



MISSOURI DEPARTMENT OF TRANSPORTATION  
SPECIFICATIONS FOR FURNISHING ONE (1)  
TRUCK MOUNTED TRAFFIC STRIPING MACHINE

TWO COLOR, VARIOUS PAINT TYPES, TANDEM AXLE TRUCK MOUNTED  
CENTER-LANE AND EDGE TRAFFIC-LINE PAINT STRIPER SPECIFICATIONS

**GENERAL**

It is the intent and purpose of this specification to describe a truck mounted self-contained traffic line striping machine, capable of applying reflectorized lines having a wet film thickness of at least .018 inch of conventional traffic paint. The machine shall be capable of applying three (3) lines of two (2) colors (white and yellow) of this material. It shall also be capable of applying either a solid or skip pattern or a combination of these patterns, and of simultaneously or separately applying center and edge line markings. The truck mounted machine shall be capable of applying the above thickness lines at speeds of up to 20 miles per hour with one gun and up to 15 miles per hour for two guns. It will be airless in method of spray, have paint plumbing and all components which come in contact with the paint to be of stainless steel, current production, latest design model, complete with all components ready for operation and described as follows:

The completed unit, when fully loaded with material and operators, must comply with legal weight limits for the State of Missouri, and weight must be evenly distributed. The maximum width cannot exceed eight (8) feet with a maximum height of eleven (11) feet and the overall length not to exceed thirty-seven (37) feet.

Bidders shall supply two (2) complete detailed drawings of their proposed truck mounted traffic-striping machine. One drawing will be of the platform body under structure and one will be a complete placement layout of material tanks, compressor, control station, etc.

**PLATFORM**

A platform of adequate size and strength to accommodate all relevant equipment to be installed on truck chassis. There shall be easy access to all routine maintenance items without requiring unbolting plates, or removing equipment. All grease zerts shall be easily accessed. Overall dimensions not to exceed 96 inches wide and a length to allow for easy, free movement of workmen from end to end and side to side around the equipment without having to descend to the ground and then ascend to the platform for normal maintenance and operation. Overall height of chassis and platform not to exceed 11 feet.

Platform shall be structural or equal strength steel spaced on minimum 12" and maximum 24" centers for maximum strength and gusseted throughout to the 6" structural channel long sills and integrally formed rub rail. Deck to be 3/16" no skid safety tread steel welded to cross sills and flush with and to rub rails. Cross members shall be 4" structural steel minimum. 7" - 8" risers shall allow for easy access to the plumbing underneath the deck.

Three (3) safety tread fold up ladders to be conveniently installed, two mounted curbside, and one mounted street side. Ladders shall store flush with the railing when not in use, held in place with finger-pull type latches. Ladders to be held in place with finger-pull type latches or standard safety chain. Access stairs with a non-slip surface on each of the steps shall be provided near center at rear of operator cab. An elevated catwalk with handrail for tank access shall be included on the curbside of paint tanks. 36" minimum handrails shall be provided at each ladder and staircase



entrance to the platform. Steel railing, 42 inches in height to be bolted to platform, where necessary.

A rear bumper of at least 4-inch channel to be installed bolted to the chassis frame, and must meet FMVSS standards.

Two (2) tool boxes with weather tight (automotive type seals) lockable doors and slam type locks to be installed under the rear cab and rear of the carriages, one approximately 3' x 2' x 2' on the curb side with side access and one approximately 2' x 2' x 2' on the street side with rear access. Doors must have a lip above the door with a drip rail to prevent water from entering the toolbox.

One (1) approximately 8" x 8" x 18", two (2) compartment (one (1) approximately 8" x 8" x 6" and one (1) approximately 8" x 8" x 12" aluminum wash basin with drain valves, weather tight seal and latch to be mounted at the rear for cleaning guns, tips, tools and miscellaneous parts.

The front of platform shall have a sign mounting bracket and tilting mechanism designed to accommodate a MoDOT-supplied 36" x 72" 'Wet Paint' sign of .125 aluminum. This mounting bracket shall provide upright sign height that does not interfere with the rotating lights and will not exceed maximum height of truck when lowered. The controls for sign tilting shall be located in the truck cab. Exhaust from engine shall be vertical, and shall not interfere with the operation and visibility of the sign.

## AUXILIARY POWER

Power for the air compressor and hydraulic systems to be an independent water-cooled, diesel fueled utility engine of adequate horsepower to operate these systems under full load. Acceptable model is the John Deere 4045D with 78HP engine. The engine shall be fueled from the truck fuel tank. Engine shall include extra cooling capacity and have hour-meter, tachometer, volt meter, oil pressure gauge and coolant temperature gauge mounted in rear control panel. Engine warning/shut down system: Audible buzzer and lamp warning for high engine temperature, low coolant level, and/or low engine oil pressure with automatic engine shut down feature. System must have an emergency override. Most all **routinely checked fluids** should be capable of being easily checked from the ground, curb side.

