

# Specifications for Thermo-Lay Model UD 425-120



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This specification describes a machine that is used to repair asphalt. While this information is not designed to exclude any bidder or equipment, it is imperative that the machine meet all of the following criteria. These criteria are based on the following: **compact size, D.O.T. Federal Bridge Weight compliance, performance, durability, ease of operation, safety, and training.**

### COMPACT SIZE:

**SIZE CRITERIA:** This machine must be compact in size to provide maneuverability, fuel efficiency, legal weight distribution, and close- quarter turning capabilities. The asphalt mix capacity of this machine must be no less than 4 ¼ cubic yards when filled to capacity. For maximum maneuverability, this machine must be no longer than a 198” wheel base or 128” CA, no wider than a 50’ turning radius, and not over 25’ in length – bumper to rear end. The physical box/hopper size must be as compact as possible and no longer than 108”, no wider than 78”, and no higher than 43”. Machine size and safety considerations dictate that the following components be built into the main body section of the machine: hydraulic tank, tack oil tank, cleaning fluid tank, hopper release agent tank, and propane tank.

- Hopper asphalt mix capacity: (cu. yd.) \_\_\_\_\_
- Truck chassis wheelbase: (inches) \_\_\_\_\_
- Truck cab to axle dimensions: (inches) \_\_\_\_\_
- Truck chassis turning radius: (ft) \_\_\_\_\_
- Overall truck length bumper to rear end: (ft) \_\_\_\_\_
- Main Body dimensions: (in) \_\_\_\_\_ in. long X \_\_\_\_\_ in. wide X \_\_\_\_\_ in. high
- Highest component height: (in) \_\_\_\_\_
- Hydraulic tank location: \_\_\_\_\_
- Tack oil tank location: \_\_\_\_\_
- Cleaning fluid tank location: \_\_\_\_\_
- Hopper release agent tank location: \_\_\_\_\_
- Propane tank location: \_\_\_\_\_
- Propane tank capacity: \_\_\_\_\_

### D.O.T. FEDERAL BRIDGE WEIGHT COMPLIANCE:

**WEIGHT CRITERIA:** This machine must be constructed and configured such that it meets all D.O.T. Federal Bridge Weight limits when fully loaded. Component locations and integration play an important part in the weight distribution. This machine must have no less than a 12,000 # front axle weight rating, a minimum 20,000# rear axle weight rating, with air ride suspension. In order to insure that this machine shall not be operated overweight, empty and loaded weight of the front, rear, and combined must be precisely calculated and documented.

- Body component weight empty: (lbs) \_\_\_\_\_
- Heat transfer oil weight: (lbs) \_\_\_\_\_
- Truck chassis total weight empty: (lbs) \_\_\_\_\_
- Front axle GVWR rating: (lbs) \_\_\_\_\_
- Front axle weight empty: (lbs) \_\_\_\_\_
- Front axle weight loaded: (lbs) \_\_\_\_\_
- Rear axle GVWR rating: (lbs) \_\_\_\_\_
- Rear axle weight empty: (lbs) \_\_\_\_\_
- Rear axle weight loaded: (lbs) \_\_\_\_\_
- Total combined weight empty: (lbs) \_\_\_\_\_
- Total combined weight fully loaded: (lbs) \_\_\_\_\_
- Front axle weight distribution percentage (%) \_\_\_\_\_
- Rear axle weight distribution percentage (%) \_\_\_\_\_

**PERFORMANCE:** Asphalt repair performance is achieved by means of the following factors: Properly heated, stored and dispensed asphalt mix; a delivery system with powerful fast distribution rates; a properly positioned, powerful anti-bridge device; a state of the art heating system capable of heating and precisely maintaining the temperature of HOT mix and COLD mix; a tack oil system with properly controlled and dispensed tack oil; a powerful quick pavement breaker; a compaction device capable of producing 100% compaction with ease; and trash spoils bins. The machine to be provided pursuant to this specification must strictly meet all performance requirements, must not be a prototype, and must have a demonstrable performance record in the field based upon the number of years the machine has been manufactured. End user references must be provided.

