121147 Rev.A

QMax, QFlo+, Qtwo Side Mount Module Specification

DETAILED SPECIFICATIONS

SPECIAL NOTE:
When preparing the specifications for your new apparatus, assure the use of Hale® products by incorporating these specifications as written.

QMAX PUMP ASSEMBLY

1. The pump shall be of size and design to mount on the chassis rails of a commercial and/ or custom truck chassis, and have the capacity of ___ gallons/ liters per minute as NFPA-1901 rated performance requirements.
2. The entire pump shall be assembled and tested at the pump manufacturer's factory.
3. The pump shall function by the utilization of a driveline from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable the pump to meet and exceed its rated performance.
4. The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be tested at the pump manufacturer's facility to performance specifications as outlined by NFPA-1901 rated performance requirements. The pump shall be free from objectionable pulsation and vibration.
5. The pump body and related parts shall be constructed of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2,069 bar). All metal moving parts in contact with water shall be manufactured of high quality bronze or stainless steel. Any pump utilizing castings made of lower tensile strength cast iron not acceptable.
6. The pump body shall be horizontally split, on a single plane in two sections, for ease of removal of the impeller assembly. Wear rings and bearings associated with the pump body shall remove easily without disturbing the piping or mounting of the pump in chassis.
7. The pump body shall incorporate the discharge manifold system with a minimum of two (2) 4” (10.16 cm) port and seven (7) 3” (7.62 cm) ports.
8. The pump shall have one (1) double suction impeller. The pump body shall have two (2) opposed discharge volute cutwaters to eliminate radial unbalance.
9. The pump shaft shall be rigidly supported by three (3) bearings for minimum deflection. There shall be one (1) high lead bronze sleeve bearing to be located immediately adjacent to the impeller found on the side opposite of the gearbox. The sleeve bearing shall be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material. (No exceptions.) The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.
10. The pump shaft shall have only one (1) packing gland located on the inlet side of the pump. The pump shaft shall be of split design for ease of repacking. The packing gland shall be manufactured of a full-circle threaded design to exert uniform pressure on packing and to prevent "cocking" and uneven packing load when it is tightened. (No exceptions.) The pump shaft shall be adjusted easily by hand with rod or screwdriver without special tools or wrenches required. The packing rings shall be of a unique, permanently lubricated, long-life graphic composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion. (No exceptions.) There is an optional mechanical seal in place of pump packing. There shall be only one (1) required on the suction (inboard) side of the pump. The mechanical seal must be two (2) inches in diameter and shall be spring loaded, maintenance free and self-adjusting.
11. The pump impeller shall have clearance rings manufactured of bronze, easy to remove, without replacing impeller or pump volute body. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.
12. The pump shaft shall be manufactured of heat-treated, electric furnace, corrosion resistant stainless steel for longer shaft life. The pump shaft shall be sealed with a double-lip oil seal to keep road dirt and water out of gearbox.

-or-

QFLO+ PUMP ASSEMBLY

1. The pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of ___ gallons per minute (U.S. GPM), NFPA-1901 rated performance.

2. The entire pump shall be assembled and tested at the pump manufacturer's factory.
3. The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.
4. The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.
5. The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.
6. Pump body shall be vertically split, on a single plane for easy removal of entire impeller assembly including wear rings and bearings from the pump without disturbing piping or the mounting of the pump in chassis.
7. The pump body shall extend as one piece across the truck chassis from side mounting to side mounting and incorporate the discharge manifolding system with a minimum of (1) 4” ports and (9) 3” ports.
8. Pump shaft to be rigidly supported by bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.
9. The pump shaft shall have: one (1) mechanical seal on the suction (inboard) side of the pump. The mechanical seal must be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat.
10. Pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.
11. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body. (No exceptions.)
12. The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

-or-

QTWO PUMP ASSEMBLY

1. The pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of ___ gallons per minute (U.S. GPM), NFPA-1901 rated performance.
2. The entire pump shall be assembled and tested at the pump manufacturer's factory.
3. The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.
4. The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.
5. The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.
6. Pump body shall be horizontally split, on a single plane in two sections for easy removal of entire impeller assembly including wear rings and bearings from beneath the pump without disturbing piping or the mounting of the pump in chassis.
7. The pump body shall extend as one piece across the truck chassis from side mounting to side mounting and incorporate the discharge manifolding system with a minimum of (2) 4” ports and (7) 3” ports.
8. The pump shall have two impellers and be of series-parallel, two stage design. The pump shall be equipped with an all bronze waterway transfer valve, capable of switching from one pumping mode to the other with two and one-half turns of the transfer valve control handwheel. (No exceptions) The transfer valve shall be equipped with a positive mechanical indicator to register the position of the transfer valve at all times. (If optional power transfer valve is supplied, it shall be equipped with a manual override and not be electrically operated.) (No exceptions.)
9. Pump shaft to be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing to be located immediately adjacent to the impeller (on side opposite the gearbox).
   The sleeve bearing is to be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material. (No exceptions.) The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.
10. The pump shaft shall have only one packing gland located on the inlet side of the pump. It shall be of split design for ease of repacking. The packing gland must be a full-circle threaded design to exert uniform pressure on packing and to prevent "cocking" and uneven packing load when it is tightened. (No