The engine, air compressor, and hydraulic pump shall be mounted immediately behind the truck cab. The engine shall be enclosed and sound insulated. Enclosure shall have removable doors for engine servicing. All externally mounted cooling radiators shall have protective grills or covers.

Additional controls for the engine to be on the streetside to include a return valve and a shutoff valve. The hydraulic system to include shut-off valves at the reservoir inlet and outlet.

The hydraulic pump shall have the capacity to provide a flow of hydraulic oil of at least 15% over the net HP demand. The hydraulic pump shall be piston type variable displacement pump, 2.75 CIR or greater. The hydraulic system should have a priority flow divider, which will supply hydraulic fluid to the carriage controls first. The hydraulic system must be able to compensate with demand at low speed. A minimum 50 GPM capacity hydraulic oil cooler must be provided and mounted above the platform to provide adequate cool airflow through the cooler. A minimum 50-gallon reservoir with baffles, breather cap, sight level gauge, and drain plug shall be provided. A 100-



mesh suction screen on the suction side, and a 6 micron absolute spin-on filter on the return line shall be provided. Air compressor to have a capacity of at least 250 CFM at 125 P.S.I., screw type, with automatic unloader and cooler. A rigidly mounted air receiver tank equipped with safety valve, drain plug and automatic moisture ejector to be provided.

## **PAINT HEATING SYSTEM**

The paint heating system shall be a scavenger type paint heating system, utilizing the heat generated by the auxiliary/compressor engine's cooling system to transfer heat to the paint heat exchangers.

## **PAINT SUPPLY**

The striping machine shall be equipped with a minimum 60" long x 72" wide x 48" high 800 gallon 2 compartment un-pressurized paint tank, designed for 2 color paint application. Each compartment shall extend across the width of the truck platform so as to equalize the load as the compartments are emptied. The compartments shall be of equal size and shall be baffled to prevent the splashing of paint. Each compartment shall have a capacity of 400 gallons of paint with a minimum 4" of air space. The tank shall be designed for easy cleaning. The exact size of the yellow and white tanks may vary. At the time of the pre-build meeting, the size will be determined. The total capacity will remain 800 gallons.

The tank shall be constructed of no less than 10 gauge 304 stainless steel and shall have bracing and gussets to strengthen and prevent flexing. All bracing shall be external. The bottom of each compartment shall be constructed of no less than 3/16" stainless steel plate sloped to the discharge pipe, so that the compartments may be pumped completely empty. A ball valve must be included at the discharge pipe to shut off each paint tank. The valves shall be in-cab controlled and provide easy shut off without climbing under the truck. Valve should be electronic solenoid controlled from cab and control panel. Tank shall be discharged from bottom of each compartment.

Each compartment shall be equipped with a hydraulic driven, adjustable, stainless steel paint agitator. Agitators shall be top supported with Teflon bottom bushings.

Valve and plumbing shall be provided so that either compartment may be used for white or yellow paint or both compartments may be used for either white or yellow paint.

The top of each paint tank shall have a fixed brace across the front to back width of the tank wide enough to mount agitators and vents. Each tank shall have two (2) removable lids on both sides of the agitator support. Lids are to be minimum 1/4" stainless steel with one (1) lifting loop at center. The tanks shall have 1/2" stainless steel studs, which will secure the lids utilizing stainless steel nuts and washers. The lids shall have 9/16" holes to accept the 1/2" studs and a tight gasket seal to prevent leakage. Each tank shall have one (1) minimum 10" quick release hose type connection inspection port on the curb side. A minimum 1/2" vent tube or breather with shut off valve shall be provided for each color. Inspection port shall be centered over the discharge pipe. The cover of the inspection port shall be secured by wing nuts or cam-type lids.

The tank plumbing shall have a two-inch plumbing assembly for each color. All rigid plumbing shall be stainless steel. Paint will be transferred from the lower right side only. A compatible, quick connect valve hose connection that will facilitate the transfer of the paint in a minimum amount of time will be furnished. Any line reductions should be done in increments in order to reduce backpressure and problems with lines clogging. All valves must be full flow design.



All valves should have the same on-off positions. They shall be Teflon seated stainless steel ball type valves and shall be color-coded for identification.

All pipe connections must be threaded **NO WELDED JOINTS**.

All paint transfer lines will be hard plumbed except for those required for shock isolation or carriage movement.