Manufacturer of the machine: \_\_\_\_\_

Model number: \_\_\_\_\_

Years of model production: \_\_\_\_\_

**ASPHALT MIX:** To provide the highest discharge rate possible, this machine must have a screw conveyor auger and be able to dispense the asphalt at a minimum rate of 1 cubic yard per minute, at an idle, without raising the engine R.P.M. In order to provide the best auger delivery rate, the auger must be driven by a single auger motor that can provide both high torque and high speed performance characteristics. For purposes of this specification, and to meet the necessary high torque/high speed requirements, a single 2 speed hydraulic auger motor must be supplied, which can automatically sense the pressure demands and still shift between high torque and high speed without any operator input, and which is reversible. In order to meet this performance requirement, the machine must have a 6" diameter auger with hard surfaced flights driven by an automatic shifting 2 speed motor with size of 12 cu. in. and 24 cu. in. displacement, a speed of 64 R.P.M. and 128 R.P.M., and a torque of 5,100 in. lbs. (425 ft. lbs.) and 10,200 in. lbs. (850 ft. lbs.). If the asphalt mix should ever try to bridge above the auger, a hydraulic driven anti-bridge bar must be capable of dislodging such a bridge with a reversible hydraulic motor capable of producing 10,200 in. lbs. (850 ft. lbs.) of torque. Asphalt mix delivery is optimized by incorporating a 180 degree pivoting chute that provides a quick, wide, dependable method for distributing properly heated mix into the repair site, insuring 100% compaction without waste, while not allowing asphalt mix cooling.

**AUGER:**

2 speed auger motor displacement sizes (cu. in.): (low) \_\_\_\_\_ (high) \_\_\_\_\_

2 speed auger motor speeds (R.P.M.): (low) \_\_\_\_\_ (high) \_\_\_\_\_

2 speed auger motor torques (in. lbs.): (low) \_\_\_\_\_ (high) \_\_\_\_\_

Dispensing rate: (cu. yd./minute) \_\_\_\_\_

Shaft pipe thickness: (sch of pipe) \_\_\_\_\_

Number of bearings: \_\_\_\_\_

Bearings sealed or greaseable: \_\_\_\_\_

Temperature rating of bearing grease: \_\_\_\_\_

**ANTI BRIDGE BAR:**

Shaft pipe thickness: (sch of pipe) \_\_\_\_\_

Anti-bridge bar hydraulic motor displacement: (cu. in.) \_\_\_\_\_

Anti-bridge bar hydraulic motor torque: (in. lbs.) \_\_\_\_\_

Number of spikes on bar: \_\_\_\_\_

Number of bearings: \_\_\_\_\_

Bearings sealed or greaseable: \_\_\_\_\_

Temperature rating of bearing grease: \_\_\_\_\_

**ASPHALT CHUTE:**

Asphalt chute location: \_\_\_\_\_

Asphalt chute pivot arc: (degrees) \_\_\_\_\_

**ASPHALT MIX HEATING:** To provide the best possible performance in repairing asphalt, this machine must be able to heat HOT mix or COLD mix, and store HOT mix at a temperature of 325° F minimum, or COLD mix at a temperature of 250° F minimum, over a 24 hour period, without temperature increase or decrease of 4° F throughout the entire mix load. This machine must be able to dispense hot mix at a minimum of 325° F without baking the asphalt mix. To avoid waste, asphalt mix temperature maintenance is the highest priority and must be automatic without operator input, day or night. The asphalt mix must be heated using an isothermal medium that can easily maintain a constant temperature up to 400° F, without baking the asphalt mix or having inconsistent cold areas in the mix that will deter distribution and /or inhibit 100% compaction. Therefore, this machine must use a liquid heat transfer oil medium to heat the asphalt mix. This machine must carry the minimal amount of heat transfer oil necessary to accomplish the objective and not add additional unnecessary weight to the overall machine. For purposes of this specification, 120 gallons is the maximum allowable amount of heat transfer oil for this machine. A propane/electrical system must be supplied to heat and maintain the radiant oil at the proper mix temperature day and night without operator input, beyond the initial thermostat programming. Therefore, a minimum 350,000 B.T.U dual stage propane burner must be used to provide the daytime or operating heat and supplement night or non-operating hours heating. The ignition of this burner must be electronic, automatic, and be able to re-ignite the propane burner without operator input, in order to maintain a constant temperature. The automatic re-ignition feature avoids delay and heat loss associated with operator fallibility. Propane for this propane burner must be stored, transported, and dispensed from a built-in 34 gallon horizontal propane tank. This tank must include a float type fill gauge, an electronic fill gauge, covered fill box with ACME quick-fill connector, and an electric gauge showing the fill level. A 9,000 watt (9KW) 240 volt AC single phase electric heater must be supplied to heat and maintain the radiant oil at the proper temperature during non-operating hours. This heater must be capable of reaching a temperature of 300° F automatically, without operator input. The propane burner and the electric heater must be controlled by two digital thermostats, one for daytime operating temperature and one for nighttime temperature. Operator fallibility is avoided by automation, and therefore the machine requires a 7 day, 2 event timer that will automatically switch between the daytime thermostat and the nighttime thermostat, at preset, predetermined start/stop times. To insure the utmost accuracy, the thermostats must be digital with ¾" display, and be capable of holding a 4° F mix temperature accuracy throughout the entire mix load.