exceptions.) It shall be easily adjusted by hand with rod or screwdriver without special tools or wrenches required. The packing rings shall be of a unique, permanently lubricated, long-life graphic composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion. (No exceptions.)

10a. Optional mechanical seal in place of pump packing. One (1) only required on the suction (inboard) side of the pump. The mechanical seal must be two (2) inches in diameter and shall be spring loaded, maintenance free and self-adjusting. Mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

11. Pump impellers shall be hard, fine grain bronze of the mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.
12. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wrap-around double labyrinth design for maximum efficiency. (No exceptions.)
13. The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel to be super-finished under packing for longer shaft life. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

GEARBOX

1. The pump gearbox shall be of sufficient size to withstand up to 16,000 lb/ft (7,257 kg/m) of drive through torque of the engine system. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.
2. The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-¾" (6.99 cm) in diameter, on both the input and output drive shafts. The drive shaft shall withstand the full torque of the engine.
3. All drive and pump gears shall be manufactured of the highest quality electric furnace chrome nickel steel. All bores shall be ground to size, teeth integrated and hardened, to create an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust. (There will be no exceptions.)
4. The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.
5. If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat-treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.
6. All apparatus' built with automatic transmissions shall be provided three (3) green warning lights to indicate to the operator(s) when the pump has completed the shift from road to pump position. The warning lights will be located as stated: two (2) in the truck driving compartment and one (1) on the pump operator's panel adjacent to the throttle control. For manual transmissions, one (1) green warning light will be provided for the driving compartment. All lights shall have appropriate identification/instruction plates.

CERTIFICATION

The pump will perform and meet the following tests:
100% of rated capacity @150 PSI net pump press.
100% of rated capacity @ 165 PSI net pumps press.
70% of rated capacity @ 200 PSI net pump press.
50% of rated capacity @ 250 PSI net pump press.
Pump shall be tested at manufacturer under full NFPA suction conditions.

PRIMING PUMP

The priming pump shall be a positive displacement, oil-less rotary vane electric motor driven pump conforming to NFPA-1901 rated performance requirements. The pump body shall be manufactured of heat-treated anodized aluminum for wear and corrosion resistance.
The pump shall be capable of producing a minimum of 24 Hg vacuum at 2,000 feet (609.6m) above sea level.
The electric motor shall be a 12 VDC totally enclosed unit.
The priming pump shall not require lubrication. The priming pump shall operate by a single pull control valve mounted on the pump operator's panel. The control valve shall be manufactured of bronze construction.

6" STEAMER INLETS

Two 6" (15.24cm) steamer inlets will be provided, one (1) on the left side and one (1) on the right side. Both inlets shall have long handle chrome vented caps and a screen.

RELIEF VALVE
There shall be one (1) suction side stainless steel relief pump valve provided on the pump system.

PUMP MODULE BODY

The pump module body shall be a self-supported structure mounted independently from the body and chassis cab. The pump module shall be constructed entirely of extrusions and aluminum plate. The framework shall be formed from beveled aluminum alloy extrusions and shall be electrically seam welded at each joint using 5356 aluminum alloy welding wire. The main framework to be 3.00 x 3.00 x 0.18, or 3.00 x 1.5 webbed 0.25, 6063-T5 aluminum extrusion. The pump module design must allow normal frame deflection through isolation mounts without imposing stress on the pump module structure or side running boards. The pump module shall consist of a welded framework, properly braced to withstand chassis frame flexing. The pump module support shall be bolted to the frame rails of the chassis.

PUMP MODULE PANELS

The pump module panels shall be 14 gauge brushed stainless steel. The panels shall be an integral part of the module.