### **PAINT TRANSFER PUMPS**

Two ARO 2" model PD20A-FSP-STT (or equal) loading pumps that provide 135 GPM to be on the right side of the truck. Pumps shall have bolted housings, stainless steel wetted parts, and a non-stalling air design. (unions instead of flanges shall be used to attach the plumbing to the pump)

Each loading pump will both load paint into the paint tanks and prime the airless paint pumps.

The pumps will have stainless steel bodies with teflon diaphragms.

All hardware necessary for the loading of paint from bulk tanks which includes two 15' x 2" paint transfer hoses with both ends having tanker type female quick connectors shall be provided. Valves and male quick couplers shall be provided for bypassing paint transfer pumps when transferring paint, using bulk storage pumps.

Valve will be provided to allow each pump to be isolated from the paint system for the purpose of cycling solvent through the pump for cleaning.

All pumps will be capable of pumping water-based paint.

Air supply lines to include oiling capabilities of all downstream pneumatic equipment, regulators, and gauges. The LaMan 140F dual stage dryer which combines a particulate filter and coalescing filter to dry the air, is acceptable. Air valves shall be ball type and shall be color-coded for identification. Air leading into bead tank shall be filtered but not oiled.

### **AIRLESS PUMPS**

Two (2) ARO model 650940-C6D-B hydraulic powered airless traffic paint pumps and must have 1-1 1/2" outlet.

The pumps will each supply up to 12.0 GPM minimum continuous duty at 50 cycles/ minute.

Pumps to be double acting, delivery on up and down strokes assuring constant delivery and have surge chambers to minimize pulsation in the high pressure paint line. Surge chambers to be nitrogen charged and shall have stainless steel wetted plumbing and a capacity of at least three quarts. Plumbing for surge chambers and pumps should be capable of withstanding vibration.

Pumps to be positive displacement type.

Paint to be delivered at pressures of 100 to 1,716 PSI.



Each pump shall be capable of pumping water-based paint. All parts that come in contact with paint shall be stainless steel, including piston, check balls, seats, housing, and packing retaining rings. Packings shall be Teflon.

All high pressure paint hoses to be enclosed in a pressure sock or covered to prevent injury in case of hose failure.

High pressure paint hoses to be non-conductive and rated in excess of 2,000 PSI. Hoses from pump to manifold and manifold to gun shall be continuous.

Pressure control valves and gauges shall be provided in the rear console.

All components and fittings susceptible to shock loads from high pressure pump stroking shall be isolated utilizing high-pressure lines.

### **SPRAY GUN CARRIAGE**

Two (2) spray gun carriages to be provided.

Spray gun carriages to be retractable to within the overall width of the vehicle and lifted off the roadway for high-speed transport.

A pneumatic lift system with independent down pressure capabilities and an automatic carriage storage lock feature for each carriage shall be provided. When carriage is lifted, down pressure shall be disabled using a four-way diverter valve. Regulators for the lift system shall be mounted in the rear console. Carriages to have a load binder and chain assembly to secure carriage up during long transports. Carriages to also have an auto-lock storage bracket.

Left spray gun carriage:

Left spray gun carriage to be located to the rear of the left rear tires.

It shall support five (5) spray guns and five (5) bead guns.

Right spray gun carriage:

Right spray gun carriage to be located to the rear of the right rear tires.

It shall support two (2) spray guns and two (2) bead guns.

Two (2) pneumatic road wheels shall be provided for each carriage to maintain a constant given height from the road surface. The wheels shall be mounted approximately 18 " apart side-by-side.

Carriage units to be mounted with a parallel linkage to allow vertical motion while maintaining the spray guns at a constant height above the road surface. Threaded bolts shall be used to mount the bead guns to the carriage.

Carriages must be capable of operating in any position from inside the platform width to a point four (4) feet outside the parameters of the platform.

The road wheels on carriages shall be fitted with pneumatic tires, sealed ball bearings, dirt shields and mounted on caster mounts to allow them to pivot freely as vehicle is turned.



All bearings or pivot points on the carriage linkage or slide shall be fitted with industrial heavy duty roller bearings and pressure lubrication fittings.

Each carriage shall have 2 slides and shall be equipped with a double acting hydraulic cylinder for moving the carriage to any point within its operating range. The cylinders to be controlled by a power steering control unit and steering wheel conveniently located for the operator. The steering wheel shall tilt, telescope and rotate inward to accommodate various operators. The steering wheel shall be mounted to allow for leg room and can be mounted off the console.

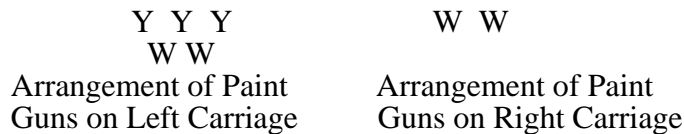
Hydraulic power for operation of the carriages to be supplied by a hydraulic pump driven by the auxiliary engine.

