

**Anti-Icing Sprayer Units and Storage Tanks
Invitation for Bids No. 60118-6-02224**

Attachment A

This is the minimum specification for 1,035 gallon anti-icing spray units; 400 gallon anti-icing spray units; 4,000, 7,800 and 10,000 gallon storage tanks. All items must be compatible with a variety of anti-icing solutions, including but not limited to the following: sodium chloride, calcium chloride, magnesium chloride, potassium acetate, and CMA.

Examples: VariTech Industries, Inc. Model AI 1035-HYD-1-MT403 (1,035 gallon capacity) or TxDOT approved equal.
VariTech Industries, Inc. Model AI 400-MT403 (400 gallon capacity) or TxDOT approved equal.
VariTech Industries, Inc. Model TS250 (storage tank) or TxDOT approved equal

A. 1,035 Gallon Anti-Icing Spray Units.

1. The unit shall:

- 1.1. Be designed to apply a constant application of liquid product to a road surface regardless of vehicle speed.
- 1.2. Include a product pump that shall be hydraulically driven using the truck's central hydraulic system.
- 1.3. Include a system calibration and programmable application rates that shall be accomplished by the use of a micro-processor, which is linked to a ground speed.
- 1.4. Be complete with a liquid spray pump, sprayer tank, storage legs, tank mounting straps, baffle system, discharge nozzles, closed-loop flow meter that is accurate +/- 1% on flows from 10 to 130 gpm, plumbing and hardware.
- 1.5. Include a separate, externally mounted radar speed sensor to provide ground speed feedback to controller in place of truck speedometer connection.
- 1.6. Be delivered complete and ready to install and run with minor harness installation and hydraulic hook up in an 8' or longer truck bed.

2. The Liquid Tank shall:

- 2.1. Have a minimum capacity of 1,035 gallons.
- 2.2. Be constructed of rotationally molded polyethylene, UV protected material
- 2.3. Include a minimum 16" threaded man-way with removable center for easy access to inside of tank.
- 2.4. Have a minimum specific gravity rating of 1.9, to weight 290 pounds.
- 2.5. Include molded in gallon-age markers at the rear of the tank.
- 2.6. Be approximately H52" x W78" x L90" in dimensions.
- 2.7. Be equipped with slosher ball type baffling system to eliminate unsafe conditions resulting from the liquid slosh associated with mobile poly tanks.

3. Frame Assembly shall:

- 3.1. Be a heavy duty steel construction using 7 gauge steel with approximately 3" x 5" x 3/16" rectangle tube for the long sill runner.
- 3.2. Have a spray bar bracket separate from the rear leg assembly.
- 3.3. Be powder coated with epoxy based powder coat which passes the ASTM 10 @ 500 hours.
- 3.4. Be de-burred and have no sharp edges.
- 3.5. Include a skid assembly equipped with a crossbar assembly that will utilize the truck tailgate latch as the rear hold down.

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- 3.6. Include self-loading front legs mounted on the front edge of the skid, rear legs shall be folding type, self-loading wheels to be approximately 4" diameter with grease fitting.
4. Liquid Pump shall:
 - 4.1. Be a 208 GPM @ 40 PSI cast-iron centrifugal pump with 2" NPT inlet x 1-1/2" NPT outlet ports or equal.
 - 4.2. Have a cast-iron impeller, driven by a hydraulic gerotor motor direct coupled to the pump, 416 stainless steel shaft, or equal, to with stand corrosive environment and not harm the shaft seals.
 - 4.3. Have housing that has integral drain ports with plugs.
 - 4.4. Have pump discharge to a Y-strainer with serviceable screen filter, recirculation valve, and flow meter and a 1" flanged 12-volt electric ball valve with stainless steel ball and field replaceable actuator, which is flanged clamped for easy separation and has valve position indicator.
5. Plumbing and Hardware of units shall:
 - 5.1. Have 304 stainless steel mounting hardware and fasteners including all clamps.
 - 5.2. Include a tank outlet that is approximately 2" stainless steel with a stainless steel nipple and brass full port ball valve.
 - 5.3. Use glass filled Polypropylene plumbing after the main tank outlet shutoff valve and flex connection.
 - 5.4. Incorporate loading and unloading that includes two 2" inch (approximate) polypropylene shut-off ball valve and integral male cam lock.
 - 5.5. Include all required hoses. Hoses shall be nylon reinforced PVC or rubber hose with a minimum working pressure of 100 PSI and a maximum temperature rating of 100° F and shall use standard port 2" (approximate) flange connectors to prevent leaks in the system plumbing.
6. Spray Boom and Nozzles:
 - 6.1. Spray Boom shall have three-lane coverage.
 - 6.2. Spray bars shall be 1-1/2" (approximate size) schedule 80 PVC or equal.
 - 6.3. All spray nozzles shall be brass, straight stream, quick-change, mounted in 16 degree swivel mount that clips on to the spray boom or equal.
 - 6.4. Spray boom shall have a 5-PSI inline diaphragm check valve or equal.
 - 6.5. Center spray boom shall have ten nozzle assemblies and shall be adjustable from approximately 12" to 18" in height from the pavement.
 - 6.6. Side lane booms shall have up to six nozzle assemblies to cover the left and right lanes.
 - 6.7. All spray booms shall be independently controlled by electric on/off ball valves manifold together.
7. System Controls:
 - 7.1. Shall be a ground speed oriented, closed loop, micro-processor based controller
 - 7.2. Shall include the following options:
 - 7.2.1. Digital display

