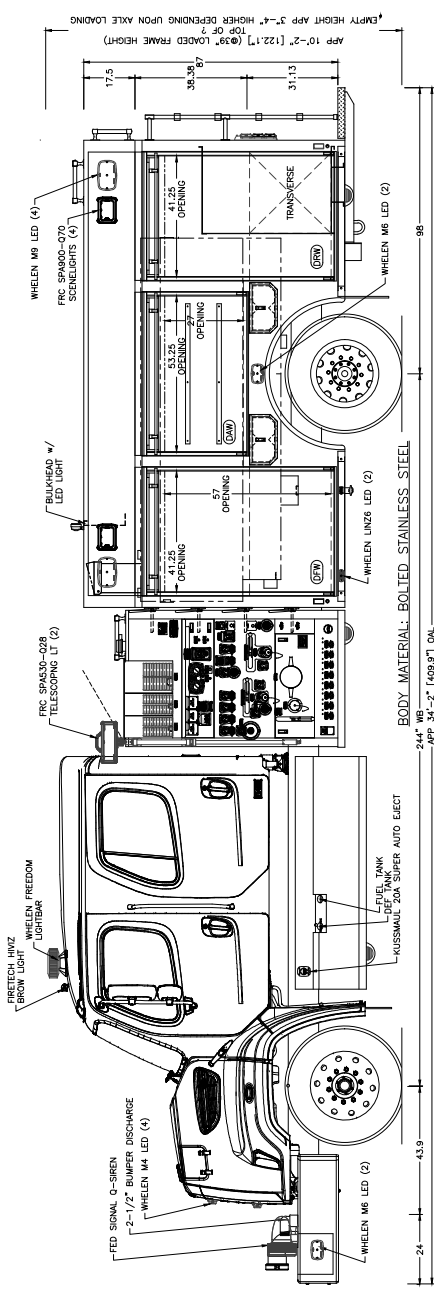
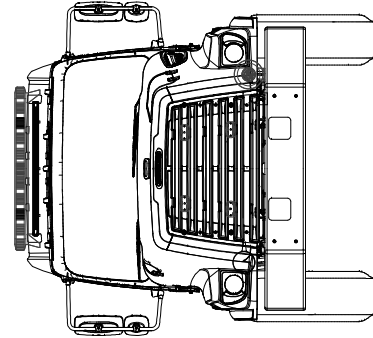


COMP.	HEIGHT	WIDTH	DEPTH		POURCE
			UPPER	LOWER	
FW					FT
DPW	37.12	47.88	14	26	48.16
DAW	37.12	63.75	14	26	57
DPW	67.12	47.88	14	26	35.61
DAW	67.12	47.88	14	26	44.35
DPW	37.12	63.75	14	26	35.35
PAW	37.12	63.75	14	—	19.18
PAW	67.12	44.00	14	26	32.49
R-1	53.12	44.00	14	26	28
HOSBED	18	68	—	30	—
SEAR X1A	16	75	—	137	—
SEAR X1A	16	71.5	—	73.5	—
SEAR X1A	16	11	—	73.5	—
SEAR X1A	16	11	—	73.5	7.51



INFORMATION.  
DIMENSIONS SHOWN ARE APPROXIMATE AND ARE SUBJECT TO MINOR CHANGE AS MAY BE FOUND NECESSARY DURING CONSTRUCTION.  
MINOR DETAILS MAY NOT BE SHOWN.  
IF DISCREPANCIES EXIST BETWEEN THIS DRAWING AND THE WRITTEN SPECIFICATIONS PROVIDED BY TONYE, THE WRITTEN SPECIFICATIONS SHALL PREVAIL.

ORIGINAL DRAWING	28OCT19	CHASSIS:	FREIGHTLINER 108SD 4 DOOR	SCALE: 1/66	SHEET: A
ISR	28OCT19	WB-CA-AF:	244" - 131.2" - 47" D17	CITY: ---	
		BODY MATL:	BOLTED STAINLESS STEEL	STATE: ---	
		PUMP:	HALE Q-MAX 1750	DIR: ---	
		TANK:	1000/25 UPF POLY-TANK III	CAD: GROSSMAN	
		FOAM SYSTEM:	N/A	DATE: 28 OCT 2019	
		GENERATOR:	N/A	FILE: 12730DEMO-A	

BREDA, IA 51436  
800-648-3358  
WWW.TOYNE.COM

# DEMO

CUSTOM PUMPER

# F R E I G H T L I N E R   S P E C I F I C A T I O N   P R O P O S A L

## Vehicle Configuration

108SD CONVENTIONAL CHASSIS

2021 MODEL YEAR SPECIFIED

SET BACK AXLE - TRUCK

## General Service

FIRE/EMERGENCY SERVICE

FREIGHTLINER SD VOCATIONAL WARRANTY

EXPECTED FRONT AXLE LOAD: 14000 lbs

EXPECTED REAR DRIVE AXLE LOAD: 27000 lbs

EXPECTED GROSS VEHICLE CAPACITY: 41000 lbs

## Engine

CUM L9 400EV HP @ 2100 RPM; 2200 GOV RPM, 1250 LB/FT @ 1400 RPM, FIRE/EMERGENCY

## Engine Equipment

2016-2019 ONBOARD DIAGNOSTICS/2010 EPA/CARB/GHG17

NFPA COMPLIANT EMBER SCREEN AND FIRE RETARDANT  
DONALDSON AIR CLEANER

DR 12V 275 AMP 40-SI BRUSHLESS PAD ALTERNATOR WITH  
REMOTE BATTERY VOLTAGE SENSE

(3) DTNA GENUINE, FLOODED STARTING, MIN 3000CCA, 555RC,  
THREADED STUD BATTERIES W/ POSITIVE JUMP START POST  
BATTERY BOX FRAME MOUNTED

WIRE GROUND RETURN FOR BATTERY CABLES WITH  
ADDITIONAL FRAME GROUND RETURN

POSITIVE LOAD DISCONNECT WITH CAB MOUNTED CONTROL  
SWITCH MOUNTED OUTBOARD DRIVER SEAT

CUMMINS TURBOCHARGED 18.7 CFM AIR COMPRESSOR WITH  
INTERNAL SAFETY VALVE

CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE  
GEOMETRY TURBO WITH ON/OFF DASH SWITCH

RH MTD HORIZONTAL AFTERTREATMENT SYSTEM ASSEMBLY  
WITH RH HORIZONTAL TAILPIPE

HORTON DRIVEMASTER ADVANTAGE ON/OFF FAN DRIVE  
AUTOMATIC FAN CONTROL NON ENGINE MOUNTED

CUMMINS SPIN ON FUEL FILTER

COMBINATION FULL FLOW/BYPASS OIL FILTER

1115 SQUARE INCH ALUMINUM RADIATOR W/ AUX COOLING

ANTIFREEZE TO -34F, OAT (NITRITE AND SILICATE FREE)  
EXTENDED LIFE COOLANT

GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT  
CONSTANT TENSION HOSE CLAMPS FOR COOLANT HOSES

ELECTRIC GRID AIR INTAKE WARMER  
DELCO 12V 38MT HD STARTER WITH INTEGRATED MAGNETIC SWITCH

### Transmission

ALLISON 3000 EVS 5 SPD AUTOMATIC TRANSMISSION

### Transmission Equipment

MAGNETIC PLUGS, ENGINE DRAIN, TRANSMISSION DRAIN, AXLE(S) FILL AND DRAIN  
PUSH BUTTON ELECTRONIC SHIFT CONTROL, DASH MOUNTED  
TRANSMISSION PROGNOSTICS - ENABLED 2013  
WATER TO OIL TRANSMISSION COOLER  
TRANSMISSION OIL CHECK AND FILL WITH ELECTRONIC OIL LEVEL CHECK  
SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

### Front Axle and Equipment

DETROIT DA-F-14.7-3 14,700# FF1 71.5 KPI/3.74 DROP SINGLE FRONT AXLE

MERITOR 16.5X5 Q+ CAST SPIDER CAM FRONT BRAKES, DOUBLE ANCHOR, FABRICATED SHOES  
FIRE AND EMERGENCY SEVERE SERVICE, NON-ASBESTOS FRONT LINING  
FRONT OIL SEALS  
HALDEX AUTOMATIC FRONT SLACK ADJUSTERS  
TRW TAS-85 POWER STEERING

### Front Suspension

14,600# TAPERLEAF FRONT SUSPENSION  
MAINTENANCE FREE RUBBER BUSHINGS  
FRONT SHOCK ABSORBERS

### Rear Axle and Equipment

27,000 LB FIRE/EMERGENCY SERVICE SINGLE REAR AXLE

IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING  
MXL 17T MERITOR EXTENDED LUBE MAIN DRIVELINE WITH HALF ROUND YOKES  
DRIVER CONTROLLED TRACTION DIFFERENTIAL  
MERITOR 16.5X7 P CAST SPIDER CAM REAR BRAKES, DOUBLE ANCHOR, CAST SHOES  
FIRE AND EMERGENCY SEVERE SERVICE NON-ASBESTOS REAR BRAKE LINING  
REAR OIL SEALS  
HALDEX AUTOMATIC REAR SLACK ADJUSTERS

### Rear Suspension

27,000# FLAT LEAF SPRING REAR SUSPENSION WITH HELPER AND RADIUS ROD FOR FIRE/EMERGENCY  
FORE/AFT CONTROL RODS

### Brake System

WABCO 4S/4M ABS WITH TRACTION CONTROL WITH ESC

STANDARD AIR SYSTEM PRESSURE PROTECTION  
BW AD-9 BRAKE LINE AIR DRYER WITH HEATER  
CUSTOM STEEL AIR BRAKE RESERVOIRS  
BW DV-2 AUTO DRAIN VALVE WITH HEATER - WET TANK  
UPGRADED CHASSIS MULTIPLEXING UNIT

## Wheelbase & Frame

(244 INCH) WHEELBASE / (131 INCH) CA  
11/32X3-1/2X10-15/16 INCH STEEL FRAME 120KSI  
(47 INCH) REAR FRAME OVERHANG

## Chassis Equipment

14 INCH CHROMED STEEL BUMPER  
FRONT TOW HOOKS - FRAME MOUNTED  
GRADE 8 THREADED HEX HEADED FRAME FASTENERS

## Fuel Tanks

50 GALLON RECTANGULAR ALUMINUM FUEL TANK - LH  
6 GALLON DIESEL EXHAUST FLUID TANK  
FUEL/WATER SEPARATOR WITH WATER IN FUEL SENSOR AND  
12 VOLT PREHEATERS

## Tires

MICHELIN XZE 12R22.5 16 PLY RADIAL FRONT TIRES  
MICHELIN X WORKS Z 12R22.5 16 PLY RADIAL REAR TIRES

## Hubs

CONMET PRESET PLUS PREMIUM IRON FRONT HUBS  
CONMET PRESET PLUS PREMIUM IRON REAR HUBS

## Wheels

22.5X8.25 10-HUB PILOT POLISHED ALUMINUM DISC FRONT  
WHEELS  
22.5X8.25 10-HUB PILOT POLISHED ALUMINUM DISC REAR  
WHEELS

## Cab Exterior

156 INCH BBC HIGH-ROOF ALUMINUM CONVENTIONAL AIR RIDE  
CREW CAB WITH COMPOSITE SUN VISOR  
BOLT-ON MOLDED FLEXIBLE FENDER EXTENSIONS  
NFPA COMPLIANT EXTERIOR GRAB HANDLES  
STATIONARY BLACK GRILLE WITH BRIGHT ACCENTS  
FIBERGLASS HOOD WITH FIREWALL INSULATION  
DUAL 25 INCH ROUND STUTTER TONE HOOD MOUNTED AIR  
HORNS WITH DUAL LANYARDS  
DUAL ELECTRIC HORNS  
HALOGEN COMPOSITE HEADLAMPS WITH BRIGHT BEZELS  
LED AERODYNAMIC MARKER LIGHTS  
DUAL 102" WEST COAST BRIGHT FINISH HEATED MIRRORS  
WITH LH AND RH REMOTE  
LH AND RH 8 INCH BRIGHT FINISH CONVEX MIRRORS  
MOUNTED UNDER PRIMARY MIRRORS  
63X14 INCH TINTED REAR WINDOW  
TINTED DOOR GLASS LH AND RH WITH TINTED NON-  
OPERATING WING WINDOWS  
RH/LH ELECTRIC POWERED WINDOWS & DOOR LOCKS  
TINTED WINDSHIELD  
8 LITER WINDSHIELD WASHER RESERVOIR, CAB MOUNTED,  
WITHOUT FLUID LEVEL INDICATOR