The carriage steering mechanism must provide a smooth operation without over-steering, creeping or jerky movement. System must be designed to prevent the opposite side from creeping out during operation.

Each carriage shall have a four (4) inch amber-red flashing strobe mounted near the end. Each strobe shall not distract the operator. It shall flash horizontally at traffic approaching from all directions. It should flash at a rate of approximately 60 flashes per minute and beat at least 150-candle power.

A complete set of 12-volt night working lights on each carriage (one forward and one rear including protective lens covers when not in use. Controls for lights shall be on the master control center.

The striping carriages shall be capable of placing a centerline and edgeline simultaneously from eight to sixteen feet apart.



White will be set up for a 4" and an 8" line spray pattern and yellow will have 4" space and line spray pattern between each gun. Each bead gun will be capable of adjusting to follow the paint gun.

**PAINT AND GLASS BEAD SPRAY EQUIPMENT**

The paint spray guns (Graco 238-377 or equal) with 163-465 tips, shall be of the air actuated, airless atomizing type, capable of processing material in quantities which will yield a four (4) inch width line of 0.018 wet film thickness, to be put down at speeds of up to 20 MPH. They should be designed for use in highway striping. All wetted parts, except tips, shall be stainless steel.

The paint system shall include temperature sensors at each heat exchanger, one each white and yellow.

The paint system shall be sealed and of such design that no shutdown or start up flushing is required.

The paint system shall include filters at the transfer pumps to filter paint being pumped on the striper and paint after high-pressure pumps. They shall be designed for Department specified water borne paint and not cause any shearing of the paint. They shall be easily accessible and cleaned from the curbside of striper. They shall be valved to facilitate cleaning without draining paint lines.



They shall be drainable before cleaning to prevent paint spills. The filters shall have a minimum of three (3) t-bolt type clamps and minimum 100 square inch surface area.

The distance between the spray gun orifice and bead gun orifice must remain constant for all spray and color patterns to insure the proper angle of entry of the glass bead spray into the paint spray for maximum dispersion and retention.

The automatic bead guns shall be Grayco bead guns model 238-338.

The bead guns shall be provided with bead flow adjustments for each bead gun.

Bead guns to have adjustable setscrew for controlling needle movement to allow bead flow control from one to fifty pounds per minute and have momentary shut off switch for mil thickness testing.

### **BEAD SUPPLY**

Bead supply tank to be A.S.M.E. certified pressure vessel, of all steel construction, and have a minimum total capacity of 6,000 pounds of glass beads. Tank will have a sight glass to show three different levels at the intervals of 1/4, 1/2 and 3/4 mounted on the side of the tank.

A hinged top opening of at least 14 inches in diameter to be provided for loading. Opening may be located off to the side with no other plumbing connected to the hinged top.

The pressure vessel to be equipped with an air release valve, a 100-pound pressure gauge, and a 110-pound pressure relief valve. Air pressure gauge shall be mounted in console.

The beads shall be conveyed under pressure to the automatic guns through 2" steel pipe to the rear of striper then through 2" abrasion resistant steel reinforced rubber hose to the bead manifolds, then through clear kink resistant hoses to each bead gun. The system shall be able to supply at least 150 pounds per minute for three simultaneous operating bead guns.

The bead tank air supply to be equipped with a finned tube type air cooler, moisture separator with an automatic moisture ejector and coalescing filter.

Valves (1/4 turn ball type) to shut off bead flow from the tank shall be provided at the bottom of tank and conveniently located in the steel pipe prior to the bead manifolds.

### **BEAD LOADING SYSTEM**

A vacuum bead loading system with a minimum capacity of 300 pounds of glass beads per minute to be included in the glass bead supply system.

The vacuum system shall be operated with no moving parts.

A muffler shall be installed on the jet pump to assure quiet operation.

The glass bead loading system shall include a 12 foot long, 2 inch I.D. fill hose with female quick coupler fittings on both ends and a 36 inch long, 2 inch O.D. x 1 7/8 inch I.D. steel tube attached to the suction end. All hoses to be non-conductive or rubber.

The loading system shall be capable of loading from bulk bead containers.



Bead loading shall be from curbside of the truck.

## **CONTROL CENTER**

A master control center shall be provided. This center shall consist of a sheet metal cover with internal framework, providing space for a control panel, electrical controls, spray equipment connections, heater thermostat control, and any and all other auxiliary parts required by the spray equipment. A master control switch with the ability to disconnect and shut down all systems shall be located in the master control center. All controls shall be color coded for quick identification. All controls shall be clearly labeled and contain large toggle switches. An AM/FM radio shall be provided in the master control center, the speakers shall **not** be mounted in the control center panel.