PUMP CERTIFICATION TEST PLATE

A permanently affixed plate shall be installed at the pump operators position that will provide the rated discharge and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump used and the no load governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

DISCHARGE VALVES
The valves including the ball shall be constructed of 304 stainless steel. The valves shall be bi-directional with full flow capability. The valves shall be of fixed pivot ball design with a flow pressure rating to meet NFPA-1901 standards. The valve shall have a single piece seat and seal design and shall have an operating pressure of 400 psi. All 3.0” (7.62cm) discharge valves shall be supplied with a true slow close mechanism per NFPA specifications. The valve shall be warranted for a period of ten (10) years on all stainless steel components, against defects in design and manufacturing processes.

PIPING AND MANIFOLDS
All the plumbing and/or piping in the pump module shall be of 304 stainless steel or flexible piping for long life. All stainless steel castings shall be a minimum of schedule 40. All NPT pipe thread connections larger than ¾” connections shall be avoided in the construction of the plumbing system. The following valves shall have groove connection: rear discharge, tank fill, all 2” and 2-½” (5.08 and 6.35cm) pre-connect valves.

The flexible piping shall be black SBR synthetic rubber hose with 300 working pounds and 1200 pounds burst pressure for sizes 1.5 through 4”. Sizes ¾”, 1” and 5” are rated at 250 pound working and 1000 pound burst pressure. All sizes are rated at 30 HG vacuum. Reinforcement consists of two plies of high tensile strength tire cord for all sizes sand helix wire installed in sizes 1 through 5” for maximum performance in tight bend applications. The material has a temperature rating of –40 degrees F to 210 degrees F. Full flow couplings are precision machined from high tensile strength stainless steel. All female couplings are brass. ¾” and 1” male and Victaulic couplings are brass.

PUMP COOLER and ENGINE COOLER VALVES
An engine cooler and pump cooler valve shall be installed in the instrument panel.
The valves shall be a 1/4" multi-turn valve installed thru the instrument panel and labeled.

MASTER PUMP DRAIN
The pump shall be equipped with a Class 1 Master Pump drain to allow draining of the lower pump cavities, volute and selected water carrying lines and accessories. The drain shall have an all brass body with a stainless steel return spring.

U.L. TEST POINTS
Two (2) U.L. test points shall be mounted on the pump panel for testing of the vacuum and pressures. The test points shall be a single piece with individual ports for suction and discharge.

VALVE CONTROLS
Class 1 locking push pull control rods shall be provided for valve actuation. The chrome plated zinc handles shall have a recessed area for 1” x 3” (2.54 x 12.70cm) identification tags. The controls shall be locked in any position.

DISCHARGE GAUGES
Individual Class 1 2-½(6.35cm) line gauges for each 2” (5.08cm) or larger discharge shall be provided and mounted adjacent to the discharge valve control handle. The gauges shall indicate pressure from 0 to 400 PSI. The pressure gauge shall be fully filled with pulse and vibration dampening Interlube® to lubricate the internal mechanisms to prevent lens condensation and to ensure proper operation to minus 40 degrees F. To prevent internal freezing and to keep contaminants from entering the gauge, the stem and Bourdon tube shall be filled with low temperature material and be sealed from the water system using an isolating Sub Z diaphragm located in the stem. A colored bezel shall be supplied for resistance to corrosion and to protect the lens and case from damage.

INDIVIDUAL DRAINS
All 2” (5.08cm) or larger discharge outlets shall be equipped with a ¾” ball valve drain valve or larger.

WIRING HARNESS
The Class 1 electrical wiring harness shall be manufactured using GXL wire as SAE- J1128 rated performance requirements. The electrical wiring harness shall be covered by a black split convoluted loom, rated at a minimum of 275º F. All terminals shall meet the minimum pull test as required by the manufacturers pull test and crimp measurement data. All splices shall be manufactured using the ultra sonic splice process. The harness shall be 100% connected to a Dynalab® circuit tester to insure continuity and correct assembly.

LEFT SIDE FRONT DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be located on the left side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 2-½" (6.35cm) MNST threads. A chrome vented cap and chain shall also be supplied. The valve shall be controlled at the side panel with a swing handle. There shall be a Class 1 2 ½” pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 700 GPM or greater.

LEFT SIDE REAR DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be located on the left side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 2-½" (6.35cm) MNST threads. A chrome vented cap and chain shall also be supplied. The valve shall be controlled at the side panel with a swing handle. There shall be a Class 1 2 ½” pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 700 GPM or greater.

LEFT SIDE AUXILLLARY SUCTION
One (1) 2-½" (6.35cm) intake with a stainless steel valve shall be located on the left side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall be controlled at the side pump panel with a swing handle. The valve shall come equipped with a chrome plug, chain, inlet strainer, 2-½ (6.35 cm) NST chrome inlet swivel and ¾” drain valve.

