (7) 12V floodlights to illuminate the striper during nighttime operations. The lights shall be located as follows:

One (1) light located on the front of the truck cab, to illuminate the pointer, with control switch inside the truck cab.

Four (4) lights total, 2 on each carriage location one front and one rear. A switch for these lights shall be located in the rear operators control panel.

Two (2) lights inside rear operators cab one over each operator station.

1 – on front of rear shelter

1 – Telescopic pole mounted on compressor

26. HOSE REEL:

There shall be one 50-foot water hose reel.

There shall be two 50-foot air hose reels.

-34-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAIN T MACHINE OVERVIEW: (Continued)

27. SPARE PARTS:

There shall be one (1) spare transfer pump
There shall be two (2) spare regulator repair kit.
There shall be one (1) spare interchangeable gun control box.
There shall be two (2) spare spray system guns.
There shall be two (2) spare bead guns.
There shall be five (5) spare 10mm bead gun nozzles, total of 10.
There shall be six (6) spare 163461 paint gun tips, total of 12.
There shall be four (4) spare 163661 paint gun tips, total of 8.

The successful manufacturer shall furnish a suggested parts stocking overview listing an essential parts inventory to support the field in areas of high turnover items frequently required to keep our units in an uptime mode.

28. MISCELLANEOUS SAFETY ITEMS:

a. Equipment Identification:

All valves, switches, gauges and controls shall be labeled with permanent tags as to their function. There shall be a written operator's manual that shows all valve functions.

b. Decals and Signs (Tank):

The tanks shall have material warning decals on both sides to alert nearby personnel of tank contents and operational hazards. Paint white or yellow, solvent, beads, etc.

The truck shall have warning placards located on the front, back and both sides. All markings as required by HAZMAT Regulations shall be employed.

There shall be a permanent decal, 2-inch-high red letters on white background affixed by the driver side door handle stating the overall maximum travel height of the completed and unloaded unit.
(Example) HT-__' __" Ref. EQN-552.

There shall be a permanent decal, "Three Point Contact" located at each entry point of the truck cab and at the bed ladder area per EQN – 552-1. Exact location to be determined at prebuild meeting.

ECCO 450 grommet mounted back up alarm, no substitute, standardization.

-35-
SPECIFICATIONS
A-48-DH
059625

I. GENERAL TRUCK SPECIFICATIONS: (Continued)

E. PAINT MACHINE OVERVIEW: (Continued)

29. OPTIONAL ADJUSTABLE RUMBLE STRIP SPREADER BAR:

This option shall be supplied with the standard dual wheel assembly.

Manufacturer to install a heavy-duty double yoke wheel rumble strip avoidance assemblies for both paint carriages. Single wheels with heavy duty bearings shall be manually adjustable independently of one another on the same axle plane to allow rumble strips to pass inside of the wheels. Rumble strip spreader bar shall use a single centered mounting point as the standard dual wheel assemblies.

30. OPTIONAL PUSH to TALK DAVID CLARK for REAR SHELTER:

INTERCOM SYSTEM:

DAVID CLARK SERIES 3800 / 9900 INTERCOM SYSTEM (No substitute).

A David Clark Model 9900 intercom system shall be provided in apparatus, it shall be the sole responsibility of the successful vendor to ensure compatibility with the Department's Radio system, the system shall be interfaced and include rear shelter PTT and all cables and hardware needed to be completely operational with the Departments two-way radio system before delivery. (Note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way). For information on the department's radio system contact the Fleet Management Division at (717)783-2889.

HEADSETS & Belt Stations FOR DAVID CLARK SYSTEM

The intercom system shall include:

Four (4) model H9940 under-helmet radio transmit headsets shall be furnished for the system seating locations in the cab. The headsets shall have M87-type noise-canceling microphone, immersion-proof, all hardware marine-grade stainless steel, and Dynamic earphones with stainless steel retainers, adjustable head strap, and a hybrid-style boom which rotates for left or right placement. The intercom headsets shall have adjustable volume controls in both ears. The sets shall also have comfortable gel ear seals. All users shall have a U9910-BSW, VOX Intercom belt station, with radio PTT function, and easily accessible battery compartment with removable Li-Polymer battery.