## Cab Interior

OPAL GRAY VINYL INTERIOR  
MOLDED PLASTIC DOOR PANELS WITH ALUMINUM KICKPLATES  
LOWER DOORS  
BLACK MATS WITH PREMIUM INSULATION  
FORWARD ROOF MOUNTED CONSOLE WITH UPPER STORAGE  
COMPARTMENTS AND ADDITIONAL CENTER COMPARTMENT  
WITHOUT NETTING  
IN DASH STORAGE BIN  
AM/FM/WB DASH MTD RADIO WITH BLUETOOTH AND USB  
CHARGERS (2) AND AUXILIARY INPUTS, J1939  
(2) CUP HOLDERS LH AND RH DASH  
HEATER, DEFROSTER AND AIR CONDITIONER  
MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH  
SOLID-STATE CIRCUIT PROTECTION AND FUSES  
12V NEGATIVE GROUND ELECTRICAL SYSTEM  
DOOR ACTIVATED DOME/RED MAP LIGHTS, FORWARD LH AND  
RH AND REAR LH, RH AND CENTER  
(1) 12V POWER SUPPLY IN DASH  
H.O. BOSTROM SIERRA AIR-50 HIGH BACK AIR SUSPENSION  
DRIVER SEAT WITH ADJUSTABLE RECLINE, FIXED LUMBAR  
NFPA COMPLIANT  
H.O. BOSTROM TANKER 450 SCBA NON SUSPENSION  
PASSENGER SEAT WITH UNDERSEAT STORAGE, SECUREALL  
READY CUSHION NFPA COMPLIANT  
H.O. BOSTROM TANKER 450 SCBA NON SUSP LH,RH & CENTER  
REAR PASS SEATS W/UNDER SEAT STORAGE, SECUREALL  
READY CUSHION NFPA COMPLIANT  
GRAY AND BLACK DURAWEAR FABRIC SEAT COVERS, SEAT  
BOLSTERS AND INSERTS  
NFPA 1901-2009 HIGH VISIBILITY ORANGE SEAT BELTS  
ADJUSTABLE TILT AND TELESOPING STEERING COLUMN  
4-SPOKE 18 INCH STEERING WHEEL  
DRIVER AND PASSENGER INTERIOR SUN VISORS

## Instruments & Controls

BLACK GAUGE BEZELS W/ WOODGRAIN INSTRUMENT PANELS  
LOW AIR PRESSURE INDICATOR LIGHT AND AUDIBLE ALARM  
2 IN PRIMARY AND SECONDARY AIR PRESSURE GAUGES  
2 INCH ELECTRIC FUEL GAUGE  
2 INCH TRANSMISSION OIL TEMPERATURE GAUGE  
ENGINE COMPARTMENT MOUNTED AIR RESTRICTION  
INDICATOR WITH GRADUATIONS  
ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH  
PANEL  
ICU3S, 132X48 DISPLAY WITH DIAGNOSTICS, 28 LED WARNING  
LAMPS AND DATA LINKED  
FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING  
ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE  
ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER  
DISPLAY  
ELECTRIC ENGINE OIL PRESSURE GAUGE  
ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH  
SCALE  
ELECTRONIC 3000 RPM TACHOMETER  
IGNITION SWITCH CONTROLLED ENGINE STOP

DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY  
 SINGLE ELECTRIC WINDSHIELD WIPER MOTOR WITH DELAY  
 MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH  
 ONE VALVE PARKING BRAKE SYSTEM WITH DASH VALVE  
 CONTROL  
 SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER,  
 WASHER/WIPER AND HAZARD IN HANDLE  
 INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD  
 LAMPS OVERRIDING STOP LAMPS

### Paint Design

TWO COLOR CUSTOM BASE/CLEAR COAT CAB PAINT

BLACK, HIGH SOLIDS POLYURETHANE CHASSIS PAINT

### Weight Summary

	Weight Front	Weight Rear	Total Weight
Factory Weight <sup>+</sup>	8257 lbs	4504 lbs	12761 lbs

(+) Weights shown are estimates only.

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**ENGINE COMPARTMENT LIGHT - LED**

An LED light shall be provided and mounted over the engine on the engine compartment wall. An on/off switch shall be provided on the light to activate it.

**KUSSMAUL LPC40 BATTERY CHARGER**

A Kussmaul LPC40 fully automatic battery charger with 40-amp output shall be installed on the apparatus. Remote voltage sensing shall be provided to compensate the charger output for the voltage drop in the charging wires.

A 15-amp DC auxiliary output circuit shall be provided on the charger.

**KUSSMAUL AUTO-PUMP AIR COMPRESSOR**

A Kussmaul Auto-Pump 120-volt air compressor shall be provided on the apparatus. The compressor shall have a .76 cfm open flow with a maximum pressure of 100 psi. The pressure switch shall be pre-set at 70 psi cut in and 90 psi cut out.

**AUTO-EJECT SHORELINE CONNECTION - BAR GRAPH DISPLAY**

A Kussmaul 20 amp 120-volt Super Auto-Eject with bar graph charge display shall be provided. The unit shall automatically eject the connecting plug when the engine is cranked.

**AUTO-EJECT COVER - RED**

The Auto-Eject shall have a spring-loaded cover red in color.

**AUTO-EJECT MATING PLUG**

A NEMA 5-15P mating female cord end shall be shipped loose with the apparatus to allow the Fire Department to connect the cord end to a Fire Department provided charging cord.

**120 VOLT SHORELINE CONNECTION LOCATION**

The 120-volt shoreline connection shall be located under the driver's door.

**BACKUP ALARM**

One (1) 97db backup alarm shall be provided and shall automatically activate when the apparatus transmission is placed into reverse.

The backup alarm shall exceed all NFPA1901 and SAE J994 Type D requirements and testing.



**CONSOLE MOUNTED CONTROL PANEL**

A control console shall be provided between the driver's and officer's seats for all warning/auxiliary light controls and pump shift.

**CENTER CONSOLE MAP POCKET**

A storage pocket shall be provided on the rear of the console for storing books, maps, etc.

**CENTER CONSOLE CONSTRUCTION MATERIAL**

The console shall be constructed of aluminum treadbrite.

**CENTER CONSOLE PANEL MATERIAL**

The console panel shall be constructed of 1/8" smooth aluminum with gray Zolatone finish.

**OBSERVATION SYSTEM CAMERA**

An ASA Voyager VCCS130 color camera shall be provided and properly connected to the flat panel display. The camera shall feature a built-in microphone, enhanced low-light performance (LED assisted), image orientation selector switch and a locking waterproof cable connector with CEC50 camera extension cable.

The camera shall be mounted on the rear of the apparatus.

**OBSERVATION SYSTEM DISPLAY**

An ASA Voyager observation system shall be provided on the apparatus. The system shall include a model AOM711 7" flat panel color display. The display shall have 300 nits brightness with a contrast ratio of 150:1. Viewing angles shall be 55 degrees left to right and 25 to 40 degrees top to bottom. The display shall have a water-resistant housing, built-in audio speaker with volume control, 12-volt audio enable and power on (standby) trigger inputs, on screen display picture controls, day/night mode, backlit controls and detachable sunshield. A 72704 mounting bracket shall also be included. The display shall be 7 3/4" wide x 5 1/4" high x 1 3/16" depth.

**TIRE PRESSURE VISUAL INDICATOR**

Real Wheels model RWTG1234 valve stem mounted visual indicators shall be provided on each tire. The LED indicators shall flash when the tire pressure drops 8 psi.

**ENGINE HORIZONTAL EXHAUST**

Shielding shall be provided between the apparatus body and the exhaust pipe if necessary, to deflect heat away from the body. The exhaust system shall be designed and installed to comply with EPA equipment requirements and shall not be modified.

**CAB ENTRY STEP COVER**

The OEM provided cab entry step on the side opposite the fuel tank shall be removed from the chassis provided brackets and replaced with a fabricated aluminum treadbrite step assembly.

**FUEL TANK/STEP COVER**

The OEM provided cab entry step on the same side as the fuel tank shall be removed from the chassis provided brackets and replaced with a fabricated aluminum treadbrite step assembly.

**FRONT MUD FLAPS**

Heavy duty black rubber mud flaps shall be provided on the front wheels. The mud flaps shall be attached to the apparatus in the wheel well area using heavy-duty stainless-steel retention straps that are secured into place using stainless steel fasteners.

**REAR MUD FLAPS**

Heavy duty black rubber mud flaps shall be provided on the rear wheels. The mud flaps shall be attached to the apparatus in the rear wheel well area using heavy-duty stainless-steel retention straps that are secured into place using stainless steel fasteners.

**FRONT/REAR AXLE NUT COVERS AND BABY MOONS**

The front and rear axles shall have stainless steel nut covers and baby moons.

**REAR PULLING EYES**

Two rear 3/4" CRS pulling eyes shall be provided under the rear tailboard. The eyes shall have a minimum of a 3" clear opening for passing chains through the eye.

**FRONT BUMPER EXTENSION**

The front bumper shall be extended forward from the chassis grille.

**BUMPER EXTENSION APRON**

An aluminum treadbrite apron shall be provided in the area between the extended bumper and the chassis cab.

**STAINLESS GRILLE COVER**

A Reel Wheels RWG114 stainless steel grille cover shall be provided and installed on the front grille.

**12 VOLT RADIO POWER FEED**

One (1) 12-volt power feed wire shall be provided in the cab for customer supplied and installed radio equipment.

**RADIO ANTENNA**

One (1) radio antenna shall be provided and mounted for customer installation of radio equipment.

**BOSTROM SECURE-ALL SCBA SEAT BRACKETS**

There shall be four (4) Bostrom Secure-All SCBA seat brackets provided and installed.

**HALE MODEL Q-MAX 1500 GPM SINGLE STAGE PUMP**

The fire pump shall be a Hale Fire Pump Company Q-MAX that complies with all applicable requirements of the latest edition of the "Standard for Automotive Fire Apparatus" published by the National Fire Protection Association and printed in Pamphlet 1901.

**PUMP WARRANTY**

The pump shall be covered by the Hale Pro-Tech 5-year pump warranty against workmanship and materials. Both parts and labor shall be covered for the first 2 years and years 3-5 shall have parts only coverage.

**PUMP PERFORMANCE - 1,500 U.S. GPM.**

The pump shall be a single stage centrifugal with a class "A" rated capacity of 1,500 United States gallons per minute. The pump shall deliver the percentage of rated discharge pressures as indicated below:

- 100 percent of rated capacity at 150 pounds net pressure.
- 70 percent of rated capacity at 200 pounds net pressure.
- 50 percent of rated capacity at 250 pounds net pressure.
- 100 percent of rated capacity at 165 pounds net pressure.

**PUMP CONSTRUCTION**

The entire pump shall be manufactured and tested at the pump manufacturer's factory.

The pump shall be driven by a drive line from the truck transmission. The pump shall be free from objectionable pulsation and vibration under all normal operating conditions. The engine shall provide sufficient horsepower and revolutions per minute to allow the pump to meet or exceed its rated performance.

The entire pump including both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by NFPA 1901.

The pump body and related parts shall be of fine grain alloy cast iron with a minimum tensile strength of 30,000 PSI. All moving parts in contact with water shall be of high-quality bronze or stainless steel. Pumps utilizing castings made of lower tensile strength cast iron are not acceptable.