Separate remote control panels will be provided for the left and right side operators. These control panels shall have adequate length wiring to allow for adjustment to accommodate various operators. An adjustable mounting shall be provided at each station for quick and easy adjustment. The control panel must have height and side adjustment for mounting in any position for operator comfort. The mounting shall lock securely in place after adjustment. The wiring shall be attached at each end by pin connectors, to an electrical junction plug.

Left Side Operator. The left side operator shall have a control panel for the operation of the paint guns, bead guns, and control of left side carriage. Bead guns shall automatically turn on when paint guns are on, and delay shut off to completely cover paint lines. Through the operation of toggle switches, it shall be possible to apply a skip, solid, double solid, or skip-solid painted line. A provision for automatic center gun cut-off shall be provided when two outside guns are painting double solid stripes for dual no passing zones on a 3-Line system. A 2-Line system will operate from the left and center guns and provide continuous intermittent timing.

Right Side Operator. The right side operator shall have available controls for the right side carriage, vertical and horizontal. Through the operation of toggle switches, it shall be possible to apply a skip, solid, double solid, or skip-solid traffic painted line.

When both the left and right carriages are being utilized to apply a skip pattern, the application of paint guns and bead dispensing guns shall be able to operate synchronized or independently.

The master control center shall be mounted in an inclined position so that it can be observed from either operator's position. It shall be painted flat black to decrease glare. The master control center shall be hinged for easy access and bolted to the floor with fixed mounting plates for easy removal from inside the rear cab.

The master control center shall have all necessary regulators, gauges, valves, switches and indicators for operation of the striping equipment mounted on it. They should be within reasonable reach for either operator to control all functions. Yellow will be located on the left, white on the right side.

All parts shall be of the panel type and located behind the panel, if possible.

A removable back plate shall allow access to the interior of the master control center for servicing. There should be adequate space behind the panel for easy access by the servicing technician.



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

The control boxes shall be equipped with one (1), three (3) position toggle switch for each paint gun. Switch positions to be up for solid line, center for neutral and down for automatic. The control boxes shall also be equipped with (1), three (3) position toggle switch for each gun. Switch positions to be center for automatic, down for off and spring loaded up for test.

A lock toggle switch will be supplied in each box to raise or lower the respective carriage by solenoid valve operation. It should be distinct from the paint gun switches to prevent operator confusion while striping. Paint guns shall not function unless carriage is in the down position.

## **ELECTRONIC TIMER**

Two solid-state electronic microprocessor timers shall be supplied, one each for left and right side skip operation. The timers shall have a digital display with simple controls and inputs.

The timer shall be adjustable by the operator while the machine is in motion or standing still. They should be able to time skip patterns for left and right synchronized or independent operation if striping from both sides.

The timers shall be adjustable so that any combination of skip and paint may be obtained up to 99.9 feet of skip in increments of 0.10 of a foot.

The timers shall be equipped with an "advance" and "retard" switch which will advance or retard the cycle in increments of 0.20 of a foot per actuation of the respective switch. This switch shall be located in the remote control operator panels.

A provision to start the cycle with the paint portion of the cycle or with the skip portion shall be selectable.

On command, the timers shall immediately reset to "ready" or "start cycle" position. The reset switch shall be located in the remote control operator panels. There shall also be an off position.

All adjustments must be so that these functional changes can be made readily by the operator while the machine is in motion or standing still.

Timing system shall operate at speeds up to 20 MPH, at ambient temperatures ranging from thirty (30) to one-hundred-seventy-five (175) degrees F.

All components must be solid state and there shall be no moving parts, except the encoder, and this shall be electrically connected with no mechanical connections.

The unit shall provide for bead gun delay to fully cover the paint line.

**The unit shall be pulsed from the transmission of the vehicle, or drive line.** (using the MB pulse system)

Timer shall keep a constant cycle for 2 line and 3 line striping when a skip line switches from one paint gun to the other as the gun switch goes through neutral.



## **FOOTAGE COUNTERS**

A six (6) digit, digital reset, footage meter capable of measuring actual feet of line applied shall be supplied for each spray gun position.

These footage meters to be mounted in the master control center, or incorporated into the skipline microprocessor.

## **SOLVENT AND OIL SYSTEMS**

An air operated, solvent/water-cleaning system shall be installed on the striping machine.

The cleaning system shall consist of a 60 gallon minimum stainless steel A.S.M.E. pressure tank, with safety valve, plus valves and piping necessary to introduce solvent/water to each paint line. The tank shall have a quick release refill opening at least 3 inches in diameter with 3" ball valve. Solvent/water shall also be piped to each main line after the tank shut off, before and after the heat exchangers, and at the paint manifolds.