One (1) model H3492 single-ear headset shall be supplied, to be used by the driver.

System Wireless Gateway

The system shall have a U9922-G38 wireless gateway capable of hands-free, full-duplex intercom. The gateway shall provide a range of up to 300 feet (line-of-sight) to all linked Belt Stations. The gateway shall be capable of radio interface, provides radio monitor and transmit capability for all wireless users. Shall have (2) SMA Antenna connectors for whip antenna, or remote antenna connection.

Wired Station / Radio Interface:

The U3800 **wired** Master Station accommodates up to (2) wired headsets that communicate with the wireless headsets via the U9922 Gateway to be installed in the cab of the truck. The U3800 Master Station is to include one U3810 radio interface module to allow two-way radio interface, one C3821-05 Radio interface harness, and one C3820 power harness. (Note: an authorized two-way radio installer shall be responsible for interfacing the intercom system with the two-way).

Battery Charging System

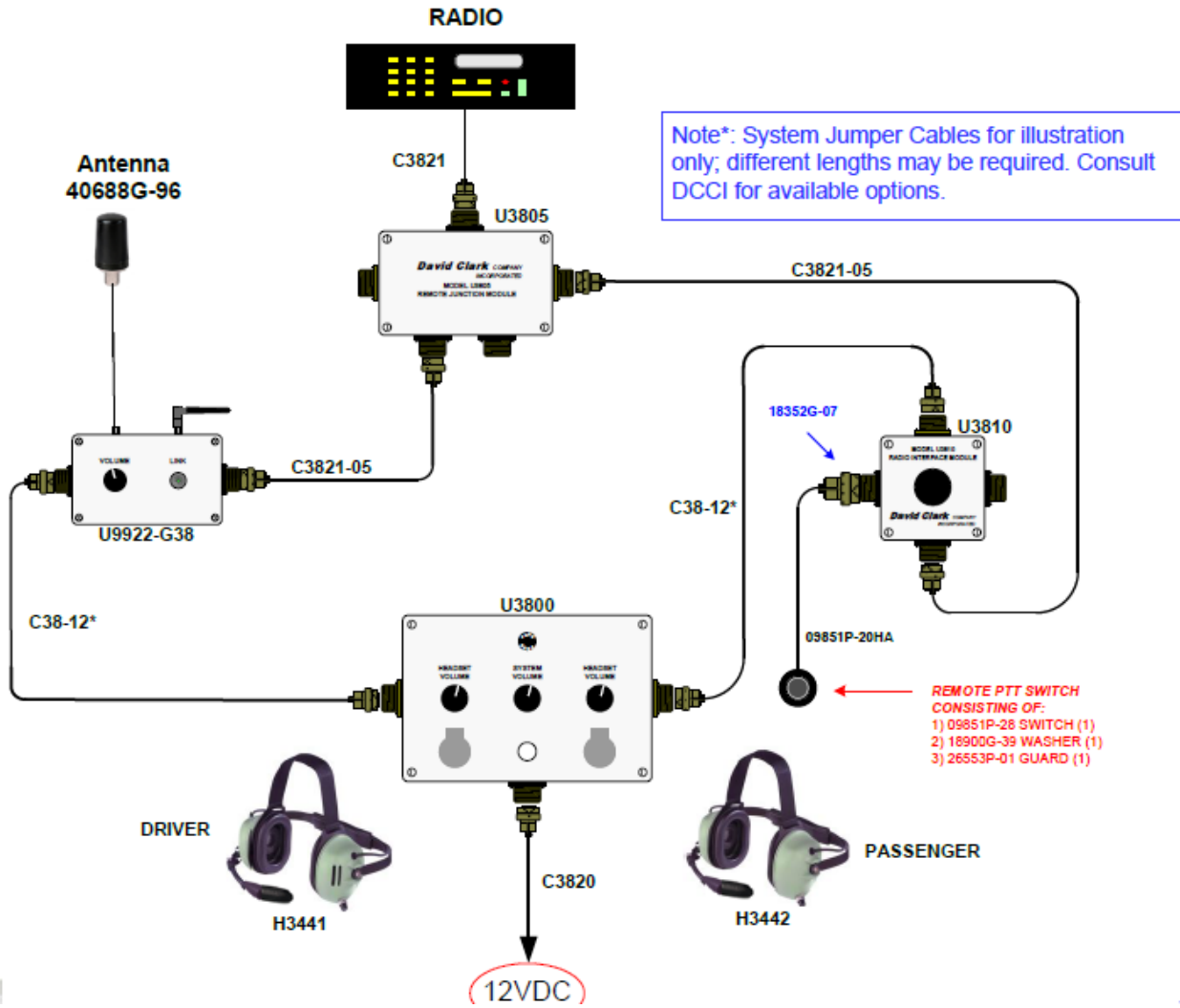
A 12V DC charging unit, 4-bay, shall be provided capable of accommodating up to 4 each 3.7V Li-Polymer batteries, used in Series 9900 Belt Stations. The charging system will provide constant thermal monitoring of battery thermistors, and LED indicators for individual visual charge status.