The pump body shall be horizontally split, on a single plane, in two (2) 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 on the chassis.

The pump shaft shall be rigidly supported by three (3) bearings for minimum deflection. The bearings shall be heavy-duty, deep groove style bearings in the gearbox, and they shall be splash lubricated.

The pump impeller shall be of hard, fine grain bronze with a mixed flow design; accurately machined, hand ground, and individually balanced. The vanes of the impeller intake eyes shall be hand ground and polished to a sharp edge and shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

The pump shaft shall be fabricated of heat-treated, electric furnace, corrosion resistant stainless steel, and shall be super finished under the shaft seal. The pump shaft must be sealed with double lip oil seal to keep road dirt and water out of gearbox.

#### **GEAR BOX**

The gear box shall be completely manufactured and tested at the pump manufacturer's factory.

The pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of torque of the engine in both road and pump operating conditions. The gearbox shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

The gearbox drive shafts shall be of heat-treated chrome nickel steel and shall be a minimum of 2.75 inches in diameter, on both the input and the output drives shafts. The gearbox shall withstand the full torque of the engine in both road and pump operating conditions.

All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and the gear teeth shall be crown shaven, and hardened for smooth, quiet running, and a higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust.

The pump gear ratio shall be selected by the apparatus manufacturer to give the maximum performance with the engine and transmission selected.

#### **NFPA 2016 INTERLOCK MODULE**

An interlock module shall be provided on the pump shift to comply with NFPA shift safety requirements.

#### **GEARCASE COOLING LINE**

A cooling line shall be provided in the pump gear case. A line shall be routed from the discharge side of the pump to the gear case, through the gear case then back into the intake side of the pump.

#### **MECHANICAL SEAL**

The pump shaft shall be equipped with a single mechanical type seal on the suction (inboard) side of the pump. The mechanical seal shall be a minimum of two inches in diameter and shall be spring loaded, maintenance free and self-adjusting. The mechanical seal shall be constructed of a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

#### **SACRIFICIAL PUMP ANODES**

To aid in protecting the pump from internal corrosion, two sacrificial anodes shall be provided and located one in left side inlet and one on the discharge side of the pump.

**FRC PUMP BOSS PRESSURE GOVERNOR SYSTEM**

Fire Research Pump Boss pressure governor and monitoring display kit shall be installed. The kit shall include a control module, pressure sensor, and cables.

The following continuous displays shall be provided:

- Check engine/stop engine warning lights
- Engine rpm shown with four daylight bright LED digits more than 1/2" high
- Engine oil pressure; shown on an LED bar graph display in 10 psi increments
- Engine temperature shown on an LED bar graph display in 10-degree increments
- Battery voltage shown on an LED bar graph display in 0.5-volt increments
- PSI / RPM setting; shown on a dot matrix message display
- PSI and RPM mode LEDs
- Throttle ready LED.

A dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator.

The program shall store the accumulated operating hours for the pump and engine, previous incident hours, and current incident hours in a non-volatile memory. Stored elapsed hours shall be displayed at the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

- High Engine RPM
- Pump Overheat
- High Transmission Temperature
- Low Battery Voltage (Engine Off)
- Low Battery Voltage (Engine Running)
- High Battery Voltage
- Low Engine Oil Pressure
- High Engine Coolant Temperature

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A control knob that uses optical technology shall adjust pressure or RPM settings. It shall be 2" in diameter with no mechanical stops, a serrated grip, and have a red idle push button in the center.

A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

**HALE/CLASS 1 INTAKE RELIEF VALVE**

A Hale/Class 1 intake relief/dump valve shall be provided on the intake side of the pump to relieve excess incoming pressure. The system shall be designed to automatically restore to a non-relieving position when excessive pressure is no longer present. The pressure adjustment range shall be from 75 psi to 250 psi. The relief system shall be adjustable with a common type box end wrench.

The intake relief valve shall be pre-set to 125 psi.

**PUMP SHIFT MECHANISM -AIR/ELECTRIC**

The pump shall be shifted from road to pump by means of a cab mounted air over electric pump shift switch. The switch shall have a built-in positive locking mechanism to prevent accidental movement of the switch. The locking mechanism shall require the operator to manually lift up on the switch lever to disengage the lock.

The switch shall have three positions:

- Position 1 = road position
- Position 2 = neutral position
- Position 3 = pump position

A green indicator light shall be provided in the driving compartment and shall be energized when the pump shift has been completed. This light shall be labeled "PUMP ENGAGED".

When the apparatus is equipped with an automatic transmission, a green indicator light shall be provided in the driver's compartment. It shall be energized when both the pump shift has been completed and the chassis transmission is in pump gear. This light shall be labeled "OK TO PUMP".

**MANUAL PUMP SHIFT OVERRIDE- REMOTE CABLE ACTUATION**

A manual pump shift override shall be provided on the apparatus. The shift shall be remote cable actuated. The remote cable shall have a "T" handle control which shall be positioned just inside the pump compartment on the driver's side. The control shall be easily accessed through the side panel hinged access door. The control shall be clearly labeled "MANUAL PUMP SHIFT".

**TRIDENT PRIMING SYSTEM**

A Trident air priming system shall be provided.

**MANIFOLD DRAIN VALVE**

The pump shall have a manifold type drain valve assembly consisting of a stainless-steel plunger in a bronze body with multiple ports. The control for the valve shall be on the left side along the bottom of the panel and above the side running board. The valve shall be a rotary type with a large easy to grip handle. The valve shall be labeled "PUMP DRAIN".

**ICI "LEVER LIFT" BLEEDER/DRAIN VALVES**

ICI 3/4" quarter turn ball type bleeder/drain valve shall be provided for each discharge and auxiliary intake. A hose shall be connected to the valve that will direct water below the apparatus and away from the immediate pump operator's location.

The control handle shall be "lever lift" style for easy actuation. The handle for the control shall have a recessed area for the color-coded identification label.

**LOW POINT AUTO-DRAINS**

Automatic drains shall be provided in low points of any discharge piping. The drain shall drain to the ground below its location. This drain shall be a supplementary drain and will not be considered the required 3/4" bleeder drain.

**6" LEFT (DRIVER) SIDE MASTER INTAKE**

A 6" master intake shall be provided on the left (driver) side of the apparatus. The intake shall have a 6" male NST connection. The intake shall have a removable screen to prevent the entry of large objects into the pump. The screen shall be constructed of a material that will provide cathodic protection to the pump. A label shall be provided above the intake that states "DRIVER SIDE MASTER INTAKE". The label shall be color coded burgundy.

**LEFT SIDE MASTER INTAKE CAP**

A 6" FNST LH chrome cap shall be provided on the left side master intake.

**6" RIGHT (PASSENGER) SIDE MASTER INTAKE**

A 6" master intake shall be provided on the right (passenger) side of the apparatus. The intake shall have a 6" male NST connection. The intake shall have a removable screen to prevent the entry of large objects into the pump. The screen shall be constructed of a material that will provide cathodic protection to the pump. A label shall be provided above the intake that states "PASSENGER SIDE MASTER INTAKE". The label shall be color coded burgundy.

**RIGHT SIDE MASTER INTAKE CAP**

A 6" FNST LH chrome cap shall be provided on the right-side master intake.

**FRONT BUMPER INTAKE**

A front bumper intake shall be provided and located on the right side of the front bumper.

**HALE MIV-E MASTER INTAKE VALVE FOR FRONT INTAKE**

The front intake shall be equipped with a Hale model MIV-E electrically operated intake valve. The valve shall be a full flow butterfly type valve designed to mount on the fire pump between the suction tube extension and the suction tube behind the pump panel. The valve shall not interfere with other suction or discharge openings on the fire pump or with the operating control properly mounted.

The entire valve shall be cast, manufactured, and tested at the pump manufacturer's factory. The valve body and related components that are in contact with water shall be fine grained corrosion resistant bronze. The butterfly disc shall be manufactured of 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. The valve shall be hydrostatically tested to 600 psig and vacuum tested to 26" hg.

A pressure relief valve shall be provided that is factory set at 125 psi and field adjustable from 75 to 250 psi. The pressure relief valve shall provide overpressure protection for the soft suction hose even when the intake valve is closed.

The inlet valve shall be operated by a 12 VDC electric motor with the control on the pump panel. The 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 the other. The valve shall have a gear operator that will open/close the valve in no less than 3 seconds. The gear actuators shall be sealed to provide reliable service in the hard pump compartment environment. The ratio of the actuator will be such that the handwheel will close the valve in no more than 10 complete turns.

A label stating the following will be provided near the intake: "WARNING-SERIOUS INJURY OR DEATH COULD OCCUR IF INLET IS SUPPLIED BY A PRESSURIZED SOURCE WHEN THE VALVE IS CLOSED."

#### **MANUAL MIV "BACKUP" CONTROL - FRONT INTAKE**

A manually operated "backup" handwheel control shall be provided for the front intake valve and located in an accessible location. Because the backup control moves when the electric control is activated, the backup control shall not be in any location that firefighting personnel may encounter the control during normal operations.

#### **FRONT MIV VALVE DRAIN**

A 3/4" drain shall be provided on the valve body to allow draining of the outer side of the valve.

#### **FRONT MIV BLEEDER VALVE**

A 1/4" bleeder valve shall be provided on valve body to bleed off air on the outer side of the valve.

#### **FRONT MASTER INTAKE PRE-PRIME**

A priming control shall be provided on the pump panel to allow pre-priming of the front master intake when the intake valve is closed.

#### **FRONT INTAKE PIPING- STAINLESS STEEL**

All piping in the front intake shall be 4" stainless steel suction pipe. Heavy duty suction type hose may be used in areas that require a flex joint area. Victaulic couplings shall be used throughout the piping assembly to allow for easy disassembly if necessary. All elbows used in the piping shall be smooth radius type to allow maximum flow and minimum pressure loss.

Bleeder/drain valves shall be installed in all low points in the piping.



**FRONT INTAKE SWIVEL CONNECTION**

A **chrome plated** front suction swivel elbow with 6" MNST thread shall be provided. The elbow shall have a vertical lock to prevent vacuum leaks due to side loads and shall have dual o-rings for a positive seal. The elbow, as well as the swivel bearings, shall be brass for increased durability. A built-in strainer shall also be included with the elbow.

**FRONT MASTER INTAKE CAP**

A 6" female NST long handle chrome cap shall be provided on the front master intake.

**LEFT SIDE FORWARD AUXILIARY INTAKE**

An auxiliary intake shall be provided on the left side of the pump compartment in the forward position. The intake valve and piping shall be 2 1/2" and manually controlled at the intake location.

The intake shall have a 2 1/2" chrome plated female NST swivel connection with screen and a male NST chrome plated intake plug and chain.

A 3/4" bleeder/drain valve shall be provided.

**HALE TRV120 THERMAL RELIEF VALVE**

A Hale model TRV120 thermal relief valve shall be provided and installed on the discharge side of the pump. The valve shall function automatically when the water temperature in the pump exceeds 120 degrees Fahrenheit. The valve shall discharge a 3/8" stream of water to the atmosphere thereby preventing pump overheat. The valve shall be self-resetting after the temperature of the water in the pump drops below 120 degrees Fahrenheit.

**FOAM PRO 1600 CLASS A FOAM SYSTEM**

A Foam Pro model 1600 Class A foam system shall be provided and properly installed on the apparatus.

The system shall be an electronic, fully automatic, variable speed direct injection discharge side foam proportioning system. The foam proportioning operation shall be based in direct measurement of water flows and pressures.

The system shall be equipped with a control module, suitable for installation on the pump panel. Incorporated within the motor driver shall be a microprocessor that receives input from the system flowmeter, while also monitoring foam concentrate pump output, comparing values to ensure that the operators preset proportional amount of foam concentrate is injected into the discharge side of the pump.