- Isothermal medium type: \_\_\_\_\_
- Heat transfer oil capacity: (gal) \_\_\_\_\_
- Propane tank location: \_\_\_\_\_
- Propane tank capacity: (gal) \_\_\_\_\_
- Number of propane burners: \_\_\_\_\_
- Propane burner output: (B.T.U.) \_\_\_\_\_
- Propane ignition stages: (single or 2 stage) \_\_\_\_\_
- Re-ignition type: (manual or automatic) \_\_\_\_\_
- Number of electric heaters: \_\_\_\_\_
- Electric heater output: (watts) \_\_\_\_\_
- Electric heater voltage: (volts) \_\_\_\_\_
- Electric heater consumption: (amps) \_\_\_\_\_
- Number of thermostats: \_\_\_\_\_
- Thermostat type: (mechanical or solid state) \_\_\_\_\_
- Thermostat display type: (dial or digital) \_\_\_\_\_
- Timed thermostat switching: (manual or automatic) \_\_\_\_\_
- Number of timer day settings: \_\_\_\_\_
- Number of timer events: \_\_\_\_\_

**ASPHALT MIX HOPPER HEAT CONTAINMENT:** Asphalt mix heat maintenance is essential, and retaining the heat in the asphalt mix requires an insulated cover on this machine. This results in both better performance, by keeping the mix at the proper temperature, for ease of dispensing and 100% compaction, and decreased operating costs, by reducing the costs of fuel for mix temperature maintenance, reducing machine and component wear and degradation by running inadequately or irregularly heated mix through the dispensing system, and reducing repair failure by dispensing properly heated mix, capable of attaining 100% compaction. Therefore, this machine must have 1” thick hydraulic operated insulated steel doors that cover the hopper. To insure a low loading height and provide a wide opening for asphalt mix loading, these doors must be 2 piece, bi-fold doors with a protected internal hydraulic cylinder for each door. There must be roller bearings in the hinges of these doors and roller bearings in a guide track on each end of each door. Keeping the elements out of the hopper is essential. Therefore, there must be a cover/seal where the bi-fold hinge is positioned, to keep moisture and debris out of the hinge area. A high temperature silicon seal must be supplied on the bottom of each door to make a positive vapor seal between the door and the door frame, which will stop the heat loss where these meet. The protected hydraulic door cylinders must have stainless steel braid enclosed Teflon high temperature hose. To insure the maximum heat retention and the lowest energy consumption, the remainder of the asphalt containment hopper of this machine must have 2” of high temperature polystyrene insulation protected by a 20 gauge steel removable cover.

- Door material construction type: \_\_\_\_\_
- Door opening type: (single or bi-fold) \_\_\_\_\_
- Door height when open: (inches) \_\_\_\_\_
- Hopper opening dimensions when doors are open: (inches) \_\_\_\_\_ long X \_\_\_\_\_ wide
- Door insulation thickness: (inches) \_\_\_\_\_
- Door bi-fold hinge material: (steel or stainless steel) \_\_\_\_\_
- Outer door hinge type: (bolt or bearing) \_\_\_\_\_
- Door track roller type: (bolt or bearing) \_\_\_\_\_
- Door hinge protection type: \_\_\_\_\_
- Door seal material type: \_\_\_\_\_
- Number of door hydraulic cylinders: \_\_\_\_\_
- Door cylinder location: \_\_\_\_\_
- Door cylinder hose material construction: \_\_\_\_\_
- Door cylinder protection method: \_\_\_\_\_
- Door hydraulic relief pressure: (P.S.I.) \_\_\_\_\_
- Body insulation type: \_\_\_\_\_
- Body insulation thickness: \_\_\_\_\_
- Body insulation value: (R) \_\_\_\_\_
- Body insulation protection cover material: \_\_\_\_\_