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- 7.2.2. Application rates which can be adjusted on the fly
- 7.2.3. Manual operation
- 7.2.4. Display application error
- 7.2.5. Rotary switch to view any one of the eight following monitored functions (gallons per lane mile, sub gallons, mph, total lane miles, sub lane miles, feet, gallons per minute, total gallons).
- 7.3. Include a controller that shall:
 - 7.3.1. Be capable of receiving a signal from the radar speed sensor and of returning the signal to a proportional liquid valve for rate control.
 - 7.3.2. Have a front panel and display that is backlit.
 - 7.3.3. Have a calibration lockout feature so drivers will be unable to access calibration mode.
- 8. The entire unit shall have a minimum warranty of 12 months. If manufacturer's standard warranty exceeds 12 months then the manufacturer's standard warranty shall apply.

B. 400 Gallon Anti-Icing Spray Units.

- 1. The unit shall:
 - 1.1. Be designed to apply a constant application of liquid product to a road surface regardless of vehicle speed.
 - 1.2. Use a gas-powered engine to drive a pump for the disbursement of liquids using a micro-processor controller linked to a ground speed sensing radar unit which in conjunction with the flow meter shall give the system a complete closed-loop operation.
 - 1.3. Include a separate, externally mounted radar speed sensor to provide ground speed feedback to controller in place of truck speedometer connection.
 - 1.4. System shall be delivered complete and ready to install and run with minor control mounting and harness in a standard 8' truck bed of flat bed truck.
- 2. The Liquid Tank shall:
 - 2.1. Have a minimum capacity of 400 gallons.
 - 2.2. Have a rotationally molded polyethylene tank with a minimum weight of 190 lbs.
 - 2.3. Have 12 molded in baffles.
 - 2.4. Have a sumped suction located in the rear wall near the bottom of the tank.
 - 2.5. Be a low profile rectangular tank with the following approximate dimensions: 27" H x 46" W x 88" L.
 - 2.6. Be made from a material that is UV protected, has a minimum density of .942 and a minimum specific gravity rating of 1.9.
 - 2.7. Have a 16" man way.
- 3. Liquid Pump (Electric Start) shall:
 - 3.1. Be a 110 GPM cast-iron centrifugal pump with a minimum 1-1/2" NPT inlet x 1-1/4" outlet.
 - 3.2. Be capable of pumping 88 GPM @ 40 PSI.
 - 3.3. Be close-coupled to a gas powered 5.5 HP Honda engine or equal with electric start and a 12 volt battery and poly battery box to be mounted to the frame.
 - 3.4. Be plumbed with a positive tank bleed to add in pump priming and the prevention of air locks.

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4. Plumbing and Hardware shall:
 - 4.1. Include a 2" inch polypropylene quick fill port with shut-off ball valve and integral cam locks.
 - 4.2. Have pump discharge plumbing featuring a Y-strainer with serviceable screen filter cartridge and inline liquid pressure relief valve with system pressure gauge.
 - 4.3. Include all hoses, which shall be nylon reinforced PVC or Rubber hose with a minimum working pressure of 100 PSI with a maximum temperature rating of 100° F.
 - 4.4. Include standard port 2" flange connectors to prevent leaks in the system plumbing.
 - 4.5. Have mounting hardware and fasteners that are 304 stainless steel and shall include all clamps.

5. Spray Bar And Nozzles (1 Lane):
 - 5.1. Spray bar shall be a single lane bar constructed from 1" stainless steel pipe.
 - 5.2. This center lane bar shall contain (10) brass straight stream quick-change nozzles mounted in a 16°-swivel mount that clips onto the spray bar, which offers quick-change capabilities.
 - 5.3. The spray bar shall have an inline diaphragm check valve, which is approximately 5 psi, to prevent siphoning.
 - 5.4. The center spray bar shall be made to fit in a receiver hitch and be adjustable in height.
 - 5.5. The spray bar shall be independently controlled by an electric on/off ball valve, which shall be installed in-line after the pump and flow meter.