<u>OPTIONS:</u>

RIGHT SIDE FRONT DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 2-½" (6.35cm) MNST threads. A chrome vented cap and chain shall also be supplied. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½”

pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 700 GPM or greater.

-or-

RIGHT SIDE FRONT DISCHARGE
One (1) 3" (7.62cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 3" (7.62cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 3"(7.62cm) MNST threads. The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 1500 GPM or greater.

-or-

RIGHT SIDE FRONT DISCHARGE
One (1) 3" (7.62cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 4" (10.16cm) outlet shall be equipped with an integral, stainless steel, straight flange terminating with 4"(10.16cm) MNST threads. The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 1500 GPM or greater.

-or-

RIGHT SIDE FRONT DISCHARGE
One (1) 4" (10.16cm) electric controlled discharge valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall be controlled with a switch panel mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 2250 GPM or greater.

RIGHT SIDE REAR DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 2-½" (6.35cm) MNST threads. A chrome vented cap and chain shall also be supplied. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 700 GPM or greater.

-or-

RIGHT SIDE REAR DISCHARGE
One (1) 3" (7.62cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 3" (7.62cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 3"(7.62cm) MNST threads. The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 1500 GPM or greater.

-or-

RIGHT SIDE REAR DISCHARGE
One (1) 3" (7.62cm) discharge with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 4" (10.16cm) outlet shall be equipped with an integral, stainless steel, straight flange terminating with 4"(10.16cm) MNST threads. The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 1500 GPM or greater.

RIGHT SIDE AUXILLLARY SUCTION
One (1) 2-½" (6.35cm) intake with a stainless steel valve shall be located on the right side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The valve shall be controlled at the side pump panel with a swing handle. The valve shall come equipped with a chrome plug, chain, inlet strainer, 2-½ (6.35 cm) NST chrome inlet swivel and ¾" drain valve.

DECK GUN DISCHARGE
One (1) 3" (7.62cm) discharge with a stainless steel valve shall be located on the top of the pump. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 3" (7.62cm) outlet shall be equipped with an integral, stainless steel flange terminating with 3"(7.62cm) Victaulic. The discharge shall be plumbed to the top of the module using 3" (7.62cm) schedule 10 stainless steel pipe. The pipe shall terminate in a 3" (7.62cm) MNPT thread. The pipe shall be held in place by a 2 piece stainless steel bracket. The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a ¾" automatic drain valve. The discharge must be capable of flowing 1500 GPM or greater.

-or-

DECK GUN DISCHARGE
There shall be a 4"(10.16cm) discharge valve installed at the top of the pump. The valve shall be a quarter turn ball type of fixed pivot design and be electronically controlled. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a ¾" automatic drain valve. The discharge must be capable of flowing 2000 GPM or greater.

LEFT REAR DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be plumbed to the left side rear. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½"(6.35cm) valve outlet terminates with 2-½"(6.35cm) grooved connection. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge must be capable of flowing 500 GPM or greater.

JUMP LINE DISCHARGE
One (1) 2"(5.08cm) discharge with a stainless steel valve shall be plumbed to the _____. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2"(5.08cm) valve outlet terminates with 2"(5.08cm) grooved connection. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge shall be foam capable.

TANK FILL
One (1) 1 1/2"(3.81cm) discharge with a stainless steel valve shall be plumbed to the tank. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 1 1/2"(3.81cm) valve outlet terminates with 1 1/2"(3.81cm) grooved connection. Valve shall be controlled at the side panel with a chrome-plated push/pull locking "T" handle mounted on the pump panel.

-or-

TANK FILL
One (1) 2"(5.08cm) discharge with a stainless steel valve shall be plumbed to the tank. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2"(5.08cm) valve outlet terminates with 2"(5.08cm) grooved connection. Valve shall be controlled at the side panel with a chrome-plated push/pull locking "T" handle mounted on the pump panel.

-or-

TANK FILL
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be plumbed to the tank. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) valve outlet terminates with 2-½" (6.35cm) grooved connection. Valve shall be controlled at the side panel with a chrome-plated push/pull locking "T" handle mounted on the pump panel.