The control module shall enable the pump operator to 1) activate the foam proportioning system and 2) select the foam proportioning rates from 0.1% to 1.0%.

A 12-volt electric motor driven, positive displacement plunger pump shall be provided. The pump capacity shall be 1.7 GPM at 200 psi with a maximum operating pressure up to 400 psi. The motor shall be controlled by a microprocessor which is mounted in the base of the pump. It shall receive signals from the control module, and power the 1/3 horsepower electric motor in a variable speed duty cycle to ensure that the correct proportion of concentrate is injected into the water stream.

A full flow check valve shall be provided in the discharge piping to prevent foam contamination in the fire pump and water tank. A 5 psi opening pressure check valve shall be provided in the concentrate line.

An installation and operation manual shall be provided for the system.

**FOAM FLOW RATING**

The foam system shall be capable of the following flow rates at given foam %:

- 1,700 GPM @ 0.1%
- 850 GPM @ 0.2%
- 340 GPM @ 0.5%
- 170 GPM @ 1%

**CLASS A "LOW FOAM IN TANK" INDICATOR**

There shall be a Foam Pro low tank level indicator provided and vertically mounted in the wall of the foam tank. The indicator shall provide "low foam concentrate" indication to the pump operator.

**FOAM SYSTEM SCHEMATIC PLACARD**

There shall be a single tank foam system layout placard provided and located near the pump operator's position as required by NFPA 1901.

**FOAM SYSTEM RATING PLACARD**

There shall be a foam system rating placard provided near the pump operator's position as required by NFPA 1901.

**25 GALLON CLASS A FOAM TANK**

A 25-gallon Class A foam tank shall be provided. The tank shall have all connections necessary to connect to the foam system and shall also have a 1/4 turn drain valve with hose attached to allow the tank to be drained.

The tank shall have an **8" x 8"** fill tower with hinged type lid with latch. A vent shall be provided in the lid.

A label shall be provided on the lid that reads "CLASS A FOAM TANK FILL" and "WARNING: DO NOT MIX BRANDS OR TYPES OF FOAM".

**CLASS A FOAM TANK/BOOSTER TANK INTEGRATION**

The class A foam tank shall be integrated into the apparatus booster tank. The foam tank shall not be separate from the booster tank.

**INNOVATIVE CONTROLS SL PLUS FOAM TANK GAUGE - CLASS A FOAM**

An Innovative Controls model SL Plus class A foam tank gauge shall be provided on the pump panel. The gauge shall feature a 180 degree highly visible wide view ultra-bright LED display showing the level of the booster tank.

**STAINLESS STEEL PIPING**

All piping for discharges shall be stainless steel using stainless steel fittings. High pressure helix wire reinforced flexible piping with a minimum burst pressure of 1200 psi may be used in some areas to minimize friction losses. All flexible piping couplings shall be high tensile strength stainless steel.

All piping shall be properly supported and braced to prevent movement of piping other than what is allowed by the flexible couplings to compensate for apparatus flexing.

Any discharge manifolds provided on the apparatus must be fabricated of a minimum of schedule 10 304 marine grade piping. Use of any welded light gauge (less than Schedule 10) manifolding or plumbing will not be acceptable.

The stainless-steel piping shall be warranted to be free from corrosion perforation for a period of 10 years following the delivery of the apparatus.

**VICTAULIC COUPLINGS - GALVANIZED**

Galvanized Victaulic style couplings shall be used in the assembly of the pump piping system. The couplings shall allow flex in the piping and provide for a disassembly point for maintenance and repairs.

**VENTED LUG CAPS AND PLUGS**

All intake and discharge plugs and caps and plugs shall be vented lug type designed to relieve trapped pressure and help reduce possible operator injuries.

**AKRON HD-8800 SERIES VALVES**

All discharge and small diameter auxiliary intakes shall have heavy duty Akron 8800 series brass ball valves with stainless steel ball. This shall include the tank to pump and tank fill valve.

**TANK REFILL/RECIRCULATION DISCHARGE**

A discharge shall be provided from the pump discharge manifold to allow pump cooling when necessary as well as to refill the booster tank. The valve and piping shall be 2" and manually controlled on the pump panel.

The water tank fill gauge shall be directly in line with this discharge control.

**RIGHT SIDE DISCHARGES**

One 2 1/2" discharge and one 4" discharge shall be provided on the right-side pump panel. The 4" discharge shall be located forward of the intake and the 2 1/2" shall be located rear of the intake.

One (1) right side 2 1/2" discharge:

The right side 2 1/2" discharge shall be manually controlled on the pump panel.

The discharge shall be equipped with a chrome plated brass or bright finish stainless steel discharge elbow with 2 1/2" MNST thread.

A 2 1/2" chrome plated NST cap and chain shall be provided.

One (1) right side 4" discharge:

The right side 4" discharge shall *be electrically actuated from the pump operator's position with an Akron 9333 Navigator Pro valve controller.* The controller shall provide valve position indication.

The discharge shall extend straight out of the apparatus with no elbow.

A 4" chrome plated NST discharge cap shall be provided.

**LEFT SIDE DISCHARGES**

Two 2 1/2" discharges shall be provided on the left side pump panel. The discharges shall be located one forward of the intake and one located rear of the intake.

Two (2) left side 2 1/2" discharges:

The left side 2 1/2" discharge shall be manually controlled on the pump panel with a horizontal side-to-side lever control.

The discharge shall be equipped with a chrome plated brass or bright finish stainless steel discharge elbow with MNST thread.

A 2 1/2" FNST x 1 1/2" MNST chrome plated reducer and chain shall be provided.

**RIGHT REAR 2 1/2" DISCHARGE**

One (1) 2 1/2" discharge shall be provided on the right rear of the apparatus. The valve and piping shall be 2 1/2" and shall be manually controlled on the pump panel.

A chrome discharge elbow shall be provided with 2 1/2" NST threads.

A 2 1/2" FNST x 1 1/2" MNST chrome plated reducer shall be provided on the right rear 2 1/2" discharge(s) with a 1 1/2" chrome plated cap and chain.

**3" MONITOR DISCHARGE**

A 3" monitor discharge shall be provided above the pump compartment. The discharge piping shall extend above the pump compartment a sufficient distance to allow use of the deck gun.

The valve shall *be electrically actuated from the pump operator's position with an Akron 9333 Navigator Pro valve controller.* The controller shall provide valve position indication.

**2 1/2" FRONT BUMPER DISCHARGE**

There shall be one (1) 2 1/2" discharge provided on the driver's side of the apparatus bumper. The valve and piping shall be 2 1/2 inch and shall be manually controlled on the pump panel.

The front bumper 2 1/2" discharge shall be foam capable.

The front bumper discharge shall have a 2 1/2" MNST thread connection.

A 2 1/2" FNST x 1 1/2" MNST chrome plated reducer shall be provided on the front bumper 2 1/2" discharge with a 1 1/2" chrome plated cap and chain.

**FRONT DISCHARGE HOSE CONNECTION - CHROME SWIVEL**

The hose connection for the discharge shall be located immediately adjacent to the hose well. A chrome plated or polished stainless-steel swivel shall be provided. The lid for the hose well shall be notched to allow for the hose to be preconnected.

**FRONT BUMPER DISCHARGE HOSE CONNECTION - DRIVER'S SIDE**

The hose connection for the front bumper discharge shall be on the driver's side.

**BUMPER EXTENSION HOSE WELLS**

Two open hose wells shall be provided in the bumper extension. The hose wells shall be designed to fit between the front bumper frame rail extensions shall be "flush" with the apron.

The hose well to the right shall be 9" wide x 14" long x 12" depth and shall have the capacity for a single 25' length of 5" LDH.

The hose well to the left shall be 30" wide x 14" long x 12" depth and shall have the capacity for 150' of 1 3/4" fire hose.

The floors of both hose wells shall be covered with Turtle Tile.

**FRONT BUMPER HOSE WELL HOSE RESTRAINT**

Heavy duty red webbing material shall be provided on the hose well to help secure the hose. The webbing shall be secured with quick release latches.

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**1 3/4" CROSSLAY PRECONNECTS**

Two 1 3/4" preconnected crosslays shall be provided and located above the side mount pump panel.

The crosslay compartment shall be constructed of 5052 smooth aluminum sheet material with a random brushed finish applied after fabrication. Each crosslay shall be piped using 2" piping or high-pressure hose incorporating a 2" ball valve with the control on the side mount pump operator's panel.

There shall be two (2) 2" swivel elbows with 1 1/2" male NST hose thread connections provided on the cross lay hose beds. The swivels shall be mounted in a position to prevent hose "pinching" at the hose thread connection.

3/4" manual drain valves shall be provided for all 1 3/4" crosslays. The valves shall have an all brass body with heavy duty neoprene seal.

*The crosslays shall have the capacity to hold 200 feet of 1 3/4" or 2" fire hose and nozzle.*

*The crosslays shall be foam capable.*

**2 1/2" CROSSLAY PRECONNECT**

One (1) 2 1/2" pre-connected crosslay shall be provided and located above the side mount pump panel.

The crosslay compartment shall be constructed of 5052 smooth aluminum sheet material with a random brushed finish applied after fabrication. Each crosslay shall be piped using 2 1/2" piping or high-pressure hose incorporating a 2 1/2" ball valve with the control on the side mount pump operator's panel.

There shall be one (1) 2 1/2" swivel elbow with a 2 1/2" male NST hose thread connection provided on the 2 1/2" cross lay hose bed. The swivel shall be mounted in a position to prevent hose "pinching" at the hose thread connection.

3/4" manual drain valves shall be provided for all 2 1/2" crosslays. The valves shall have an all brass body with heavy duty neoprene seal.

*The 2 1/2" crosslay shall have the capacity to hold 200 feet of 2 1/2" or 3" fire hose and nozzle.*

*The 2 1/2" crosslay shall be foam capable.*

## **PUMP COMPARTMENT**

A modular pump compartment with side mounted pump operator's panel shall be provided. The modular design of the pump compartment shall allow the compartment to be fully independent of the apparatus body. A 1" flex joint shall be provided between the pump compartment and the apparatus body.

The modular design of the pump compartment shall allow the entire pump system, including the pump itself, to be removed from the apparatus in a one-piece assembly while leaving the body intact and without having to cut any sheet metal or welds.

## **STAINLESS STEEL PUMP COMPARTMENT CONSTRUCTION**

The entire pump compartment shall be constructed using only 304 marine grade stainless steel fabricated sheeting with a #4 annealed and polished finish on all exterior surfaces. The pump compartment shall not require any finish painting. Due to the extreme twisting and flexing that all fire apparatus are subjected to, aluminum shall not be used in any portion of the pump compartment structural support. The use of any type of enclosed tubing that requires the use of self-tapping or any other type of machine screw shall not be acceptable.

## **PUMP COMPARTMENT RUNNING BOARDS**

The pump compartment side running boards shall be constructed of NFPA compliant slip resistant aluminum treadbrite.

## **PUMP MODULE SEAL**

An extruded rubber seal shall be installed between the pump compartment and the body to help prevent entry of road debris, snow, ice, etc., into the pump compartment.

## **PUMP HEAT PAN ENCLOSURE - ALUMINUM**

An aluminum heat pan shall be provided to enclose the bottom of the pump compartment. Aluminum material shall be used to prevent rust and corrosion that is commonly found in pans made of steel. The assembly shall completely enclose the underside of the pump to aid in the prevention of freezing in winter weather. The bottom of this enclosure shall be designed to be easily removed without the need to remove any bolts or fasteners. For ease of handling, the bottom enclosures shall be installed in two sections. One section shall slide out each side for maintenance and pump compartment clean out.

## **PUMP COMPARTMENT HEATER**

A minimum 40,000 BTU hot water type heater shall be provided and mounted within the pump compartment. Both the feed and return coolant hoses shall be routed within the frame rails from the engine compartment to the heater in the pump compartment. Shutoff valves shall be provided in both lines and shall be in an easily accessible location within the engine compartment. A 12-volt fan shall be provided and shall be mounted to direct heated air toward the back of the gauge panel.