**TACK OIL:** Permanent asphalt repair performance is highly dependent upon using tack oil to seal the repair and bond the new asphalt to the old asphalt. EPA mandated use of emulsion type tack oil requires special heating, storing, and distribution of this material. Therefore, it is imperative that this machine have an insulated tack oil tank built into the main body with a capacity of 120 gallons minimum. This tank must be insulated with 1" insulation, and protected from external damage. Because these tack oils are emulsified with electrically charged water, the heat source to this tank must be of a type that will never let the tack oil freeze or boil. Therefore, an isothermal heating source must be used that can keep the tack oil temperature between 33° F and 211° F. A rear mounted digital thermometer must be supplied to monitor the tack oil temperature at all times, so that the operator can easily see the display. For proper distribution of the tack oil, a hydraulically driven gear pump must be supplied to provide a 60-80 P.S.I. output spray pressure and an automatic re-circulation path to return excess tack oil back into the tack oil tank. Keeping this tack oil system clean, working, and dependable requires a cleaning system that will flush a cleaning fluid through the pump, hoses, hose reel, and spray nozzle by the use of one pull lever. To avoid wasting tack oil by contamination, the cleaning system must not allow any cleaning fluid into the tack oil tank. Tack oil should be loadable through a 3" fill spout or by reversing the pump direction while loading from a barrel. Tack oil must be sprayed through a 3/8" diameter X 60" long spray wand with a dead man valve, and a 30° spray pattern nozzle and supplied through a 25' hose mounted on an internal mounted hose reel.

- Tack oil tank capacity: (gal) \_\_\_\_\_
- Tack oil tank insulation material type: \_\_\_\_\_
- Tack oil tank insulation thickness: (inches) \_\_\_\_\_
- Tack oil tank insulation value: (R) \_\_\_\_\_
- Isothermal heating medium type: \_\_\_\_\_
- Thermometer type: (dial or digital) \_\_\_\_\_
- Thermometer location: \_\_\_\_\_
- Tack oil pump type: (gear or vane) \_\_\_\_\_
- Tack oil pump gear size: (inches) \_\_\_\_\_
- Tack oil pump discharge pressure: (P.S.I.) \_\_\_\_\_
- Tack oil pump discharge rate: (G.P.M) \_\_\_\_\_
- Cleaning fluid tank location: \_\_\_\_\_
- Cleaning fluid tank capacity: (gal) \_\_\_\_\_
- Cleaning fluid selection method: \_\_\_\_\_
- Fill spout size: (inches) \_\_\_\_\_
- Spray wand dimension size: (inches) \_\_\_\_\_ diameter X \_\_\_\_\_ long
- Spray valve type: (manual or dead man) \_\_\_\_\_
- Spray wand nozzle pattern: (degrees) \_\_\_\_\_
- Tack oil hose length: (feet) \_\_\_\_\_
- Tack oil reel location: \_\_\_\_\_

**HYDRAULIC SYSTEM:** Permanent asphalt repair performance is highly dependent upon a powerful, quick, responsive, flexible, and durable hydraulic system. Since hydraulic power is dictated by hydraulic pressure, this machine must have a closed center hydraulic system, with a load sense pressure demand piston pump supplying 2,250 P.S.I. hydraulic fluid pressure. This pump must be mounted directly to a hot shift P.T.O. installed on an Allison 3000 series transmission that will allow the hydraulic system to function when the truck engine is operating, producing “live” hydraulics, in order to allow both stationary and moving repair operations. In order to maintain a cool running hydraulic system, the hydraulic tank capacity must be at least 30 gallons. To eliminate foaming and cavitation, the hydraulic tank must have a baffle that will separate the incoming, hotter oil from the cooler bottom suction oil. For purposes of safety and trouble free, low-maintenance hydraulic operation, this tank must have pressure fill vent cap, a 100 micron suction filter, a 10 micron replaceable return filter, a suction shut-off valve, and a sight gauge/thermometer to monitor the oil level and temperature. To insure flexibility and durability, this machine must have sealed electric solenoid hydraulic control valves mounted on a single aluminum manifold with 11 solenoid valves, and a pressure gauge, and must also allow remote electrical control of the hydraulics at the right rear of the machine, in the truck cab, behind the truck cab, and into the burner control box for safety purposes. All of the solenoid valves must be labeled to indicate each function’s direction of operation. In the case of an electrical failure, there must be a method of manual override.

