**Attachment 1- Slip-on Firefighting Unit- Minimum Specifications**

The following specifications are for a complete slip-on firefighting unit. The entire slip-on unit shall be mounted on a rectangular platform that is integrated with the water storage tank that can accommodate forklift blades or has integral lifting points. The slip-on unit shall have minimum dimensions of 78 inches long by 48 inches wide (± 0.25 inches). The fully loaded weight of the completed unit shall not exceed the gross vehicle weight rating (GVWR) of the host chassis.

All fasteners and adjustable plumbing brackets used shall be stainless steel. All tubing shall use metal fittings, rated to 500 pounds per square inch and requiring no special tools. No underside nuts or bolts shall be used. Non-slit corrugated loom shall cover all water lines.

The electrical function of the slip-on unit shall be wired to operate only when the master switch is ON.

**Pump Motor – Minimum 18 HP output.**

- The pump shall be driven by a four-cycle gas powered auxiliary air-cooled 4- cycle California Air Resources Board (CARB) compliant electric start engine with backup recoil starter, fixed mounted on the rear and integrated on the slip-on unit.
- The pump motor exhaust shall include a US Forest Service (USFS) qualified spark arrestor.
- The pump motor shall include a fuel tank with a two-gallon (minimum) capacity, increasing commensurate to tank water capacity.
- The pump unit shall be equipped with a low-pressure shutdown switch set at manufacturer's recommended safe pressure.
- The pump motor shall be equipped with low oil protection.
- All serviceable items such as air filters, oil filters, drains, and fuel pumps shall be accessible for routine maintenance without tools.
- There shall be custom fabricated polished aluminum tread plate safety shield(s) to prevent damage or injury if the potential exists for loose clothing, hands, or foreign objects to enter any other moving parts of the auxiliary pump.
- The pump motor shall carry a three-year (minimum) warranty.

**Pump -** The pump shall be capable of delivering the minimum performance requirements from the tank, and at a 5-foot lift through 24 feet of 1½-inch suction hose and a suction strainer. The pump shall be capable of achieving the same minimum performance criteria when water supply is from the water tank through the tank to the pump valve.

**Pump Certification -** The pump, when dry, shall be capable of taking suction and discharging water in compliance with National Fire Protection Association (NFPA) 1900 (previously 1906). The pump shall be tested at the manufacturer's facility. The conditions of the pump test shall be as outlined and in accordance with current NFPA 1901 (previously 1906).

The pump shall deliver the percentage of rated capacities at pressures indicated: 100% of rated capacities at 150 PSI (1000KPA) net pump pressure.

The pump manufacturer shall certify that the pump can deliver the following minimum capacities as measured at the pump head:

50 GPM at 100 psi net pump pressure
30 GPM at 150 psi net pump pressure
200 psi shutoff pressure

The pump shall have a self-adjusting mechanical pump seal.

**Foam System-** Optional selection by ordering entity.

**Plumbing-** All plumbing components shall be fabricated from stainless steel or brass and high-pressure flexible hose where appropriate. All plumping components shall be designed to allow easy disassembly of components for repairs and maintenance. Full-flow quarter turn ball valves shall be used throughout. All visible quarter turn ball valves shall be in the closed position when the valve handle is perpendicular to the run of the pipe and in the open position when the handle is parallel to the run of the pipe. Any blind valves shall be labeled "open" and "closed." All controls shall be accessible from the ground without climbing onto the utility, platform, or pickup bed.
Valve labeling - Each valve shall be labeled as to its function immediately adjacent to the valve control. The valves shall be labeled in accordance with the US Forest Service valve numbering system in common use with off-road firefighting agencies. A placard with an identification key shall be affixed at the rear of the apparatus.

- Suction Side –
  - a manual hand diaphragm primer. The primer shall be equipped with an internal or external check valve. The primer valve shall be labeled #6. The primer shall develop 17 inches of HG vacuum, prime and pump water from a 10-foot lift in 30 seconds (maximum)and pump water from a 17-foot lift.
  - Overboard Suction supply through a minimum 2-inch NH Valve (labeled #8).
  - A Y strainer shall be installed prior to the pump to strain water from both overboard suction and tank. The strainer shall have a screw-off cap to allow access and easy cleaning of the filter element in the field.
  - Tank to Pump line shall be 2-inch (minimum) with valve labeled #1.
  - two (2), eight-foot x 2-inch sections of not collapsible, clear PVC suction hose with appropriate female fittings to attach to Overboard suction and male fittings to attach to foot valve.
  - one (1), two-inch foot valve barrel strainer with appropriated fitting to attach to the suction hose.
- Discharge Side–
  - The pump to tank line shall be 1- inch (minimum). The pump to tank line shall include a check valve prior to a quarter turn shut off (labeled #2). A ⅛-inch pump cooler line shall be installed and plumbed around the pump to tank valve and into the tank fill tower. The cooler line shall include a shut off valve (labeled #17).
  - One (1) 1.5-inch NH rear discharge valve (labeled #3) with chrome cap and aircraft cable retainer shall be installed.