A lighted switch shall be provided on cab console to activate/de-activate the heater fan.



**PUMP COMPARTMENT HEATER HOSE**

The pump compartment heater shall be connected to the chassis engine using Gates Green Stripe or comparable rubber heater coolant hose.

**PUMP COMPARTMENT FRONT WALL**

The front wall of the pump compartment shall be constructed of aluminum treadbrite which is bolted to the pump compartment assembly and removable.

**PUMP COMPARTMENT RIGHT SIDE ACCESS DOOR - SIDE MOUNT**

A brushed stainless-steel hinged access door shall be provided on the right side of the pump compartment. The doors shall have pneumatic hold open devices and push button type flush latches.

**SIDE MOUNT PUMP PANEL - BLACK VINYL**

All controls and instruments shall be located on the left side of the apparatus. All discharge and intake valve controls shall be located on the left side pump panel.

**BLACK VINYL PUMP PANELS**

The left and right-side pump panels shall be constructed of 1/8" aluminum with black vinyl covering.

The upper section of the left side pump panel shall be vertically hinged and have chrome plated lift-n-turn latches to secure the panel when closed.

**CROSSLAY COMPARTMENT ENDS - RED WEBBING**

The crosslay compartment shall be enclosed on each end using a heavy-duty webbing to prevent hose from accidentally unloading. The webbing shall be red.

A yellow nozzle strap shall be provided for each crosslay. The strap shall be designed to loop through the nozzle handle and secured to the apparatus to keep nozzle from coming out of the crosslay compartment without manually disconnecting the nozzle strap.

**HINGED ALUMINUM TREADBRITE CROSSLAY COVER**

An aluminum treadbrite hinged cover shall be provided to cover the crosslay compartment. The cover shall have a full length polished stainless-steel hinge. A chrome plated lift handle shall be provided on each end of the cover. Rubber protection blocks shall be provided in any area where the cover may encounter a painted surface.

**LED SIDE MOUNT PUMP PANEL LIGHTS**

The side mount pump panel shall be illuminated using a track type LED light assembly.

The light shall be constructed of an unbreakable type clear poly flexible material housed in an aluminum extrusion mounted behind a brushed stainless-steel light shield provided across the top of the gauge panel.

**LED RIGHT SIDE DISCHARGE/INTAKE PANEL LIGHTS**

The right-side discharge and intake panels shall be illuminated using a track type LED light assembly.

The light shall be constructed of an unbreakable type clear poly type flexible material housed in an aluminum extrusion mounted behind a brushed stainless-steel light shield provided across the top of the hinged access door.

**AUTOMATIC PUMP PANEL LIGHT ACTIVATION**

The pump panel lights above the pump control panel shall function automatically with the pump shift activation.

**PUSH/PULL VALVE CONTROL HANDLES**

The apparatus pump panel shall be equipped with Innovative Controls side mount valve controls to open/close the manually operated discharge valves.

The ergonomically designed ¼ turn push-pull T-handle shall be chrome plated zinc with recessed labels for color coding and verbiage. The control rod shall provide a true positive lock to eliminate valve drift. Bronze and Teflon impregnated stainless steel bushings in both ends of rod housing shall minimize rod deflection, never need lubrication, and ensure consistent long-term operation.

The control assembly shall include a decorative chrome plated zinc panel mounting bezel.

**DISCHARGE VALVE CONTROL HANDLE LAYOUT**

All discharge valve control handles shall be in one or two horizontal lines across the mid-section of the pump panel. The control handles shall be located immediately below their corresponding pressure gauge for ease of pump operation.

Any pump operator's panel discharge(s) shall have direct horizontal lever style control(s) with the gauge adjacent to the control.

**VALVE CONTROL LINKAGES**

All manual valve controls requiring remote actuation shall have control rod linkages constructed of 1/2" galvanized pipe and shall implement heavy ball swivel joints and clevises for smooth valve operation.

**ICI MASTER PUMP DISCHARGE PRESSURE GAUGE**

An ICI 4" diameter master pressure gauge shall be provided to indicate the main pump discharge pressure. The gauge shall read from 30" hg vacuum to 400 psi and shall be accurate within +/- 1%. The gauge shall be glycerin filled (-40F to +150F) and have a high impact resistant clear acrylic lens.

**ICI MASTER PUMP INTAKE PRESSURE GAUGE**

An ICI 4" diameter master pressure gauge shall be provided to indicate the pump intake pressure. The gauge shall read from 30" hg vacuum to 400 psi and shall be accurate within +/- 1%. The gauge shall be glycerin filled (-40F to +150F), read up to 400 psi, be accurate within +/- 1% and have a high impact resistant clear acrylic lens.

The master intake and discharge gauges shall have bright finish stainless steel bezels.

The master gauge dials shall be white with black markings. The needle shall match the color of the markings.

The master intake gauge shall be clearly labeled "PUMP INTAKE" and shall be located to the left of the master discharge pressure gauge. The label shall be burgundy color.

The master discharge gauge shall be clearly labeled "PUMP DISCHARGE" and shall be located to the right of the intake pressure gauge. The label shall be black color.

The master intake/discharge pressure gauges shall have a lifetime non-yellowing and freeze warranty. The gauges shall also be warrantied for 4 years for defects in materials and workmanship, including fluid leakage. The warranty will not cover labor costs and/or transportation costs.

#### **PRESSURE/VACUUM TEST PLUGS**

Underwriter's test plug adapters shall be provided for connection of pump test gauges.

#### **INNOVATIVE CONTROLS SL PLUS TANK GAUGE - PUMP PANEL**

An Innovative Controls model SL Plus tank gauge shall be provided on the pump panel. The gauge shall feature a 180 degree highly visible wide view ultra-bright LED display showing the level of the booster tank.

#### **INNOVATIVE CONTROLS SL MINI TANK GAUGE - CAB**

An Innovative Controls model SL MINI tank gauge shall be provided on or near the cab control panel in clear view from the driver's and officer's position.

The gauge shall have ultra-bright LED lights displaying the level of the booster tank.

#### **TANK GAUGE PARK BRAKE DISABLE**

The tank gauge(s) shall be disabled when the park brake is released so that the lights are not a distraction when the vehicle is in motion.

#### **ICI DISCHARGE PRESSURE GAUGES**

Unless otherwise specified, each 1 1/2" or larger discharge shall have an ICI pressure gauge. The gauge shall be glycerin filled (-40F to +150F), read from 0 - 400 psi, be accurate within +/- 1% and have a high impact resistant clear acrylic lens.

The individual discharge pressure gauges shall have a 2 3/4" diameter.

The discharge pressure gauge dials shall be white with black markings. The needle shall match the color of the markings.

### **LIGHTED DISCHARGE PRESSURE GAUGES**

All foam capable discharge pressure gauges shall have red backlighting. All non-foam capable discharges requesting a pressure gauge shall have blue backlighting.

The pressure gauge shall be directly in line with or adjacent to the discharge control handle for the discharge that they provide pressure readout for. **For ease of operation, this requirement must be strictly adhered to. There shall be no exception to this requirement.**

The gauges shall be clearly labeled with permanent color-coded labels.

The discharge pressure gauges shall have a lifetime non-yellowing and freeze warranty. The gauge shall also be warrantied for four years for defects in materials and workmanship including fluid leakage. Warranty will not cover labor costs and/or transportation costs.

### **PUMP PANEL AIR HORN BUTTON**

A momentary push button with a red reflective background shall be provided on the pump panel to activate air horns.

### **IDENTIFICATION LABELS FOR PUMP PANEL**

Innovative Controls verbiage label bezels shall be installed. The bezel assemblies will be used to identify apparatus components. These labels shall be designed and manufactured to withstand the specified apparatus service environment.

Where required, the verbiage label bezel assemblies shall include a chrome plated panel mount bezel with durable easy to read UV resistant polycarbonate inserts featuring the specified verbiage and color coding. The UV resistant polycarbonate verbiage and color inserts shall be sub-surface screen printed to eliminate the possibility of wear and protect the inks from fading. Both the insert labels and bezel shall be backed with 3M permanent adhesive (200MP), which meets UL969 and NFPA standards.

The color scheme for the discharge and intake labels shall be per NFPA A.16.9.1

**BOOSTER TANK- UNITED PLASTIC FABRICATING, INC.**

The tank shall have a LIFETIME warranty provided by United Plastic Fabricating, Inc.

The tank exterior shell shall be constructed of minimum 1/2" thick PT3 polypropylene sheet stock. This material shall be non-corrosive stress relieved thermoplastic which is U.V. stabilized for maximum protection. The booster tank shall be of a specific configuration and is designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The tank construction shall include Poly Pro Seal technology. A sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise.

The transverse swash partitions shall be manufactured of 3/8" PT3 polypropylene material. The longitudinal swash partitions shall be constructed of 3/8" PT3 polypropylene and extend through the cover to allow for positive welding and maximum integrity. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions shall interlock with one another and are welded to each other as well as to the walls of the tank. All partition spacing shall be compliant with NFPA 1091 recommendations.

The top of the booster tank shall be fitted with removable lifting eyes.

The tank cradle assembly shall be designed to provide support to the tank. The assembly shall be approved by the manufacturer of the tank.

**BOOSTER TANK CAPACITY 1,000 GALLONS**

The poly booster tank shall have a capacity of 1,000 U.S. gallons.

**BOOSTER TANK FILL TOWER - LEFT SIDE FRONT**

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" polypropylene and shall be a minimum of **10" x 10"** outer dimension. The tower shall be in the left front corner of the hose bed. The tower shall have a 1/4" thick removable polypropylene screen and polypropylene hinged type cover.

**4" TANK OVERFLOW**

A 4" diameter tank vent/overflow shall be provided and integrated into the tank. The piping shall be a minimum of schedule 40 polypropylene designed to run through the tank and discharge behind the rear wheels.

**1" TANK SUMP DRAIN**

A 1" drain shall be provided in the bottom of the tank sump to fully drain the tank. The drain shall use 1" stainless steel piping with a 1" valve. The control for the valve shall be remoted to the driver's side of the apparatus just under and behind the side rub rail. The drain control handle shall be labeled "TANK DRAIN".

**3" TANK SUMP CLEAN OUT PLUG**

A 3" tank sump clean out plug shall be provided in the bottom of the tank sump.

**2 1/2" FIREMAN'S FRIEND TANK FILL - RIGHT REAR**

A 2 1/2" rear fill shall be provided on the right rear of the apparatus. The fill shall be located on the rear face of the apparatus on the right side. The fill shall incorporate a 2 1/2" FFE fill system.

The system shall include an internally mounted check type valve and be designed to be self-deflecting.

A 2 1/2" MNST x 2 1/2" FNST elbow with plug and chain shall be provided on the rear tank fill.

A 3/4" bleeder valve shall be provided on the tank fill.

**3" TANK TO PUMP**

One 3" tank to pump line and valve shall be provided between the tank and the pump. The piping from the sump to the valve shall be 4".

The tank to pump valve shall be electrically actuated from the pump operator's position with an Akron 9323 Navigator Pro valve controller. The controller shall provide valve position indication.

**TANK TO PUMP CHECK VALVE**

A check valve assembly shall be provided on the pump. The valve shall prevent unintentional back filling of the tank through the tank to pump line. Connection from the valve to the tank shall be made by using a non-collapsible flexible rubber hose.

**HOT DIPPED GALVANIZED SUB FRAME**

The tank cradle and body substructure shall be constructed of high strength ASTM A-36 structural steel with 36,000 psi minimum yield strength. The entire substructure shall be framed, and jig welded together to insure a truly square assembly. The substructure shall be fastened to the chassis rails so that it may be easily removed from the chassis for repair, replacement or mounting to a new chassis.

After complete assembly of the tank cradle substructure, the entire assembly shall be hot dipped galvanized for superior corrosion protection.