There shall be four (4) additional batteries supplied as backups while one set is being charged.

Charger shall be mounted in rear shelter.

-36-
SPECIFICATIONS
 A-48-DH
059625

- I. GENERAL TRUCK SPECIFICATIONS: (Continued)
- E. PAINT MACHINE OVERVIEW: (Continued)
- 30. OPTIONAL PUSH TO TALK DAVID CLARK for REAR SHELTER: (Continued)



-37-
SPECIFICATIONS
A-48-DH
059625

II. DRAWINGS:

EQN-66	dated	Rev.	07-20-09	2 sheets	SPLASH GUARDS-RUBBER
EQN-66A	dated	Rev.	07-13-17	1 sheet	TRIANGLES AND STORAGE BOX
EQN-78	dated	Rev.	10-27-06	1 sheet	CB CONNECTORS
EQN-82D	dated	Rev.	07-22-15	1 sheet	CHOCK AND HOLDER
EQN-120Q	dated	Rev.	01-28-20	1 Sheet	UNIVERSAL TRUCK LIGHTING
EQN-122	dated	Rev.	06-30-14	sheet 1	DUMP BODY REFLECTIVE SHEETING
EQN-127A	dated	Rev.	01-02-09	1 sheet	CONSPICUITY
EQN-351A	dated	Rev.	06-19-13	2 sheets	FAST LUBE OIL CAHNGE SYSTEM
EQN-370-60	dated	Rev.	07-11-13	3 sheets	PAINT TRUCK REAR SHELTER
EQN-501	dated	Rev.	06-08-09	2 sheets	CENTRALIZED LUBE SYSTEM
EQN-552	dated	Rev.	07-25-18	1 sheet	MAX. TRAVEL HEIGHT
EQN-552-1	dated	Rev.	07-24-18	1 sheet	THREE POINTS OF CONTACT STICKER

The above referenced drawings shall become part of these specifications.

These drawings reflect the intent of the Department and any discrepancies shall be resolved at the pre-build meeting between the vendor and the Specification Unit.

DRAWINGS APPEAR AT THE END OF THE SPECIFICATIONS.

-38-
SPECIFICATIONS
A-48-DH
059625

III. MANUALS:

The successful vendor shall furnish all applicable manuals per unit:

- 1 Operator's
- 1 Parts – With original OEM part numbers
- 1 Service
- 1 Engine
- 1 Transmission (Automatic or Manual)
- 1 Body and Sub-frame (Parts and Service)
- 1 Complete set of manuals for any additional items/equipment added to a piece of equipment.
- 1 Electrical System Charts

The manuals listed shall be official O.E.M. publications supplemented with technical manuals for all components as published by sub-vendors/manufacturers.

Parts Manual presented must be a relative to "all" items utilized to build these units, with appropriate part numbers.

All manuals shall be supplied on thumb drive in PDF format that can be loaded to a dedicated website. Paper manuals may be supplied if available from manufacture. Paper manuals do not relieve the requirement for the thumb drives.

Delivery of manuals shall be completed with the delivery of each unit.

-39-
SPECIFICATIONS
A-48-DH
059625

IV. TRAINING:

Mechanic:

The successful vendor shall provide services of qualified factory trained technicians for not less than 1 training session of not less than 7.5 hours at 1 PennDOT location to train personnel for in-depth preventive maintenance, overhaul and review of the proper usage of parts and service manuals, as well as component/system adjustments that need to be monitored at specified service intervals.