6. System Controls shall be a ground speed oriented, closed loop, micro processor based controller capable of receiving the signal from the radar speed sensor or truck speedometer and of returning the signal to a proportional liquid valve for rate control and shall include the following.
 - 6.1. A digital display.
 - 6.2. Application rates that shall be adjustable on the fly.
 - 6.3. A manual operation mode.
 - 6.4. Display application error feature.
 - 6.5. Rotary switch for viewing any one of the eight monitored functions as follows: gallons per lane mile, sub gallons, mph, total lane miles, sub lane miles, feet, gallons per minute, total gallons.
 - 6.6. A front panel and display that are backlit.
 - 6.7. A calibration lockout feature to prevent drivers from being able to access the calibration mode.

7. Frame shall:
 - 7.1. Have a heavy constructed 7 gage formed steel frame.
 - 7.2. Be designed to fit in an 8' truck bed or on a flat bed truck between the wheel wells.
 - 7.3. Have forklift pockets to load and unload with ease approximately H 3" x W 7" x Wall 3/16" with an approximate 48" in length steel tube.
 - 7.4. Have a bracket to hold the spray bar when unit is not being used or is being stored.
 - 7.5. Have a bracket for the radar unit.

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- 7.6. Be powder coated with epoxy based powder coat which passes the ASTM 10 @ 500 hrs, de-burred, and have no sharp edges.
 - 7.7. Have the approximate dimensions of 120" long x 58" at the widest point x 3" in height.
 8. The entire unit shall have a minimum warranty of 12 months. If manufacturer's standard warranty exceeds 12 months then the manufacturer's standard warranty shall apply.
- C. Vertical Storage Tank and Transfer System. The 4,000, 7,800 gallon and 10,000 gallon tanks have the same specifications with the exception of the minimum capacity.
1. Tank shall:
 - 1.1. Be constructed of rotationally molded, high-density linear polyethylene.
 - 1.2. Be UV stabilized.
 - 1.3. Carry a minimum specific gravity rating of 1.9.
 - 1.4. Have an 18" threaded man way at the top of the tank for interior access to the tank.
 - 1.5. Have molded in lifting lugs to insure safety in unloading, relocating and installing the tank.
 - 1.6. Have molded flat areas on the top of the tank for both proper fitting installation and ease of movement.
 - 1.7. Have two 2", 316 SS bolted fittings installed in the tank. One fitting shall be installed as close to the bottom as possible for suction and draining and the other fitting shall be installed a minimum of 5' above the bottom tank outlet for recirculation capabilities. Each outlet shall be equipped with a brass nipple, brass ball valve, and male poly camlock fitting to connect to the mating hoses connected to the pump.
 2. Pump shall be a 1-1/2" inlet x 1-1/2" outlet, bronze centrifugal pump with a stainless steel shaft and mechanical seal and shall be close coupled to a 2 HP, 115/230 volt, single phase, 3450 RPM, TEFC motor or equal. Bases on water, this pump shall be capable of pumping 90 GPM at 20 PSI. The pump assembly shall be mounted on a powder coated steel frame and enclosed in a UV stabilized polyethylene enclosure.
 3. Frame shall incorporate a 5' vertical post that shall include a hose rack to store the fill and unload hoses in the off season, as well as, provide a place to mount the pump control and run light.
 4. The run light shall be red in color and will illuminate with the pump when the pump is turned on. Run light shall be mounted on the 5' vertical post of the frame.
 5. Plumbing shall:
 - 5.1. Be equipped with a 3-way poly ball valve on each side of the pump and shall be accessible from the outside of the pump enclosure.
 - 5.2. Have a brass nipple for connection between the pump and the ball valve.
 - 5.3. Have three-way ball valves that shall allow for the filling and unloading of truck mounted tanks and shall also allow for the recirculation of the storage tank. The valve on the suction side of the pump shall be a side load 1-1/2" poly valve, while the valve on the discharge side of the pump shall be a bottom load 1-1/2" poly valve.

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6. Hoses:

The hoses on the suction side of the pump shall be constructed of heavy-duty EPDM rubber or equal that has been wire reinforced. These hoses shall be the following approximate lengths and sizes: 2" x 15' to connect the storage tank to the pump, 1-1/2" x 25' to connect truck mounted tank to the pump for offloading. The hoses on the discharge side of the pump shall be constructed of heavy-duty EPDM rubber or equal and shall consist of the following approximate lengths and sizes: 1-1/2" x 25' to connect the storage tank to the pump for recirculation, 1-1/2" x 25' to connect truck mounted tanks to the pump for filling. Each hose end that connects to the storage tank shall include female camlock fittings to connect to the mating male camlock fittings. Each hose end that connects to the truck mounted tanks shall include a hose barb, ball valve, and proper camlock fitting to mate to the fitting on the truck mounted tanks.

7. The tank shall have a minimum warranty of 12 months from date of delivery. If manufacturer's standard warranty exceeds 12 months then the manufacturer's standard warranty shall apply.