CROSSLAY 1 ¾"
One double crosslay shall be installed on apparatus. Each section of the crosslay shall hold 200' of 1-3/4" double jacket fire hose. A 1-1/2" mechanical swivel hose connector shall be used in each crosslay to provide access of hose in either direction. Each crosslay shall have one (1) 2" (5.08cm) stainless steel valve. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2"(5.08cm) valve outlet terminates with 2"(5.08cm) grooved connection. The discharge shall be plumbed to the crosslay trays using 2" (5.08cm) schedule 10 stainless steel pipe. The pipe shall terminate in a stainless steel swivel with 1 ½" (3.81cm) NH thread. The swivel shall allow the hose to be pulled from either side of the apparatus. The pipe shall be held in place by a 2 piece stainless steel bracket. Each valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near each control to indicate pressure. Each discharge shall also come equipped with a quarter-turn ¾" drain valve. Each discharge shall be foam capable. Each discharge must be capable of flowing 180 GPM or greater.

RIGHT REAR DISCHARGE
One (1) 2-½" (6.35cm) discharge with a stainless steel valve shall be plumbed to the right side rear. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½"(6.35cm) valve outlet terminates with 2-½"(6.35cm) grooved connection. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge shall be foam capable. The discharge must be capable of flowing 500 GPM or greater.

-or-

CROSSLAY 2 ½"
One single crosslay shall be installed on apparatus. The section of the crosslay shall hold 200' of 2 ½"" double jacket fire hose. A 2-1/2" stainless steel mechanical swivel hose connector shall be used in the crosslay to provide access of hose in either direction. The crosslay shall have one (1) 2-½" (6.35cm) stainless steel valve. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2-½" (6.35cm) valve outlet terminates with 2-½" (6.35cm) grooved connection. The discharge shall be plumbed to the crosslay trays using 2 ½" (6.35cm) schedule 10 stainless steel pipe. The pipe shall terminate in a stainless steel swivel with 2 ½" (6.35cm) NH thread. The swivel shall allow the hose to be pulled from either side of the apparatus. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel. There shall be a Class 1 2 ½" pressure gauge mounted on the panel near the control to indicate pressure. The discharge shall also come equipped with a quarter-turn ¾" drain valve. The discharge shall be foam capable. The discharge must be capable of flowing 350 GPM or greater.

TANK TO PUMP
One (1) 3" (7.62cm) stainless steel valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall be controlled with a chrome-plated push/pull locking "T" handle mounted on the pump panel.

-or-

TANK TO PUMP
One (1) 3" (7.62cm) stainless steel valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall be actuated with an air cylinder. The valve shall be controlled with a switch at the pump panel.

-or-

TANK TO PUMP
One (1) 3"(7.62cm) stainless steel valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall be actuated with an electric motor. The valve shall be controlled with a switch at the pump panel.

-or-

TANK TO PUMP
One (1) 4" (10.16cm) valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall be actuated with an air cylinder. The valve shall be controlled with a switch at the pump panel.

-or-

TANK TO PUMP
One (1) 4" (10.16cm) valve shall be installed between the water tank and the pump. The valve shall be a quarter turn ball type. The valve shall be electric controlled with a switch at the side pump panel.

MASTER GAUGES
Class 1 4-½(11.43cm) gauges shall be provided. The master discharge gauge shall indicate pressure from 0 to 600 PSI. The master intake gauge shall indicate pressure from -30hg to 600 PSI. The gauges shall be Interlube filled pressure gauges and handle pressures from 0 to 400 PSI. The pressure gauge shall be fully filled with pulse and vibration dampening Interlube® to lubricate the internal mechanisms to prevent lens condensation and to ensure proper operation to minus 40 degrees F. To prevent internal freezing and to keep contaminants from entering the gauge, the stem and Bourdon tube shall be filled with low temperature material and be sealed from the water system using an insolating Sub Z diaphragm located in the stem.

TOTAL PRESSURE GOVERNOR PLUS (TPG+)
Apparatus shall be equipped with a Class1 “Total Pressure Governor Plus” (TPG+) that is connected to the Engine Control Module (ECM) mounted on the engine. The “TPG+” will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine’s J1939 data for optimal resolution and response when supported by the engine manufacturer. If J-1939 engine control is not supported, then analog remote throttle control shall be provided by the “TPG+”. The “TPG+” shall function as a Master Pump Discharge and Intake Gauge.
The TPG+ shall utilize control algorithms that minimize pressure spikes during low or erratic water supply situations. The “TPG+” shall be backwards compatible to any engine that supplies J1939 RPM, Temperature and Oil Pressure information providing the ability to maintain a consistent fleet fire-fighting capability and reduce operator cross training and confusion.
The “TPG+” shall have the ability to use either a 300 PSI or a 600 PSI discharge pressure transducer and a 300 PSI intake pressure transducer. PSG system diagnostics shall be built in and accessible by technicians. Programmable presets for RPM and Pressure settings shall be easily configurable. The straightforward menu structure shall allow the “TPG+” configuration to match existing apparatus operation as closely as possible. The “TPG+” shall also include indication of engine RPM, system voltage, engine oil pressure and engine/transmission temperature with audible alarm output for all. The “TPG+” uses the J1939 data bus for engine information, requiring no additional sensors to be installed. The TPG+ shall monitor and display pump and engine hours. The “TPG+” shall use J1939 broadcast warnings for the alarm as a standard and allow the “user” to select warning values if “SOP’s” dictate.