Due to the extreme duty that this apparatus will experience during its intended service life and to prevent rusting and corrosion from shortening the service life of this apparatus, sub frames fabricated of painted/undercoated steel or aluminum tubing shall not be acceptable.

**20 YEAR SUB-STRUCTURE WARRANTY**

The tank cradle and body substructure shall have a 20 year warranty covering failure due to corrosion perforation or structural design error.

This warranty shall be in effect for 20 years after delivery of the apparatus to the customer. **NO EXCEPTION.**

**HYPER-FLEX BODY MOUNTING**

The body module assembly shall be mounted to the chassis frame rails with "Hyper-Flex" vibration and shock isolators using a forward mounting system. Flexible neoprene pads, or U-springs especially developed for the expected weight and torsional flexing of the apparatus body, shall be incorporated into the system to eliminate chassis frame rail flex from transmitting harmful loads and twisting onto the body.

**100" BODY WIDTH**

The apparatus body shall be 100" wide from side to side measuring from the rub rail mounting surface.

**APPARATUS BODY MATERIAL**

The entire apparatus body shall be constructed of 304 marine grade stainless steel with a #4 annealed and polished finish on both the interior and exterior surfaces. The interior or exterior of the apparatus body shall not require any finish painting.

**APPARATUS BODY CONSTRUCTION**

The entire apparatus body shall be formed by sheering and bending the sheet metal. Metal tubular structures or extrusions shall not be used in the construction of the apparatus body. All edges of the sheared metal shall be sanded to remove any sharp shearing edges prior to bending the metal. After sheering and bending, the body shall be assembled on a jig table that is designed to hold all parts securely in place to insure an accurately built apparatus body.

**APPARATUS BODY ASSEMBLY METHOD**

The entire apparatus body shall be assembled using only bolted type construction. All apparatus body parts shall be able to be unbolted without the need to cut welds, etc. No exceptions to this requirement as all apparatus manufacturers have the capability to manufacture apparatus bodies in this manner.

**COMPARTMENT FLOORS**

All compartment floors shall be constructed of 304 marine grade stainless steel with a # 4 annealed and polished finish on the interior surface. The drain ports shall be designed to prevent road spray from entering the compartment. The front edge shall consist of a minimum of two bends to provide additional strength in the compartment floor and shall then form the lower door jamb.

All compartment floors shall be sweep out design. This shall include the lower side compartments, any compartments above the wheel well, any transverse compartments, and the rear face compartment(s).

**COMPARTMENT WEIGHT RATING**

Each compartment shall be designed to carry 1,000 lbs. of equipment distributed throughout the compartment.

**INTERIOR COMPARTMENT SURFACES**

All visible interior compartment surfaces shall be 304 marine grade stainless steel with a # 4 annealed and polished finish. Surfaces that are painted or coated in any manner, raw material or any surface with any type sanded finish are not acceptable.

**FRONT COMPARTMENT CORNERS**

The apparatus body front compartment corners and vertical faces on both sides shall be constructed of 304 marine grade stainless steel with a # 4 annealed and polished finish. The corners shall be a one-piece fabrication from top to bottom and from the inner body panel to the outer face of the compartment to provide maximum strength. Corners using structural support channels or extrusions that require two or more pieces shall not be implemented.

The # 4 finish corner shall wrap around the side of the apparatus body and form the front compartment door jamb providing front corner protection.

**REAR COMPARTMENT CORNERS - BRUSHED**

The apparatus body rear compartment corners and vertical faces on both sides shall be constructed of 304 marine grade stainless steel with a # 4 annealed and polished finish. The corners shall be a one-piece fabrication from top to bottom and from the inner body panel to the outer face of the compartment to provide maximum strength. Corners using structural support channels or extrusions that require two or more pieces shall not be implemented.

The # 4 finish corner shall wrap around the side of the apparatus body and form the rear compartment door jamb providing front corner protection.



**COMPARTMENT TOPS/CEILINGS**

The apparatus body compartment tops shall be constructed of 304 marine grade stainless steel with a # 4 annealed and polished finish on the interior surface.

**COMPARTMENT TOP OVERLAY**

The compartment top shall be overlaid with 1/8 aluminum treadbrite. The aluminum treadbrite shall be an overlay only and shall not form any structural part of the apparatus body or shall the bottom side of the treadbrite be visible when looking into the compartment.

**UPPER DOOR JAMB EXTENSIONS FINISH PAINTED**

The outer surface of the upper door jamb shall be finish painted to match the exterior of the apparatus body color.

**FENDERWELLS**

The left and right-side rear fender wells shall be constructed of 304 2B marine grade stainless steel with a # 4 annealed and polished finish. The fender wells shall have a full circular liner to prevent pockets and for ease of cleaning. Sufficient clearance shall be provided for tire chains. A minimum of a 1" gap shall be provided on the bottom of each side of the circular liner to allow automatic drainage of water and for easy washout.

**REMOVABLE INNER FENDER LINER**

The fender wells shall be radius cut and shall have a circular inner liner to prevent corrosion pockets and for ease of cleaning. The inner liner shall be constructed of high impact polypropylene material and shall be fully removable for chassis suspension access.

To prevent the accumulation of potential corrosive materials in the fender well area, there shall be no exception to the removable inner fender liner.

**STAINLESS STEEL FENDERETTE**

The fender wells shall be trimmed with a polished stainless steel fenderette. The stainless steel fenderette shall be secured into place with stainless steel fasteners and shall be easily removable for replacement. A black rubber fender welting shall be provided between the fenderette and the inner liner surface. The fenderettes shall protrude from the apparatus body a maximum of 1".

Fenderettes that are welded to the apparatus body are not acceptable.

**COMPARTMENT VENTILATION**

Each compartment shall have a removable metal ventilation plate to allow for air movement in the compartment. A cleanable filter material shall be provided behind the plate.

Plastic cover plates will not be acceptable.

**STAINLESS STEEL COATED FASTENERS**

All fasteners used in the finish construction of the apparatus body shall be marine grade stainless steel. Fasteners that pass through a dissimilar metal panel shall be Magna-Gard, or equal, coated to help prevent metal reaction and corrosion.

As the Magna-Gard, or equal, coating is a "baked on" type coating providing for excellent adhesion to the fastener, spray on type coatings may be used in conjunction with the Magna-Gard, or equal, but not in place of it.

**RUBRAILS - BRIGHT ANODIZED ALUMINUM**

Extruded aluminum rub rails shall be provided on the apparatus body sides. The rub rails shall have a bright finish with anodized coating to protect the finish. The rub rails shall be spaced from the apparatus body a minimum of 1/4" with poly spacers.

The rub rails must be bolted on to the apparatus body to allow easy replacement if damaged. Rub rails that are permanently fastened to the apparatus body by welding or any other permanent method will not be acceptable.

**RUB RAIL ENDS**

The rub rail ends shall be 'capped' with a high impact resistant black EPDM contoured block.

**HOSE BED FLOORING**

The floor of the hose bed shall be constructed of fiber reinforced Dura-Dek, or equal, material.

The top portion of each "T" cross section shall measure 1 5/8" wide x 3/16" thick with beaded ends. The vertical portion shall be 3/16" thick tapering out at the bottom to a thickness of 1/2" and have an overall height of 1". The "T" sections shall be spaced 3/4" apart to allow for drainage and ventilation.

The flooring shall then be protected with a polyurethane coating to screen out ultraviolet rays. The gray colored coating shall be baked on and include a slip resistant material.

**HOSEBED - 68" WIDE**

The hose bed shall be 68" wide from side to side extending over the side compartments.

**HOSE BED DIVIDER**

There shall be one (1) hose bed divider to partition off hose. The divider shall be constructed of 3/16" thick aluminum plate material. The lower edge of the divider shall have a two inch 90-degree bend toward one side and a 2" x 2" x 3/16" aluminum angle welded to the other side.

The divider shall be adjustable by sliding in tracks which are recessed flush into the hose bed flooring, one on front and one on rear. The divider shall be held in place by two bolts on each end.

The upper rear corner of the divider shall have a minimum of a 3" radius cut with a 1" aluminum rub plate.

**HOSE BED BULKHEAD**

A bulkhead divider shall be provided in the front area of the hose bed separating the hose bed from the tank fill tower(s).

**HOSE BED COVER WITH VELCRO FASTENERS-RED**

A heavy-duty vinyl coated nylon red hose bed cover shall be provided to protect the hose load from the weather. The cover shall extend from the front of the hose bed to the rear and then extend downward to cover the exposed rear of the bed.

The cover shall have a double reinforced area where the cover encounters the upper rear corners of the hose bed dividers. The cover shall be secured to the apparatus using Velcro on the sides and lift dots on front.

The rear of the cover shall be secured to the apparatus using positive mechanical latches.

**LED HOSE BED LIGHT**

One LED light shall be provided and mounted in the front of the hose bed. The light shall be controlled by the pump panel light switch.

**ROM SERIES IV ROLL UP COMPARTMENT DOORS**

For all compartments requiring roll up doors, Robinson (ROM) Series IV roll up doors shall be installed.

Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum.

The shutter slats shall feature a double wall extrusion 0.315" thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slat must have interlocking joints with an inverted locking flange. The slat inner seal shall be a one-piece PVC extrusion designed to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

The shutter door tracks shall be one-piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door tracks shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

The shutter bottom rail shall be a one-piece double wall extrusion with integrated finger pull. The finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. The bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene and shall be a double "V" seal to prevent water and debris from entering compartment.

The bottom rail lift bar shall be a one piece "D" shaped aluminum extrusion with linear striations to improve operator grip during operation. The lift bar shall have a wall thickness of 0.125" and be supported by no less than two pivot blocks constructed from Type 66 Glass filled reinforced nylon for superior strength. The bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counterbalance system. The system shall be 4" in diameter and held in place by 2 heavy duty 18-gauge zinc plated plates. The counterbalance system shall have 2 over-molded rubber guide wheels to provide a smooth transition from vertical track to counterbalance system; no foam material of any kind shall be permitted or used in this area.

**PAINTED ROLL UP DOOR EXTERIOR TRIMS**

The side and upper trims on the roll up door shall be painted a single color to match the primary exterior color of the apparatus.

**PAINTED ROLL UP DOORS**

The compartments shall have a roll up doors which shall be painted to match the primary exterior color of the apparatus.

**COMPARTMENT DEPTHS**

The right-side compartments shall be 26" useable depth in the lower 28" and 14" useable depth in the remaining upper section.

The left side compartments shall be 26" useable depth in the lower 57" and 14" useable depth in the remaining upper section.

**DRIVER'S SIDE COMPARTMENT IN FRONT OF THE REAR WHEELS**

A compartment shall be provided in front of the rear wheels. The compartment interior dimensions shall be 67" high x 47.75" wide x 26" usable depth.

**DRIVER'S SIDE ABOVE WHEEL COMPARTMENT**

A compartment shall be provided above the rear wheels. The compartment interior dimensions shall be 37" high x 63.75" wide x 26" usable depth.

**DRIVER'S SIDE COMPARTMENT BEHIND REAR WHEELS**

A compartment shall be provided behind the rear wheels. The compartment interior dimensions shall be 67" high x 44" wide x 26" useable depth.

**PASSENGER'S SIDE COMPARTMENT IN FRONT OF THE REAR WHEELS**

A compartment shall be provided in front of the rear wheels. The compartment interior dimensions shall be 67" high x 47.75" wide with the lower 28" of the compartment being 26" usable depth and the remaining upper section being 14" usable depth.

**PASSENGER'S SIDE ABOVE WHEEL COMPARTMENT**

A compartment shall be provided above the rear wheels. The compartment interior dimensions shall be 37" high x 63.75" wide x 14" usable depth.

**PASSENGER'S SIDE COMPARTMENT BEHIND REAR WHEELS**

A compartment shall be provided behind the rear wheels. The compartment interior dimensions shall be 67" high x 44" wide x 26" useable depth in in a portion of the lower section and the remaining upper section being 14" usable depth.