Two (2) self-retracting hose reels shall be mounted at the rear of truck. One reel shall have 3/8" oil and 1/4" air lines and the other shall have 3/8" solvent and 1/4" air lines. All hoses to be 50' in length and have quick couplers and dusting guns for cleaning or coating the striping components at the ends and be valved prior to or at the reels.

All valves used in the solvent system shall be ball type with Teflon seals.

Oil system to consist of a minimum 10 gallon A.S.M.E. air pressurized oil tank, safety valve, oil valve, air valve, and piping. The tank shall have a quick release refill opening at least 3 inches in diameter.

## **ENCLOSED CAB**

The paint striper operator's cab to be all 14-gauge steel, or 10-gauge aluminum welded construction, fully enclosed, insulated and sound suppressed. The cab shall be weather sealed where it meets the platform and have an industrial grade rubber mat on the floor. The cab to be approximately 96" wide and 60" deep with a minimum inside ceiling height of 72". The paint striper operator's cab shall be equipped with a heavy-duty steel rollover protective frame, which must be certified and labeled SAE J1040. Proof of ROPS certification shall be included with your bid. Bracing shall not interfere with operator when observing spray guns. Cross bracing should be no higher than armrest height and shall not cross side windows.

The enclosure shall be equipped with two tight fitting weather and wind sealed doors (minimum 21" opening each). One at the right hand front corner and one at the center rear. Each door shall be equipped with a key lock (both doors keyed alike). Center rear door should be swing out type. Doors to have windows top and bottom for operator visibility.

There shall be at least one sliding safety glass window in the front of the cab, and two sliding safety glass windows in the rear, one behind each operator's station. Windows on lower sides and back are not required. The slide window at the bottom of the bubble will be safety glass.



Side windows to be two (2) piece sliding type, safety glass with provisions to lock the windows in the open or closed position, plus bubble windows approximately 1/4" thick 8 inches deep and large enough to be slid over the existing windows for viewing of the spray guns. Windows should be wide enough to not interfere with operator when observing spray guns. Bubble windows shall slide forward to allow for an open window, have small access for operator use and be able to be permanently installed in lieu of the side windows. Bubble windows made of Plexiglas are acceptable. Padded armrests shall be included on each bubble windowsill to provide support and cushion when striping.

All windows including bubbles shall be dark tinted privacy glass, or manufacturer's standard tinting. The bottom of the bubble and the lower 1/4 of the front part of bubble shall be clear.

The design of the cab shall allow operators full carriage visibility with windows closed.

Two (2) operator seats shall be securely mounted close to the walls (with no floor flexing) on the platform body rear conveniently located for all operations. The seats shall have forward, backward, and vertical adjustments in addition to air ride vertical adjustments, with all steel frames, full depth foam seat cushions, foam padded backrests, and be covered with heavy-duty vinyl all-weather material. The seats shall be air ride high back suspension type with folding armrests, 910E or equal designed to eliminate practically all vibrations, jolts, jars, road shock and back slap. Each shall be fitted with a seat belt in accordance with S.A.E. and Federal Standards.

**Heating (minimum 26,000 BTU) and air conditioning (minimum 32,900 BTU) will be provided as a self-contained 12-volt system on the rear cab. Interior vents and controls shall be mounted in the center in front of cab. It shall be separate from the truck air conditioning system. This is OK or a combination heat/cool unit may be used. If auxiliary engine coolant is used, then proper valves to isolate the system at the engine shall be used. Air conditioner condenser should be center mounted in a permanent manner and not require removal for normal operations.**

**VEHICLE ALIGNMENT** Hydraulic or pneumatic operated front bumper mounted stinger, fully adjustable for various lane widths, shall be provided. It shall be movable left or right and telescope from six to ten feet with lift controls mounted in front cab convenient for driver operation. Stinger shall have a caster type rubber pneumatic road wheel. It shall be able to be lifted well off the road surface for transport.

## **INTERCOM SYSTEM**

Intercom system shall be furnished to provide vocal communication between the driver of the vehicle and operators of the striping equipment. It shall be wired to accept a 2-way radio system Kenwood TK-760 or Kenwood TK-790 for MoDOT installation in the truck cab.

The intercom master shall be located in the front cab behind driver and be of solid-state design with transistorized hardware.

Each striping equipment operator's position and the vehicle driver's position shall have overhead jacks for remote headsets. Four headsets with cords shall be included, with front headsets single ear and rear headset double ear. Each operator's position and each driver position shall have a foot pedal to activate the 2-way radio.



The system shall be of heavy-duty construction with shielded metal conduit and be interference free and vibration proof.

The inter-communication system shall be a David Clark U3800.