-or-

TOTAL PRESSURE GOVERNOR (TPG)

Apparatus shall be equipped with a Class 1 “Total Pressure Governor” (TPG) that is connected to the Electronic Control Module (ECM) mounted on the engine. The “TPG” will operate as a pressure sensor (regulating) governor (PSG) utilizing the engine’s J1939 datalink for optimal resolution and response provided that J1939 is supported by the engine manufacturer. If J-1939 engine control is not supported, then analog remote throttle control shall be provided by the TPG, subject to J1939 RPM data availability.
The TPG shall utilize control algorithms that minimize pressure spikes during low or erratic water supply situations and display operational status messages to the operator under certain circumstances. The TPG shall be backwards compatible to any engine that supplies J1939 RPM, Temperature and Oil Pressure information providing the ability to maintain consistent fleet fire-fighting capability.
TPG shall incorporate the ability to use either a 300 PSI or a 600 PSI transducer for best operation. PSG system diagnostics shall be built in and accessible by service technicians.
Programmable presets for RPM and Pressure settings shall be easily configurable. The TPG shall incorporate configurable parameters in the menu structure accessed through a diagnostic password.
The “TPG” shall also include indication of engine RPM, system voltage, engine oil pressure and engine temperature with audible alarm output for all. The “TPG” uses the J1939 data bus for engine information, requiring no additional sensors to be installed.
The TPG shall use J1939 broadcast warnings for the alarm points as a standard.

ITL-40 TANK LEVEL GAUGE
The apparatus shall be equipped with a Class1 “ITL-40” Tank Level Gauge for indicating water or foam level. The Tank Level Gauge shall indicate the liquid level or volume on an easy to read LED display and show increments of 1/8 of a tank.
Each tank level gauge system shall include:
1) A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
2) A super bright LED display viewable from 180 degrees with a visual indication at nine accurate levels.
3) A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power. Additional (slave) displays (if requested) are to be easily integrated and will receive data from the same source as the Master Display. No additional transducers shall be required.
4) The system shall include the ability to display “text messages”
5) The system shall include built-in diagnostic capabilities.

-or-

ITL TANK LEVEL GAUGE
The apparatus shall be equipped with a Class1 “Intelli-Tank” Tank Level Gauge for indicating water or foam level. The Tank Level Gauge shall indicate the liquid level on an easy to read LED display and show increments of 1/8 of a tank.
Each tank level gauge system shall include:
1) A pressure transducer that is mounted on the outside of the tank in an easily accessible area. Sealed foam tanks will require zero pressure vacuum vents.
2) A super bright LED 4-light display with a visual indication at nine accurate levels.
3) A set of weather resistant connectors to connect to the digital display, to the pressure transducer and to the apparatus power.

TRV-L
A thermal protection device shall be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump. The thermal protection device shall be set to relieve water when the temperature of the pump water exceeds 120o F (49 C). The components of the thermal protection device shall be manufactured of brass and stainless steel and be compatible with most foam concentrates. The thermal protection device shall have 1-1/4 inch NPT threads for easy adaptability to existing pump discharge openings. The discharge line shall be 3/8 inch diameter tubing vented to atmosphere or back to the booster tank. The thermal protection device shall have a hydrostatic test rating of 600 PSIG.

ANODES
The Fire Pump shall be equipped with replaceable anodes. The pump shall have one anode on each intake section and one anode on the discharge section of the Fire Pump.

-or-

ANODE PRO

The Fire Pump shall be equipped with replaceable anodes. These anodes shall be constructed with alloy meeting MIL-A-24779 (no exceptions). The pump shall have one anode on each intake section and one anode on the discharge section of the Fire Pump. The anodes shall have a central stainless steel core to prevent anode breakage that can lead to clogged nozzles (no exceptions).

Each anode shall have an internal probe that detects when the anode has worn to the point where the anode no longer provides adequate protection for the pump. The internal probe shall be connected to a monitoring box via a single wire and a sealed weatherpak connection. Each anode shall have an NPT thread to allow replacement and proper sealing and removal for replacement.