    - One (1) booster hose reel with 1-inch net positive suction head (NPSH) outlet, and capacity for 100 feet of 1-inch inside diameter REELTEX® hose, shall be provided and mounted on the tank module. The reel shall be installed in a fashion that allows unobstructed hose deployment on both the driver and passenger side of the vehicle. Chrome outriggers, spools and roller assemblies shall be installed on both sides of the reel (driver and passenger sides). A one inch (minimum) flexible line shall be plumbed from the discharge pluming manifold to the hose reel, the line shall be equipped with quarter turn shut off valve (labeled #4) to turn off water supply in the event the supply line or hose on the reel is damaged. The water supply inlet shall be equipped with a 90-degree swivel joint. The reel shall be provided with a 12- volt electric rewind and brake.
    - A check valve(s) shall be installed on each discharge.
    - A placard shall be installed on the slip-on unit with detailed pump operation steps/instructions.
- Winterization
    - The pump shall have a drain (labeled #11) at the bottom of the volute that will fully drain the pump.
    - All plumbing shall be capable of being drained for winterization by opening all valves.
    - The tank shall be capable of being drained with gravity (through the tank to pump and suction valves) or retaining the tank water when the plumbing is drained.
    - A placard shall be installed on the slip-on unit with detailed steps/instructions for proper winterization.

**Printed Materials for the Pump** -

One set of printed operation, service, and parts manuals shall be provided. Each manual shall be presented with a table of contents. Manuals shall contain the following:

- Operating instructions, descriptions, specifications, and ratings for the chassis, installed components, and auxiliary systems.
- Warnings and cautions pertaining to the operation and maintenance of the fire apparatus and firefighting systems.
- Charts, tables, checklists, and illustrations relating to lubrication, cleaning, troubleshooting, diagnostics, and inspections.
- Instructions regarding the frequency and procedure for recommended maintenance.
- Maintenance instructions for the repair and replacement of installed components.
- Parts listing with descriptions and illustrations for identification.

**Controls/Gauges/Lights-**

Any connection to the chassis shall be proved with easy access to simplify and accommodate removal of the unit. A brushed stainless steel control panel shall be provided and located rear-facing. The panel shall be appropriately sized with the controls positioned in a methodical, user-friendly format. The panel shall have an extended top to assist in weather protection and to house the panel light. The Control Panel shall be equipped with

- a switch for pluming area lighting,
- a Liquid filled 2.5-inch (minimum) freeze protected 0-300 psi pressure gauge,
- an hour meter,

- ignition start/stop switch,
- Twist type throttle control,
- choke, low pressure shut down switch, and
- primer controls (if electric). Manual primer controls may be located elsewhere in an easily accessible location.
- The plumbing area **and** controls shall be equipped with weatherproof LED lighting.

The Tank shall be equipped with a sight gauge to view the level of water.
Each valve shall be labeled as to its function immediately adjacent to the valve control. The valves shall be labeled in accordance with the US Forest Service valve numbering system in common use with off-road firefighting agencies. A placard with an identification key shall be affixed at the rear of the apparatus.

**Water Tank**
Water Tank design to maximize water carrying capability while limiting negative effect on chassis center of gravity and stability.

- The water tank shall be constructed from ½ (minimum) Polypropylene and have a capacity minimum capacity of 100 Gallons and maximum capacity of 850 Gallons. This material shall be non-corrosive stress relieved thermoplastic, be black in color and U.V. stabilized for maximum protection.
- The tank assembly shall be provided with provisions for securely attaching to a pickup bed with accessible hardware for easy removal using a hoist or forklift.
- The tank assembly shall have a lifetime warranty to cover defects in workmanship and materials for the service life of the vehicle.
- The tank shall be designed to be completely independent of the platform structure.
- All joints and seams shall be nitrogen- welded inside and out.
- All exposed edges on the tank and fill tower shall be rounded off to a ¼- inch radius.
- The tank shall have a manual fill tower (labeled WATER) with debris strainer, located on the top at the rear. The fill tower cap shall be provided with a hinged cover with hinges placed on the cab side. The fill tower shall be constructed of same material as the rest of the tank and shall have a minimum dimension of 6 inches by 6 inches outer perimeter.
- The water tank shall be vented.
- The tank construction shall meet all baffling requirements of NFPA 1900 (previously NFPA 1906), latest edition.
- The tank shall be equipped with an internal piping that terminates ½ inches from the bottom of a sump. The sump shall have a 1.5-inch outlet on the bottom for cleanout and draining.
- The tank shall be equipped with an anti-cavitation device.
- The tank assembly shall include integrated storage for 200 feet of 1-inch synthetic hose, and the compartment or tray shall allow the hose to be pre-connected to the #3 discharge.

**Electrical System** -
1 – Qwik-connector (or equivalent) for the 12volt battery to skid unit connection. 4’ of 4-gauge (red) and 4’ of 4 - gauge (black) battery cables along with male and female connectors are supplied by the manufacturer.

**Slip on Unit Warranties**

The polypropylene water tank that is specified to be supplied with this slip-on unit shall be warranted by the water tank manufacturer for a "lifetime" period from the date that the slip- on is put into service. The manufacturer shall repair, at no cost to the purchaser, any problems caused by defective materials and/or workmanship. The warranty shall cover the reasonable costs of removing the water tank from the apparatus and reinstalling it after the completion of the covered warranty repairs.
All other materials and workmanship herein specified, including all equipment furnished, shall be guaranteed for a period of ten years after the acceptance date of the apparatus, unless otherwise noted, with the exception of any normal maintenance services or adjustments which shall be required.

Under this warranty, the apparatus manufacturer shall be responsible for the costs of repairs to the apparatus that have been caused by defective workmanship or materials during this period.