**REAR FACE COMPARTMENT**

A rear compartment shall be provided on the apparatus just ahead of the rear step. The compartment shall be a minimum of 30" useable depth.

**REAR COMPARTMENT HEIGHT**

The rear facing compartment shall extend upward and shall be flush with the top of the booster tank to maximize the height of the rear compartment.

There shall not be a void area between the top of the rear facing compartment and the bottom of the hose bed nor shall the booster tank extend over the rear compartment.

**REAR COMPARTMENT DOORS - HINGED**

The rear compartment shall have vertically hinged doors constructed of aluminum treadbrite.

**DRIVER'S SIDE REAR COMPARTMENT - TRANSVERSE**

The driver's side compartment behind the rear wheels shall be open into the rear facing compartment (transverse).

**PASSENGER'S SIDE REAR COMPARTMENT - TRANSVERSE**

The passenger's side compartment behind the rear wheels shall open into the rear facing compartment (transverse).

**UPPER DOOR JAMB EXTENSIONS - HARD SUCTION COMPARTMENTS**

The upper door jamb of the side compartments shall be extended upward on both sides for storage of hard suction hose, one each side.

**HARD SUCTION ACCESS DOORS**

A smooth aluminum vertically hinged door with a slam-type latch shall be provided for the hard suction compartment. The latch shall be activated by a large "D" ring control. The use of lift-and-turn or small snap type latches on this door shall not be acceptable.

The door shall be covered with Chevron material.

**LOW MOUNT ENCLOSED LADDER COMPARTMENT**

A ladder storage compartment shall be provided on the right side of the apparatus with an access door on the rear. The compartment shall be located below the hose bed level and shall not be located above or through the booster tank. The compartment shall be located between the booster tank and the right-side compartments.

For ease of removal and replacement with limited staffing, the compartment shall be designed to carry all portable ladders vertically on their beams. Ladder racks that carry the ladders horizontally shall not be acceptable.

The compartment shall be constructed of 5052 1/8" aluminum with a brushed finish. Individual slides fabricated of 5052 H32 alloy aluminum shall be provided in the compartment on both sides to allow individual storage for all ladders. The slides shall be provided with permanently attached Rodex poly slip blocks with tapered front and rear edges allow easier loading/unloading of the ladders.

All ladders shall be capable of being removed individually without disturbing the remaining ladders.

**LADDER COMPARTMENT DOOR**

A smooth aluminum vertically hinged door with a slam-type latch shall be provided on the compartment. The latch shall be activated by a large "D" ring control. The use of lift-and-turn or small snap type latches on this door shall not be acceptable.

The door shall be covered with Chevron material.

**PIKE POLE STORAGE**

Storage for two straight handle pike poles shall be provided in the ladder storage compartment.

**LADDER COMPARTMENT LIGHT**

An LED light shall be provided in the ladder storage compartment. The light shall be mounted just inside the ladder compartment access door and activated with an automatic door switch.

The light switch shall be incorporated into the door ajar warning system in the cab.

**WHEELWELL SPARE CYLINDER COMPARTMENTS**

A compartment shall be provided in the wheel area in front of the rear axle on the driver's side to hold a total of two (2) spare SCBA cylinders.

A compartment shall be provided in the wheel area behind the rear axle on the driver's side to hold a total of two (2) spare SCBA cylinders.

A compartment shall be provided in the wheel area in front of the rear axle on the passenger's side to hold a total of two (2) spare SCBA cylinders.

A compartment shall be provided in the wheel area behind the rear axle on the passenger's side to hold a total of two (2) spare SCBA cylinders.

The compartments shall be injection molded high strength polyethylene designed specifically for the SCBA cylinder storage. The compartment shall be slanted towards the rear and have a drain port at the low point of the compartment.

**WHEELWELL STORAGE COMPARTMENT DOORS – BRUSHED FINISH STAINLESS**

Brushed finish stainless steel access doors shall be provided on each wheel well storage compartment in the wheel well.

**WHEELWELL SCBA CYLINDER COMPARTMENT RETENTION STRAPS**

One 1" wide loop of high visibility yellow webbing shall be installed in each wheel well spare cylinder compartment for each cylinder to be stored in the compartment. The loop(s) shall be designed to loop around the cylinder valve and help prevent the cylinder from sliding out of the compartment if the door is not latched or fails.



**COMPARTMENT SHELF TRACKS - ALUMINUM**

Two (2) sets consisting of two heavy duty aluminum adjustable tracks shall be provided in specified compartments, one for each end of shelf.

The tracks shall not be welded to the apparatus body.

**DUAL COMPARTMENT SHELF TRACKS - ALUMINUM**

Two (2) sets consisting of four heavy duty aluminum adjustable tracks shall be provided in specified compartments, two for each end of shelf.

The tracks shall not be welded to the apparatus body.

**SHALLOW DEPTH COMPARTMENT SHELVING**

There shall be two (2) shallow depth shelves provided. The shelves shall be constructed of 1/8" smooth aluminum with a 2" upward bend on the front and rear edges.

The shelves shall have a random orbit sanded finish.

**FULL DEPTH COMPARTMENT SHELVING**

There shall be four (4) full depth shelves provided. The shelves shall be constructed of 1/8" smooth aluminum with a 2" upward bend on the front and rear edges.

The shelves shall have a random orbit sanded finish.

**STATIONARY VERTICAL COMPARTMENT PARTITION**

One (1) stationary vertical compartment partition shall be provided. The partition shall be bolted into place with stainless steel fasteners. The partition shall be constructed of 3/16" smooth aluminum with random orbit sanded finish.

The partition shall have a random orbit sanded finish.

**SENSIBLE PRODUCTS CHANNEL PANELS**

There shall be three (3) Sensible Products Channel Panels provided and mounted in the apparatus.

**ROLL OUT TRAY**

There shall be two (2) roll out trays provided. The tray shall be constructed of 3/16" aluminum. The tray shall have a 2" upward bent lip on all four sides of the tray.

250 lb. total capacity heavy duty ball bearing type telescoping slides shall be provided. A positive latching mechanism shall be provided to hold the tray in either the fully open or fully closed position.

**ROLL OUT TRAY - ADJUSTABLE**

There shall be one (1) roll out tray provided. The tray shall be constructed of 3/16" aluminum. The tray shall have a 2" upward bent lip on all four sides of the tray.

250 lb. total capacity heavy duty ball bearing type telescoping slides shall be provided. A positive latching mechanism shall be provided to hold the tray in either the fully open or fully closed position.

The tray shall be mounted on Unistrut tracks to allow it to be raised up/down in the compartment.

**VERTICAL ROLL OUT TOOL BOARD - PAC TRAC**

There shall be one (1) vertically mounted roll out tool board provided. The tool board shall be constructed of PAC-TRAC.

Grant, or equal, 250 lb. total capacity heavy duty ball bearing type telescoping slides shall be provided. A positive latching mechanism shall be provided to hold the tray in either the fully open or fully closed position.

**VERTICAL HINGED TOOL BOARD -PAC TRAC**

There shall be one (1) vertically hinged tool board provided. The tool board shall be constructed of PAC TRAC.

**TURTLE TILE FLOOR MATS**

All lower level apparatus body compartment floors shall be provided with 3/4" thick Turtle Tile modular 12" x 12" square tiles with perforated surface for ventilation and air circulation. The tiles shall be easily removable for cleaning the compartment. The tiles shall interlock into each other to form a "one piece" floor liner.

Floors with permanent mounted or bolted in place accessories will not have floor mats.

**TURTLE TILE - RED**

The Turtle Tile shall be red in color.

**TURTLE TILE BEVELED EDGES - RED**

The Turtle Tile shall have red beveled edge "ramps" on the outer edge of the compartments.

**TURTLE TILE SHELF MAT**

Each shelf shall have Turtle Tile matting.

**TURTLE TILE ROLL OUT TRAY MAT**

Each roll out tray shall have Turtle Tile matting.

**110 VOLT SHORELINE CONNECTION IN COMPARTMENT**

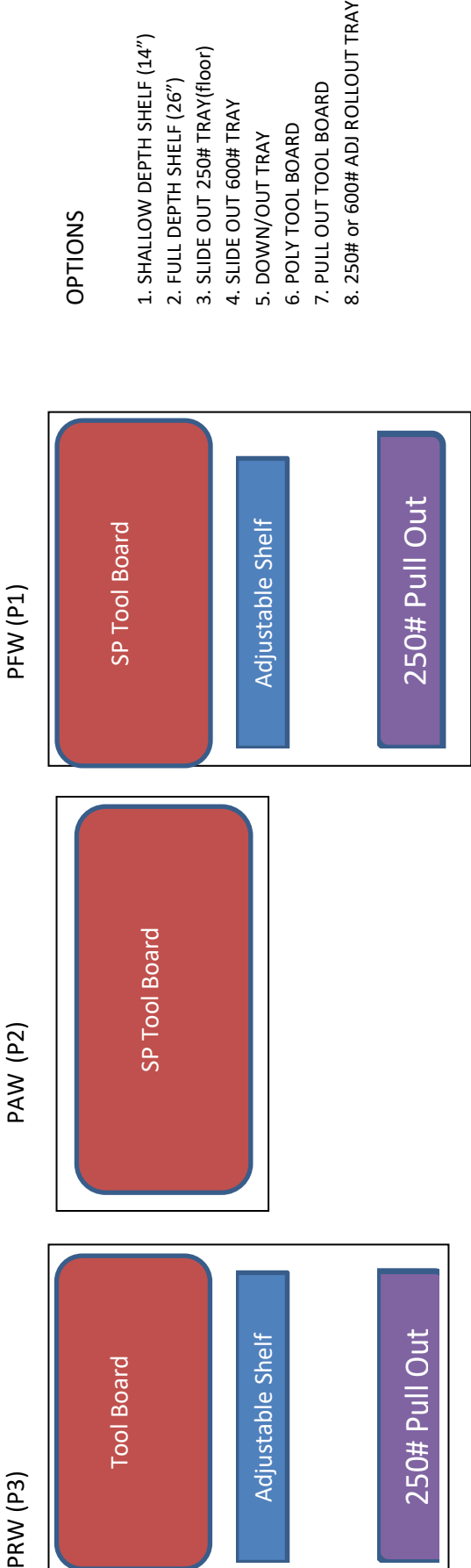
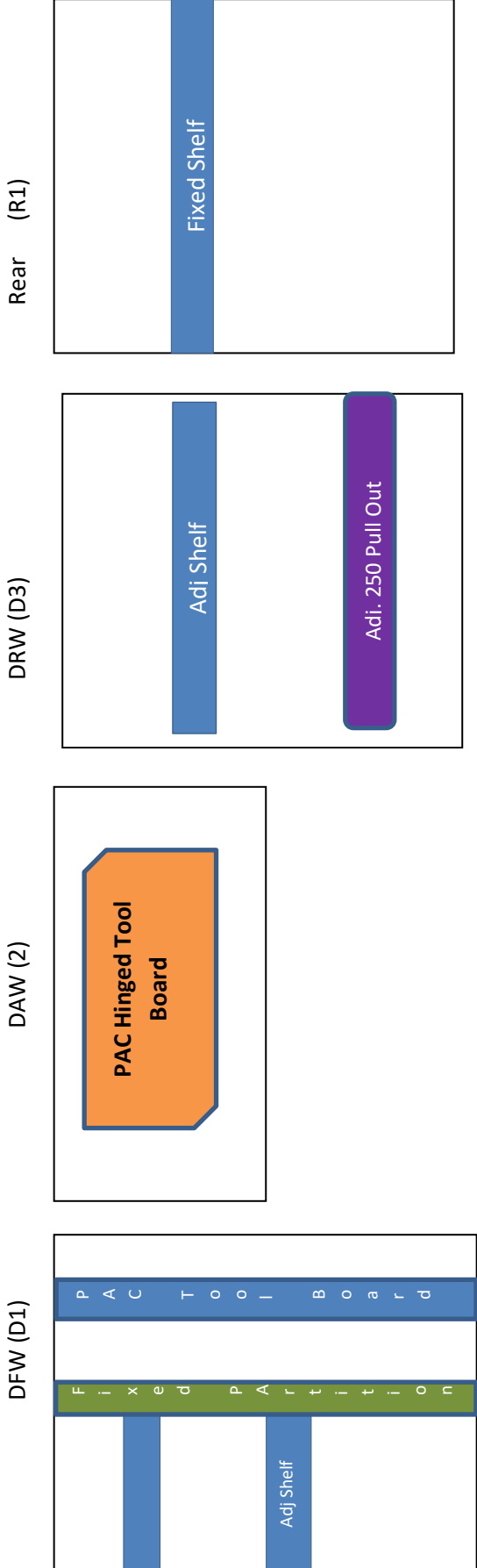
There shall be one (1) duplex 110-volt shoreline connection provided in the apparatus body compartment(s) for charging accessory items.