A monitor box shall be provided and mounted in a protected space such as the engineers' compartment or behind the pump panel to indicate the status of the anodes. The monitor box itself shall have three individual LEDs that monitor the anodes every 4-5 seconds and indicates the status on the box panel. A clearly labeled monitor panel shall have a separate indicator LED for each anode. The LEDs shall indicate green when the anode is still working and shall flash red when the individual anode needs replacement. The monitor box housing shall be constructed of a non-metallic material and shall utilize a sealed pass-thru connector to prevent leakage contaminants into the anode monitor box. The circuit board for the monitor box shall be conformal coated to resist corrosion.

The monitor box (AnodePro) shall operate on 12VDC and shall be wired to battery on or ignition switches. The power connection shall be a two pin weatherpak sealed connector. The AnodePro shall be grounded directly to the Fire Pump body. The anode connections shall be color coded and all wiring shall conform to NFPA 1901 requirements.

MASTER INTAKE VALVE (MIV)

Electric master intake valves shall be installed on the left hand side steamer inlet, left hand bottom steamer inlet, right hand side steamer inlet, the right hand bottom steamer inlet and the right hand rear (T port) inlet. The valves shall meet the following criteria:

1. The inlet valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and suction tube behind the pump compartment panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with pump operating controls when properly mounted.
2. The entire valve shall be manufactured and tested at the pump manufacturers' factory.
3. When the valve is installed in the fire pump suction the fire pump shall be capable of achieving an NFPA / UL test rating of 1500 GPM through a single 6 inch NST suction hose. When two valves are installed on the fire pump, the pump shall be capable of achieving an NFPA/UL test rating of 2000 GPM using dual 6 inch NST suction hoses.
4. The valve body and related components that are in contact with water shall be manufactured of fine grained corrosion resistant bronze.
5. The butterfly disc shall be manufactured from 80,000 PSI minimum yield strength heat treated cast steel then coated with a durable nitrile rubber to provide a positive seal when the valve is closed.
6. Testing and rating of the valve shall be accomplished at the valve manufacturers factory. The valve, less relief valve, shall be hydrostatically tested to 600 PSIG. The valve shall then be vacuum tested to 26 inches Hg.
7. A pressure relief valve shall be provided that is factory set to 125 PSI and field adjustable from 75 to 250 PSI. The pressure relief valve shall provide overpressure protection for the suction hose even when the intake valve is closed. An integral relief valve mounting pad shall be provided on the valve body. This mounting pad shall provide a Hale type 115 4-3/8 inch bolt circle flange for normal installation. The mounting pad shall have 2-½ inch female NPT threads to permit remote mounting of the relief valve without special adapters. The outlet of the pressure relief valve shall have 2-½ inch NPT threads to allow directing the discharge flow away from the pump operator position.
8. The inlet valve(s) shall be operated by a 12 VDC electric motor with remote capabilities or by a manual handwheel located next to the suction tube.
9. Each valve shall be provided with panel placards indicating control operation. The placards shall have status lights to indicate whether the valve is open, closed or traversing from one position to another.
10. Each valve shall be provided with a gear actuator that will cycle the valve from OPEN to CLOSED position in no less than 3 seconds. The gear actuators shall be sealed units designed to provide reliable service in the harsh pump compartment environment. The ratio of the gear actuator shall be such that the handwheel will close the valve in no more than 10 complete turns.

11. The 12 VDC motor on the electric operated valve shall be provided with an automatic resetting, thermally compensated, over current protection circuit breaker to protect the 12 VDC motor and apparatus electrical systems.
12. The electrical wiring for the valve shall be minimum 14 AWG, type SXL or GXL (SAE J1128) and shall be protected using 257 F minimum flame retardant, moisture resistant loom or braid. All electrical connections shall use sealed Packard Weather Pack connectors to provide extra protection from the harsh pump compartment environment to ensure long life and reliable operation.
13. The valve body shall have a ¾ inch female NPT threaded port on the top to allow installation of an NFPA compliant large diameter hose air bleeder valve. The air bleeder valve shall be mounted on the operator panel and be controllable by the pump operator. Air bleeder valve connections shall have a restriction no larger than ¾ inch to prevent water hammer when filling hose.
14. The valve body shall have a ¼ inch female NPT threaded port on the bottom to permit connection of an individual water drain valve.
15. A suction tube extension 7-¼ inches wide shall be used to allow for the additional length of the inlet valve. The shorter suction tube extension, along with a 4, 6 or 9 inch suction tube, will keep the suction tube threads within the apparatus running boards while maintaining clearance for adapters.
16. A panel mounted manual override shall be provided to permit operation of the electric remote control valve in the event of abnormal operating conditions. The manual override shall be designed to permit operation of the valve without the use of special tools or disassembly of the pump compartment panel or valve.
17. The valve shall be equipped with o-ring seals for the mounting flanges. The o-ring seal groove shall be sized for proper squeeze of the o-ring for pressures in excess of 600 PSIG.