- Hydraulic system type: (open or closed circuit) \_\_\_\_\_
- Hydraulic pump type: (gear or piston) \_\_\_\_\_
- Hydraulic pump pressure: (P.S.I.) \_\_\_\_\_
- Hydraulic tank location: \_\_\_\_\_
- Hydraulic tank capacity: (gal) \_\_\_\_\_
- Suction strainer filtration size (micron) \_\_\_\_\_
- Discharge filter filtration size (micron) \_\_\_\_\_
- Number of solenoid valve sections: \_\_\_\_\_
- Pressure gauge location: \_\_\_\_\_

**ASPHALT REMOVAL EQUIPMENT:** Quick, precise removal of the old existing perimeter asphalt requires a pavement breaker (jack hammer). Therefore, this machine must be equipped with a 72# class hydraulic pavement breaker with a 1 1/8” shank, a 5” spade cutter and a 6” square tamping shoe. The breaker must have the hydraulic fluid supplied by 25’ of 1/2” pressure hose and 25’ of 3/4” return hose mounted on an internally mounted hose reel. The hydraulic fluid supplied for this breaker must be flow controlled at 9 G.P.M., at an idle without the need for an engine throttle to maintain this flow rate. For monitoring and diagnostic purposes, a flow meter must be installed to verify the flow capabilities of the hydraulic pump system.

- Pavement breaker brand: \_\_\_\_\_
- Pavement breaker size: (lbs) \_\_\_\_\_
- Pavement breaker model: \_\_\_\_\_
- Pavement breaker shank size: (inches) \_\_\_\_\_
- Asphalt cutter size: (inches) \_\_\_\_\_
- Asphalt tamper size: (inches square) \_\_\_\_\_
- Pressure hose diameter: (inches) \_\_\_\_\_
- Return hose diameter: (inches) \_\_\_\_\_
- Flow meter location: \_\_\_\_\_

**TRASH SPOILS BINS:** To expedite the performance of permanent asphalt repair after squaring up the sides of the repair and breaking up the debris in the repair, it is essential to have storage and transportation of debris available within the confines of this machine. Therefore, there must be 2 hydraulic operated trash spoils bins located on both sides of the truck chassis, behind the truck cab, no higher than the truck frame when in the loaded upright position. Each bin must have a capacity of at least 1 ¼ cubic yard. These bins must hydraulically roll over for dumping purposes, roll out for a superior loading height, and have a hydraulic lock in the upright position. The controls for these bins must be independent, and located in the cab. There must be sealed flange bearings on each end of each bin and one hydraulic cylinder located at the rear of each bin.

Number of spoils bins: \_\_\_\_\_  
Trash spoils bin capacity: (cu.yd.) \_\_\_\_\_  
Bin location: \_\_\_\_\_  
Bin dumping type: (manual or hydraulic) \_\_\_\_\_  
Bin loading height: \_\_\_\_\_

**ASPHALT COMPACTION DEVICE:** Proper and precise 100% asphalt compaction can only be achieved with a fast, easy operating, self-propelled compactor. Therefore, this machine must be supplied with a roller compactor that is hydrostatically driven. This roller must have forward and reverse control, and a 22" wide steel compaction drum. For maximum performance, this roller must be stored and transported on a hydraulic operated lift mechanism located behind the truck cab on the driver's side, so that it will not interfere with the asphalt repair procedures taking place at the rear of the truck. This lift must have a hydraulic locking mechanism that provides positive locking of the lift and roller in the "UP" position. There must be an amber strobe light attached to the lift that provides visual evidence of lift displacement from its locked upright position. There must also be an audible warning accompanying "UP" or "DOWN" movement of the lift. To insure that this roller cannot inadvertently leave the lift or be stolen, there must be a self-locking mechanism that secures the roller when the lift is in the upright most position. There must be removable 4.2 gallon water storage tank for lubricating the roller drum.

Roller brand: \_\_\_\_\_  
Roller model number: \_\_\_\_\_  
Roller engine make: \_\_\_\_\_  
Roller drum width: (inches) \_\_\_\_\_  
Roller operating weight: (lbs) \_\_\_\_\_  
Roller water tank capacity: (gal) \_\_\_\_\_  
Roller lift location: \_\_\_\_\_  
Roller lift locking mechanism type: (manual or automatic) \_\_\_\_\_  
Roller locking mechanism: (manual or automatic) \_\_\_\_\_  
Visual displacement method: \_\_\_\_\_  
Audible movement warning method: \_\_\_\_\_

**AUXILIARY WATER STORAGE TANK:** Even though the roller compactor has a removable 4.2 gallon water tank, it is essential to insure that water is available at all times during the repair process. Therefore, this machine must have a rear mounted 8 gallon auxiliary water tank. This tank must be non-metallic in construction with a 4" fill, a ½" drain, and accompanying hose. This tank must be mounted above and behind the tool rack so that it provides easy access to the operators at the rear and does not impede upon the repair process.