## **ELECTRICAL AND WIRING**

All electrical systems and controls shall operate from the machine's 12-volt system.

All wiring shall be contained in loom, welded or securely fastened to vehicle.

All systems shall terminate at weatherproof covered barrier strips.

All lugs or connections will be insulated crimp-on type, or soldered with rosin core solder.

Wiring to be color-coded or clearly numbered and permanently marked.

Wiring subject to exposure shall be sealed with R.T.V. silicone sealant.

All electronic circuits shall have appropriate transient voltage spike protection.

Electronic circuitry should consist of standard off-the-shelf components and devices.

Electronic circuitry should contain no proprietary custom integrated circuits.

Devices should be of industrial or military specifications or grade.

Schematics of all electrical systems to be furnished.

All LCD digital readouts shall be backlighted for proper viewing under low light conditions.

## **PROTECTION FROM CHEMICALS**

Cables, wiring, insulation and hoses shall be of such materials as not to be affected by paints, chemical solvents or pressure steam cleaning systems.

## **FENDERS**

Full length (minimum 11 ga.) poly fenders, which cover the rear wheels, should be provided. Mud flaps front and rear shall be provided. The fenders shall be removable to facilitate servicing under bed components.

## **CHASSIS - CAB FORWARD**

GVW to be a minimum of 56,000 pounds.

Striper must be highly maneuverable for urban striping. Minimum curb-to-curb turning radius is desired.



Wheelbase and cab-to-axle dimensions to be specified by the striper manufacturer to provide proper length and weight distribution and accommodate painting equipment.

Front GAWR to be at least 18,000 pounds with shock absorbers.

Rear axle to have a GAWR of at least 40,000 pounds with a gear ratio to provide a top road speed of 65 MPH.

Rear suspension capacity to be at least 44,000 pounds, Peterbilt Air Trac or Hendrickson PAX-460 AIR (46,000 pounds) (Air Ride)

Low speed constant speed electronic cruise control designed to work between 4 MPH and 20 MPH. Unit shall hold speed to  $\pm 0.5$  MPH on grades of 3% or less. Unit shall also function at normal highway speeds.

Automatic Transmission to be Allison MD3000 RDS transmission, 6 speed, 1050 LB-FT or approved equal. (Allison SCAAN analysis required.) Striper will frequently operate between 5 and 20 mph. Engine and transmission must possess cooling capabilities to continuously operate at these speeds in summer temperatures.

Engine to be diesel fueled, developing not less than 300 horsepower at rated RPM.

Engine equipment to include: Fuel water separator, fuel filter, 1000 watt minimum block heater, low oil pressure/high engine temperature warning light, anti-freeze protections to -35 degrees F., vertical exhaust system up right side.

Cooling system: Since the major portion of the operation of this unit will be at speed of approximately 10-20 MPH, the cooling system should include the extra capacity to adequately cool the engine and transmission, during this slow speed operation.

Frame to have minimum RBM of 2,000,000 in/lb with minimum 110,000 PSI steel.

Front tow hooks.

Wheels: Front wheels to be 10-bolt hub piloted steel disc 22.5" x 9.00".

Rear wheels to be 10-bolt hub piloted steel disc 22.5" x 8.25".

Tires to be 315/80R22.5 LR-J 20-ply rating, steel belted tubeless radial with highway tread.

Spare wheel and tire to be furnished.

Fuel tanks: One or two fuel tanks totaling 150 gallons, frame mounted.

Front wheel mud flaps.

Power steering.

## **CAB**

Cab to be a low entry, cab forward, tilt cab. Cab to be equipped with a cab-lifting jack.

Seats: Driver and passenger seat to be air suspension type 910E or equal. Both seats to have arm rests, heavy-duty vinyl trim and seat belts.



Two (2) speed windshield wipers and washers with intermittent feature.

West coast type right and left outside mirrors approximately 16 x 6 inches with auxiliary convex mirrors bracket mounted. The outside mirrors are to be remotely controlled from either operator position.

Heavy-duty heater and defrosters. A/C minimum 22,000 BTU

Dual sun visors.

Cab entry assist grab handles.

Tinted safety glass in all windows.

Instruments to include: Fuel gauge, oil pressure gauge, temperature gauge, ammeter or voltmeter, air cleaning restriction indicator, tachometer, low oil pressure warning lamp, and high temperature warning lamp. Transmission gear indication must be visible from each operator position.

Dual air horns, which can be activated from either operators' position.

Ashtray and cigarette lighter.

Door arm rests.

Factory air conditioning must accommodate normal operating speeds of between 5 and 20 mph.  
Cab needs to be insulated

AM/FM Stereo radio with dual speakers.

Cab to have LED lighting providing visibility in all directions.