Operator:

The successful vendor shall provide services of qualified factory trained technicians for not less than 1 training session of not less than 7.5 hours at 1 PennDOT location to train personnel in the proper operation, safety and servicing of the equipment.

The successful vendor shall provide services of qualified factory trained technicians for not less than 1 training session of not less than 7.5 hours to train personnel on equipment functions while unit is performing a startup painting operation. "Ride along"

The successful vendor shall submit a training plan to the Fleet Management Division for approval within 45 days after receipt of the Purchase Order. The training plan shall consist of course outline and class schedule.

All training must be completed within 60 days after the dates established in the approved training plan unless an extension is mutually agreed to in writing by the Chief of the Fleet Management Division.

All training shall be coordinated with the District Equipment Managers, with the exception of Asphalt related training, which must be coordinated with the Statewide Training Coordinator (717) 787-4836, Fax (717) 783-4438.

-40-
SPECIFICATIONS
A-48-DH
059625

V. WARRANTY:

Per PCID 1075: E.1. Construction Equipment - 2 years or 4000 hours whichever first occurs.
1 year starting from the Department's in-service date.

The warranty start-up date shall be defined as the date of transfer from the PennDOT Fleet Management Division to the designated county location. This will be considered the date of delivery to the county and NOT the date of delivery by the successful bidder to the Department. The PennDOT Fleet Management will supply the actual start-up date, equipment number, and serial number of the machine, via email, to the successful bidder. It is the responsibility of the successful bidder to ensure that the equipment manufacturer recognizes and applies the Department's actual warranty start-up date in their database.

This warranty is in effect as follows, starting from date of acceptance by the Department. Warranty shall not be voided due to Department operation as explained in the Intent Statement. It is understood that the components specified are minimum and if the manufacturer's Engineering Department recommends or deems necessary a more robust component, other than specified, be installed to meet the vehicles intent statement and to not void the warranty, it shall be the bidders/vendors responsibility.

ENGINE WARRANTY:

The successful vendor and or supplying OEM shall provide the Department with a 100% parts and labor engine warranty, shall include all engine components internal and external FOR 60 months / 150,000 miles minimum.

The oil pan shall be warranted against corrosion, rust, rust thru etc. regardless of atmospheric conditions for 5 years, 100% parts and labor.

EMISSION WARRANTY: The successful vendor and or supplying OEM shall provide the Department with a 100% parts and labor warranty for all emission related components to include the diesel particulate filter (DPF) FOR 60 months / 100,000 miles, unlimited engine hours. Shall be warranted against corrosion, rust, rust thru etc. regardless of atmospheric conditions.

RADIATOR WARRANTY:

Manufacturer's standard service and warranty policy for radiator minimum shall be for one (1) year, 100% parts and labor.

TRANSMISSION WARRANTY:

Manufacturer's service and warranty policy for automatic shall be three (3) years 100% parts and labor. This warranty shall include all internal and external components related to the automatic transmission.

BODY ELECTRICAL/LIGHTING:

Wiring harness shall be 5 years 100% parts. First year shall include 100% labor.
All LED lights shall be 5 years 100% parts.

WARRANTY REPAIRS SHALL BE COMPLETED AT THE MANUFACTURER'S LOCATION OR IN-HOUSE FIELD REPAIR COMPLETED BY PENNDOT. IT SHALL BE THE DEPARTMENTS DISCRETION TO REPAIR INTERNALLY OR TRANSPORT THE UNIT TO THE DEALERSHIP. THE MANUFACTURER SHALL REIMBURSE THE DEPARTMENT AT THE MANUFACTURERS STANDARD PUBLISHED IN-HOUSE LABOR RATE. THE LABOR RATE SHALL BE MUTUALLY AGREED UPON BETWEEN THE DEPARTMENT AND VENDOR/BIDDER. ALL IN-HOUSE WARRANTY DOCUMENTATION SHALL BE DELIVERED WITH THE PILOT MODEL. ALL WARRANTY DOCUMENTATION SHALL BE DELIVERED WITH THE PILOT MODEL.