Water tank location: \_\_\_\_\_  
Water tank capacity: (gal) \_\_\_\_\_  
Water tank material type: \_\_\_\_\_

**HAND PROPANE TORCH:** This machine must have a 250,000 B.T.U. propane torch with 20' of ½" propane hose used to dry moisture from the repair site and to force set cold tack oil.

Hand propane torch rating: (B.T.U.) \_\_\_\_\_  
Hand propane torch hose length: (feet) \_\_\_\_\_

**DURABILITY:** In order to provide a long service life, this machine must have built-in durability.

**MATERIAL THICKNESS, FASTENERS AND SURFACE COATING:** The construction of this machine must be as heavy duty as weight permits. The main body sides and hopper walls must be constructed of 3/16" mild steel with 3/16" radiant heat transfer oil bottoms. All fasteners on this machine must be of stainless steel construction for durability and a long service life. This machine must have a 100% powder coated finish on all components that would normally be primed and painted. All electrical wiring must be either triple insulated cord, conduit, or in loom. There must be no splices or tees in any of the electrical wiring.

- Main body steel material thickness: (inches) \_\_\_\_\_
- Hopper sides thickness: (inches) \_\_\_\_\_
- Radiant heat transfer oil bottom material thickness: (inches) \_\_\_\_\_
- Fastener material: (black, plated, or stainless steel) \_\_\_\_\_
- Component finish: (painted or powder coated) \_\_\_\_\_
- Electrical wiring type: \_\_\_\_\_

**COMPONENT LOCATION:** Component location has profound effects on the durability of this machine. Exterior non-protected locations deteriorate components by subjecting them to weather, corrosion, impact injury, and the accumulation of asphaltic compounds and other grime endemic to asphalt road construction and repair, elevate maintenance costs, and shorten life expectancy of a machine. Therefore, covered, sealed, and non-exposed component placement must be paramount on this machine. The hydraulic tool hose reel, tack oil hose reel, and cleaning system hose reel must be mounted internally in the main body and enclosed behind metal enclosures. The tack oil wand and cleaning fluid wand must be stored in a holder that protects the nozzles and spray wands. The propane tank, tack oil tank, hydraulic tank, hopper release agent tank, cleaning fluid tank, and waste oil tank must be built into the main body. To eliminate any side collision impact possibility, the propane tank must be located high and inside the outer shell of the main body. The hydraulic door cylinders must be mounted inside the hopper and must be protected. The tack oil pump, cleaning fluid pump, and release agent pump must be built into the main body and behind metal enclosures. The hydraulic control valve manifold must be mounted high on the front of the main body, and between the main body and the cab, to shield it from impact injury, corrosion, and accumulated asphaltic residues.

- Hydraulic tool hose reel location: \_\_\_\_\_
- Tack oil hose reel location: \_\_\_\_\_
- Cleaning fluid hose reel location: \_\_\_\_\_
- Tack oil wand location: \_\_\_\_\_
- Cleaning fluid location: \_\_\_\_\_
- Propane tank location: \_\_\_\_\_
- Tack oil tank location: \_\_\_\_\_
- Hydraulic tank location: \_\_\_\_\_
- Hopper release agent tank location: \_\_\_\_\_
- Cleaning fluid tank location: \_\_\_\_\_
- Waste oil tank location: \_\_\_\_\_
- Tack oil pump location: \_\_\_\_\_
- Cleaning fluid pump location: \_\_\_\_\_
- Release agent tank location: \_\_\_\_\_

**EASE OF OPERATION:** Cost savings in labor can be enhanced by ease of operation, avoiding time-consuming worker tasks through efficient equipment placement, fluid distribution, and component automation. In addition, flexible location of hydraulic controls (see Hydraulic System, Page 6) allows this machine to be efficiently operated with a crew of only 2 people. This machine must have demonstrable ease of operation and a proven ability to operate with a crew of 2 people.

**HOPPER RELEASE AGENT:** Heated asphalt HOT mix and heated COLD mix are extremely adhesive and tend to adhere to the hopper walls. To eliminate such adhesion, a biodegradable, emulsified, non-solvent release agent is essential and therefore must be sprayed into the hopper regularly. An 18 gallon tank must be supplied to store, transport, and spray this release agent, which must be built into the main body and equipped with a 12 volt electric pump capable of supplying the 45 P.S.I pressure and 4.9 G.P.M. flow necessary to spray the release agent out of 30 removable bronze spray nozzles located in the upper rim edge of the hopper. The nozzle spacing must be such that no hopper surface is left uncoated. There must be a washable replaceable discharge filter located on the pump. The release agent pump must be located inside the driver's side rear compartment and actuated by a switch that will automatically spray a 25 second flow of release agent into the hopper and automatically shut off.