Wig-Wag on front headlight controls shall be mounted and accessible from each operator's position.

Digital speedometers shall be provided for each operator position.

## **BRAKES**

Brakes to be full air cam type.

Front brakes to be at least 16.5 x 6 inches. Rear brakes to be at least 16.5 x 7 inches.

14 cubic foot minimum air compressor.

Automatic moisture ejectors and air dryers.

Low air pressure warning device.

Parking/emergency brakes to be spring set, air released.



## **ELECTRICAL**

200 AMP Heavy Duty alternator.

Three (3) 12-volt maintenance free batteries of at least 535 cold cranking amps each.

Back up alarm OSHA approved.

Power supply for 2-way radio.

The rear turn signals shall be minimum seven inches in diameter or equal area each.

## **LED warning lights**

Lighting system as described in separate specification.

## **WARRANTY**

Truck chassis to be warranted for at least 12 months or 12,000 miles after unit is accepted into regular service. The chassis shall be serviced locally. Engine shall have a 24-month warranty.

## **MISCELLANEOUS**

The successful bidder shall provide a qualified factory technician for at least five (5) days of initial setup instruction while the unit is in actual striping operation. An additional five (5) days of instruction approximately 30 days after initial setup. If problems are encountered, a minimum of three (3) additional days may be needed to correct problems and to ensure customer satisfaction.

The successful bidder will be required to furnish the following and the cost should be considered and included with your bid:

Two (2) complete hard copy parts books, and two (2) CD copies, including wiring diagrams for truck chassis cab and factory line setting sheet which includes part numbers.

Two (2) complete hard copy repair manuals, and two (2) CD copies, for the striping equipment and components. A manual on all functions and operations of the microprocessor shall be included in the shop manuals. A diagram of all grease zerts should be located in the shop manuals.

Two (2) operators manuals, and two (2) CD copies, for the striping equipment and components.

Parts will be supplied within 48 hours when in stock by the vendor for a minimum of seven years.

Detailed blue prints, longitudinal **and** lateral weight distribution charts, along with recommended deck layout must be **included in the bid**.

Payment will not be made on units until all detailed schematics, detailed parts list, detailed service manuals, and detailed technical manuals are accepted.



The entire unit shall be manufactured in accordance with the latest and best manufacturing practices and all components shall be new and of best quality.

Color to be Federal Standard #595B (Colors Used In Government Procurement) "Highway Yellow" #13432 or equal and matching the truck chassis-cab exterior color. A minimum of one primer coat and two finish coats shall be applied to all metal parts. **(IF YOU HAVE ANY QUESTIONS REGARDING COLOR PLEASE CONTACT THIS OFFICE.)**

Supplier shall give three (3) days notice when actual delivery will be made.

The new unit is to be delivered to the location designated on the bid form, complete, assembled, and ready for use.

The total system shall be flushed and cleaned before delivery.

The entire striping unit shall be warranted for at least 12 months after unit is put into regular service, full parts and labor. The striper shall not count against 12,000-mile chassis warranty.

**Any deviations or exceptions to this specification must be detailed when bids are submitted.**

A user's list of at least 10 airless truck mounted stripers manufactured by the bidder shall accompany the bid. Failure to provide these references including contact names and phone numbers may be cause for rejection of bidder's offer.

The Missouri Highways and Transportation Commission reserves the right to waive technicalities and to reject any or all bids and no bid is final until formally accepted by the Commission.



## EXPLANATIONS OF OPTIONS FOR STRIPERS

1. **5-Year manufacturer's warranty**

The successful bidder shall warranty the truck and all its components, as delivered, for a period of five (5) years from the in-service date. This warranty shall cover all parts and labor for repairs excluding normal maintenance. The bidder shall also warranty the parts and labor for repairs made by MoDOT personnel during this time frame. MoDOT will agree to make no repairs in-house in which parts and labor are expected to cost more than \$2000.00.

2. **Maximum width 102" in lieu of 96"**

Please provide pricing for increasing the platform size to a maximum width of 102".

3. **Annual Factory Inspection and Maintenance Repair Program**

Vendors must develop and document the annual requirements of this program from year 1 through year 10. This program will include replacement of all fluids and filters, inspection of unit and replacement or repair of all components as needed. Annual maintenance and repair entire unit will be at bidders' facility. Unit(s) will typically be available from December 15 through March 31, but actual dates will be determined by MoDOT. Vendors must provide written documentation of this program with their bid.

4. **Dual Truck Steering and All Truck Controls for Either Right Hand or Left Hand Driver**

5. **Cloth Seats in lieu of Vinyl Seats**

This option includes seats in cab/chassis and operator's cab in rear of striper.

6. **Provisions to Transport....**

7. **Additional Training Modules...**