FOAMLOGIX 2.1-A FOAM CONCENTRATE PROPORTIONING SYSTEM

The apparatus shall be equipped with a FoamLogix automatic electronically controlled, direct injection, discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

A DC powered variable-speed electronic direct-injection foam-concentrate proportioning system with a 2.1-gpm-foam concentrate pump shall be integrated into the apparatus to provide foam proportioning. The pump shall be capable of handling Class A foam concentrate only and be operated by a full-function panel mounted digital display.

-or-

FOAMLOGIX MODEL 3.3 SINGLE AGENT

The apparatus shall be equipped with a FoamLogix single agent automatic electronically controlled, direct injection, rotary gear pump, and discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

The foam proportioning system shall be compatible with most Class A foam concentrates and most high viscosity normal hydrocarbon or polar solvent Class B foam concentrates. The foam proportioning system shall be capable of delivering the rated foam concentrate flow. Foam system manufacturer shall provide a list of foam chemicals that have been tested for compatibility with the foam pump.

The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 3.3 GPM (12 LPM) foam concentrate flow rate with maximum operating pressure of 400 PSIG (28 BAR). The electric motor shall be powered by direct current with a ¾ Hp (0.5 Kw) power rating at a maximum current draw of 60 AMPS.

-or-

FOAMLOGIX MODEL 3.3 DUAL AGENT WITH AIR OPERATED DUAL TANK SELECTOR

The apparatus shall be equipped with a FoamLogix dual agent automatic electronically controlled, direct injection, rotary gear pump, and discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

The foam proportioning system shall be compatible with most Class A foam concentrates and most high viscosity normal hydrocarbon or polar solvent Class B foam concentrates. The foam proportioning system shall

be capable of delivering the rated foam concentrate flow with the above mentioned foam concentrate types. Foam system manufacturer shall provide a list of foam chemicals that have been tested for compatibility with the foam pump.

The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 3.3 GPM (12 LPM) foam concentrate flow rate with maximum operating pressure of 400 PSIG (28 BAR). The electric motor shall be powered by direct current with a ¾ Hp (0.5 Kw) power rating at a maximum current draw of 60 AMPS.

An air operated dual tank selector shall provide dual foam tank selection via a three-position toggle switch located on the pump operator panel.

-or-

FOAMLOGIX MODEL 5.0 SINGLE AGENT

The apparatus shall be equipped with a FoamLogix single agent automatic electronically controlled, direct injection, rotary gear pump, and discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

The foam proportioning system shall be compatible with most Class A foam concentrates and most high viscosity normal hydrocarbon or polar solvent Class B foam concentrates. The foam proportioning system shall be capable of delivering the rated foam concentrate flow with the above mentioned foam concentrate types. Foam system manufacturer shall provide a list of foam chemicals that have been tested for compatibility with the foam pump.

The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 5.0 GPM (19 LPM) foam concentrate flow rate with maximum operating pressure of 250 PSIG (17 BAR). The electric motor shall be powered by direct current with a ¾ Hp (0.5 Kw) power rating at a maximum current draw of 60 AMPS.

-or-

FOAMLOGIX MODEL 5.0 DUAL AGENT ADT WITH AIR OPERATED DUAL TANK SELECTOR

The apparatus shall be equipped with a FoamLogix dual agent automatic electronically controlled, direct injection, rotary gear pump, and discharge side foam proportioning system. Foam proportioning operation shall be based on direct measurement of water flow, and remain consistent within the specified flows and pressures.

The foam proportioning system shall be compatible with most Class A foam concentrates and most high viscosity normal hydrocarbon or polar solvent Class B foam concentrates. The foam proportioning system shall be capable of delivering the rated foam concentrate flow with the above mentioned foam concentrate types. Foam system manufacturer shall provide a list of foam chemicals that have been tested for compatibility with the foam pump.

The foam proportioning system shall be based on an electric motor driven, rotary gear foam concentrate pump, rated at 5.0 GPM (19 LPM) foam concentrate flow rate with maximum operating pressure of 250 PSIG (17 BAR). The electric motor shall be powered by direct current with a ¾ Hp (0.5 Kw) power rating at a maximum current draw of 60 AMPS.

An air operated dual tank selector shall provide dual foam tank selection via a three-position toggle switch located on the pump operator panel.