- Release agent tank location: \_\_\_\_\_
- Release agent tank capacity: (gal) \_\_\_\_\_
- Release agent pump capacity: \_\_\_\_\_ P.S.I \_\_\_\_\_ G.P.M.
- Number of spray nozzles: \_\_\_\_\_
- Spray nozzle material: \_\_\_\_\_
- Spray activation: (manual or automatic) \_\_\_\_\_
- Duration of spray per application: (seconds) \_\_\_\_\_

**CLEANING FLUID:** Keeping the asphalt tack oil system, rear discharge chute, and hand tools (shovels and rakes) clean is an essential part of the smooth operation and durability of this machine. Therefore, a 10 gallon cleaning fluid tank must be supplied to store, transport, and spray a biodegradable, non-caustic cleaning fluid that is used to flush the tack oil system, lubricate the rear discharge chute, and clean the hand tools. There must be 12 volt DC pump with a discharge filter and a deadman valve with 20' of hose on an internal mounted hose reel. The cleaning fluid spray wand must drip into the waste oil tank when stored.

- Cleaning fluid tank location: \_\_\_\_\_
- Cleaning fluid tank capacity: (gal) \_\_\_\_\_
- Cleaning fluid hose length: (feet) \_\_\_\_\_
- Cleaning fluid hose reel location: \_\_\_\_\_

**WASTE OIL TANK:** Cleaning out the tack oil system dictates that the cleaning fluid must be discharged daily. Therefore, there must be a 10 gallon waste oil tank supplied to store and transport waste fluid from cleaning the tack oil system and capture dripping fluid from the tack oil spray wand and the cleaning fluid wand. There must be a 3" pipe in the top of tank as a receptacle for cleaning the tack oil spray wand, which drains into the waste tank. There must also be a 1" drain with valve on the bottom of the tank for draining purposes.

- Waste oil tank location: \_\_\_\_\_
- Waste oil tank capacity: \_\_\_\_\_

**TOOL STORAGE RACK:** The asphalt repair process takes place at the rear of the truck and dictates that shovels, rakes, and brooms must be within easy reach of the operators. Therefore, this machine must have a 4 tool holder at the rear of the truck for storage and transportation of shovels, rakes, and brooms. This rack must be designed so as not to allow these tools to bounce out during transportation.

- Location of the tool rack: \_\_\_\_\_
- Number of tool holding positions: \_\_\_\_\_

**SAFETY: Operator safety must be the highest priority on this machine. Therefore, there must be superior safety lighting supplied with this machine including LED truck directional signal lighting, hydraulic raised and lowered arrowboard lighting, 6 corner strobe lighting and other safety equipment essential to safe operation of this machine.**

**REAR TRUCK DIRECTIONAL STOP TURN, TAIL LIGHTING:** Traffic notification of repair operations begins with signaling the truck operator’s intentions, and relies upon visibility to avoid accidents from the rear. Therefore there must be 6 red stop, turn, tail lights supplied at the rear of the machine. Two of the stop, turn, tail lights are to be supplied with the truck chassis and may be mounted low as supplied by the truck manufacturer or high to provide superior visibility. In addition, there must be 4 red LED stop, turn, tail lights mounted at the rear of the truck, 2 mounted high, above 6’ level, and 2 mounted lower in the 4’ to 6’ high zone. These lights must be mounted as wide as possible. There must be 5 red LED marker lights mounted at the rear, 3 high in the center of the rear door frame and 1 mounted on each side at the rear, for side visibility. There must be 4 amber marker lights mounted on this machine, 1 mounted on each side visible from the front and one on each side front of the body visible from the front. To provide long life and low maintenance this lighting system must be a sealed system with a common junction box at the rear with a triple insulated wire from each light terminating inside the junction box, with no splices or tees allowed. The junction box must be labeled with color code and function.

- Number of red stop, turn, tail lights: \_\_\_\_\_
- Number of red LED stop, turn, tail lights: \_\_\_\_\_
- Location of red LED stop, turn, tail lights: \_\_\_\_\_
- Number of red LED marker lights: \_\_\_\_\_
- Location of red LED marker lights: \_\_\_\_\_
- Number of amber LED marker lights: \_\_\_\_\_
- Location of amber LED marker lights: \_\_\_\_\_

**HYDRAULIC RAISED AND LOWERED DIRECTIONAL ARROWBOARD:** There must be a hydraulic raised and lowered arrowboard installed behind the truck cab and in front of the main body. The arrowboard must be capable of signaling traffic from both the front and the rear to move to either the left or the right of the machine. This is accomplished by including with the arrow board control switching that signals either left arrow, right arrow, right and left arrows, right and/or left bar at the operator’s election. For maximum visibility to all traffic, this arrowboard must have 10 LED amber lights visible from the rear and 10 LED amber lights visible from the front, with an amber LED strobe light in between the arrows. The arrowboard steel background must be 95” wide. Superior visibility is obtained by elevating the arrowboard as high as possible without creating a hazard to overhead obstacles. Therefore, this arrowboard must no higher than 98” in the “DOWN” position and raise hydraulically 36”. Operator safety depends on the ability to raise this arrowboard from within the truck cab before stepping out. Two arrowboard controls must be mounted in the cab with easy driver access.

- Arrowboard location: \_\_\_\_\_
- Arrowboard size: (inches) \_\_\_\_\_ wide X \_\_\_\_\_ deep
- Raised and lowered mechanism: (manual, electric, or hydraulic) \_\_\_\_\_
- Arrowboard height when in the “DOWN” position: (inches) \_\_\_\_\_
- Arrowboard height when in the “UP” position: (inches) \_\_\_\_\_
- Number of front visible arrowboard LED lights: \_\_\_\_\_
- Number of rear visible arrowboard LED lights: \_\_\_\_\_
- Amber LED strobe location: \_\_\_\_\_
- Number of in cab controls: \_\_\_\_\_
- Location of raise/ lower switch: \_\_\_\_\_

**6 CORNER STROBE LIGHTING:** For added traffic awareness, there must be 2 LED amber strobe lights mounted at the front of the truck and 4 LED amber strobes mounted at the rear of the truck, 2 high on the body and 2 low on the body. A labeled illuminated switch for strobe operation must be mounted in the cab within easy reach of the driver.

Number of amber LED strobes: \_\_\_\_\_

Amber LED strobe locations: \_\_\_\_\_

**PROPANE BURNER SAFETY:** In order to insure operator and machine safety, it is essential that propane burner safety features be supplied with this machine. There are 3 fluids that must be sprayed in the repair process on this machine and it is vital that the propane burner automatically stop operating when the tack oil pump, hopper release agent pump, or cleaning fluid pump is operating. In addition, the propane burner must automatically shut-down in the event of high temperature or loss of flame. This propane burner system must have a 7 second re-ignition period upon loss of flame ending in total shut-down and provide a red safety shut-down light for visible warning of the shut-down. This propane burner system must be capable of burning at highway speeds without flame extinguishing occurrences. The roller compactor and accompanying hydraulic lift must be front mounted between the main body and the cab to provide a safe environment, away from the burner, for re-fueling the roller.

**OPERATOR SAFETY EQUIPMENT:** To eliminate dangers associated with operators leaving ground level and climbing up on this machine in the field, there must be no hand-holds or ladders on this machine. There must be an air pressure load gauge located at the rear that allows the operator to view the asphalt mix load remaining without having to climb upon the machine and visually observe the hopper contents. This machine must have safety shut-off switches installed on the hydraulic doors that will automatically disengage the auger screw conveyor and/or the anti-bridge bar in the hopper, if the doors are opened. The hydraulic roller lift must have visual and audible alarms for lift movement. To provide additional visual awareness and safety, this machine must have a large section of the rear powder coated with “school crossing FEDERAL safety green/yellow” color in contrast with the black powder coated body. The hydraulic doors must have a pressure relief valve setting that does not allow the doors to level the asphalt mix or injure personnel in the asphalt mix hopper.

**OPTIONAL SAFETY EQUIPMENT AVAILABLE:** Optional safety equipment is also available, such as rear video display cameras, rear mounted LED work lights, and an additional hydraulic lift for storage and transport of the roller on the passenger side of the machine.

**MANUALS AND TRAINING:** Proper permanent asphalt repair dictates that specific repair and machine operational steps be followed and that the machine be kept in the best working condition. Therefore, this machine must be supplied with an operators’ manual that includes detailed instructions on the operation of this machine as well as drawings and parts listings. This manual must be delivered in hard copy form as well as digital CD form. To facilitate the initial use of this machine, and to insure safe and proper operation, crews must be properly trained in the use and maintenance of the machine. Therefore, at least 8 hours of hands on training by factory authorized personnel must be provided at the owners’ facility as part of the acquisition cost of the machine.