**12 VOLT ACCESSORY CONNECTION IN COMPARTMENT**

A 12-volt accessory connection shall be provided in (1) apparatus body compartment(s) for charging accessory items.

A distribution panel shall be provided at the mounting location. The panel shall provide up to six 5 amp individually fused connection points. The panel shall be powered from the main apparatus electrical system and shall include a 30-amp master breaker.

**NOTE: Adj Pull out trays have poly floor inserts**



**FOLDING ACCESS STEPS**

Austin FS-200 CHR chrome plated folding access steps shall be provided in areas listed in these specifications. All access steps provided on the apparatus shall support a minimum static load of 500 lbs. and be mounted in accordance to recommended mounting procedures as outlined by NFPA 1901. The steps shall be **minimum** of 6.5" wide x 6.5" depth. The steps shall be attached to the apparatus using stainless steel bolts with locking type nuts.

Four NFPA compliant folding steps shall be provided on the right-side front compartment face.

Four NFPA compliant folding steps shall be provided on the left side front compartment face.

**REAR STEP MATERIAL - ROM BUSTIN M4**

The rear step shall be constructed of ROM Bustin M4 galvanized steel safety grating.

**18" REAR TAILBOARD STEP**

The outer rear edge of the rear step shall be positioned 18" from the rear face of the apparatus. This shall include an approximate 3/4" wash out gap at the rear face of body.

**'MITERED' REAR STEP CORNERS**

The rear step corners shall be mitered on each side. The miter shall be at a 45-degree angle starting in 8" on each side.

**ACCESS LADDER**

An access ladder shall be provided on the rear of the apparatus to access the upper area of the apparatus. A minimum of 8" of clearance shall be provided between the rung and the body or any obstruction.

**ACCESS LADDER LEFT SIDE MOUNTING**

The rear access ladder shall be mounted on the left (driver) side of the apparatus.

**INTERMEDIATE HOSEBED STEP**

A full width aluminum treadbrite step shall be provided on the rear face of the apparatus. The step assembly shall be bolted into place using stainless steel fasteners.

**NFPA KNURLED FINISH HANDRAILS**

All handrails shall be 1 1/4" diameter extruded aluminum "knurled finish" with chrome plated stanchions. Rubber gaskets shall be provided between the stanchions and any painted surfaces.

**LEFT REAR VERTICAL HANDRAILS**

An NFPA compliant handrail shall be provided on the left rear of the apparatus for boarding the rear step and using the left rear hose bed access steps.

**RIGHT REAR VERTICAL HANDRAILS**

An NFPA compliant handrail shall be provided on the right rear of the apparatus for boarding the rear step and using the right rear hose bed access steps.

**RIGHT FRONT HOSEBED GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the upper right front of the apparatus towards the front of the hose bed.

**LEFT FRONT HOSEBED GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the upper left front of the apparatus towards the front of the hose bed.

**RIGHT REAR GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the right rear of the apparatus towards the rear of the hose bed.

**LEFT REAR GRAB RAIL**

A 12" NFPA compliant horizontal handrail shall be provided on the left rear of the apparatus towards the rear of the hose bed.

**INTERMEDIATE REAR HORIZONTAL HANDRAIL**

An intermediate horizontal handrail shall be provided on the rear of the apparatus.

**NFPA 1901 CERTIFIED 12 VOLT ELECTRICAL SYSTEM**

The 12-volt apparatus body electrical system shall be provided and shall follow NFPA 1901 testing and certification procedures as follows:

**NFPA MINIMUM ELECTRICAL LOAD DEFINITION**

The NFPA 1901 defined minimum electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode:

- Propulsion engine and transmission.
- The clearance and marker lights.
- Communication equipment (5 amp default).
- Illumination of all walking surfaces, the ground at all egress points, control and instrumentation panels and 50% of total compartment lighting.
- Minimum warning lights required for "blocking right of way" mode.
- The current to simultaneously operate fire pump and all specified electrical devices.
- Anything defined by the purchaser, in the advertised specifications, to be critical to the mission of the apparatus.

**RESERVE CAPACITY TEST**

The first electrical test to be performed will be the Reserve Capacity Test. All items listed in NFPA Minimum Load Definition shall be activated with the engine shut off. After 10 minutes of operation, those items shall be deactivated. After deactivation, the battery system shall have ample reserve to start the engine.

**ALTERNATOR PERFORMANCE TEST AT IDLE**

An "alternator performance test at idle" test shall be completed. The minimum continuous electrical load shall be activated with the engine running at idle speed. When the engine temperature has been stabilized at idle speed, the battery system shall be tested to detect any battery discharge current.

**ALTERNATOR PERFORMANCE TEST AT FULL LOAD**

An "alternator performance test at full load" test shall be completed. The minimum continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed for a 2 hour period.

**TEST CONDITIONS**

All electrical testing shall be performed with the engine compartment at approximately 200 degrees.

## **12-VOLT WIRING SYSTEM**

All 12-volt electrical wiring shall be SXL cross link rated to carry 125% of the maximum current for which the circuit is protected. The wire shall be of sufficient size so that voltage drop in any electrical device does not exceed 10%. All wiring shall be color, number, and function coded with the number and function being printed every 3" along the entire length of all apparatus body wires (as required by NFPA 1901). All wiring shall be routed through heavy duty PVC split loom securely attached and protected against heat, oil, and physical damage. All locations where the wire passes through a body panel shall be protected with electrical grommets.

All connections shall be made using mechanical connectors and be screwed to terminal or junction box with machine screws. Wire nut, insulation displacement, or piercing connections shall not be used.

All circuits shall be provided with properly rated low voltage over current protective devices of the automatic reset type.

Removable access panels shall be provided to provide access to the wire and electrical components.

## **MULTI-PLEXED ELECTRICAL SYSTEM**

The apparatus body electrical system shall incorporate a Multiplexed Electrical System. The multiplex system shall consist of all solid-state components contained inside aluminum extrusions referred to as nodes. Each node shall consist of (24) output channels and (24) input channels. All inputs and outputs will be configured into an electrical harness utilizing Deutsch connectors. The nodes must be waterproof and not require special mounting requirements.

The system, at a minimum, shall be capable of performing the following functions: load management sequencing, switch loads, receive digital and analog signals, perform and report diagnostics, continuously report vehicle status and the system is expandable.

Placement of nodes throughout the apparatus enables a reduction in wire harness bundles, elimination of redundant harnesses and separate circuit boards, relay and circuit breakers, electrical hardware, separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs. The multiplex system shall be field re-programmable and re-configurable by any authorized dealer or service center. This complete system shall eliminate the need for the following separate components or devices: load manager, load sequencer, warning lamp flasher, door open notification system, interlock modules, separate voltmeter and ammeter.

The Base System Shall Include:

- Total Load Management
- Load Shedding Capabilities
- Load Sequencing Capabilities
- "On-Board" Diagnostics Readout
- Very Reliable, Solid-State Hardware
- Error Reporting
- Continuous system monitoring and reporting
- Emergency warning lamp flasher
- Door Ajar System
- Field Configurable
- Expandability Capabilities
- Advanced PC Diagnostics



As-built wiring harness drawings and a master circuit list of electrical circuits that the apparatus builder installs shall be furnished in the delivery manuals. These schematics must show the electrical system broken down into separate functions, or small groups of related functions. Schematics shall depict circuit numbers, electrical components, harnesses, and connectors from beginning to end. **A single drawing for all electrical circuits installed by the apparatus builder shall not be accepted.**

#### **V-MUX VFD DISPLAY PANEL**

An interface display shall be provided on the cab control console to report and display "Real Time" data.

#### **DIGITAL 'DOOR OPEN' INDICATOR**

The VFD display shall indicate which individual door or doors are open using alpha-numeric symbols (letters and numbers). For example, if the driver front compartment door is open, the display shall read "DRIVER FRONT COMPARTMENT DOOR".

Any system that does not indicate individual open doors and/or provides 'door open' indication using a single visual or audible alarm to represent all apparatus doors will not be acceptable.

#### **VMUX WARRANTY**

The VMUX multiplexed electrical system shall be warranted, under normal use and service, for a period of four years. One year parts and labor and the remaining three years parts only.

#### **AUTOMATIC HIGH IDLE FUNCTION**

An automatic high idle system shall be installed and will activate whenever the system voltage drops below a determined voltage. The high idle will remain on until adequate voltage is achieved.

#### **MASTER BATTERY DISCONNECT**

A Cole Hersee master battery disconnect switch shall be provided and mounted within easy reach of the driver when entering the apparatus.

A green 'battery on' indicator light shall be provided in clear view of the driver. The light shall be mounted in a manner that will not impair the driver's vision.

### **REAR LICENSE PLATE LIGHT/BRACKET**

A chrome plated LED license plate light shall be provided on the rear of the apparatus. License plate mounting posts shall be provided that will space the license plate away from the apparatus body.

### **CLEARANCE LIGHTS/REFLECTORS**

All apparatus body clearance lights shall be LED style. All lower clearance lights and reflectors shall be mounted in a manner that provides protection from damage and shall comply with FMVSS-108 regulations.

### **MID-MOUNTED SIDE TURN SIGNAL - LED**

An amber LED side turn signal shall be provided in the mid-section area of the apparatus on both sides.

### **LED PUMP COMPARTMENT LIGHTS (2)**

Two LED compartment lights shall be provided to illuminate the pump compartment. The lights shall function with the pump operators gauge panel lights.

### **DUAL TRACK TYPE LED COMPARTMENT LIGHTING**

Each apparatus body compartment shall have two track type LED lights vertically mounted in the compartment. The lights shall be constructed of an unbreakable type clear poly type flexible material housed in an aluminum extrusion.

A compartment that is considered a 'full height' compartment shall each have two 48" long light sections and a 'low height' or above wheel compartment shall each have two 18" long sections.

The lights shall function automatically and independently of other compartments when the compartment door is opened. **Compartment lighting systems that are controlled by a single, dash mounted switch are not acceptable.**

### **COMPARTMENT LIGHT SWITCHES**

Each hinged apparatus body door compartment shall have a magnetic style reed indicator switch.

Each roll up door shall have an integral door open indicator magnet in the lift bar. If the bar is not properly closed, it shall activate the "Door Open" light in the cab.

The compartment lights shall function automatically when the door is opened. A master compartment light switch shall not be acceptable.

### **2" DOOR AJAR INDICATOR**

A 2" diameter red LED flashing light shall be provided in the cab, in clear view of the driver to warning of an open compartment or personnel door.

A label shall be provided adjacent to the light that states "Do Not Move Apparatus When Light Is On".

**PERIMETER GROUND LIGHTING -SEVEN (7)**

There shall be seven (7) 4" diameter underbody LED perimeter lights furnished and installed. The lights shall have an unbreakable polycarbonate lens and housing. The lights shall be sealed to help prevent moisture entry.

The ground lights shall be activated with the parking brake.

**LED APPARATUS BODY STEP LIGHTING**

All apparatus steps and running boards shall be illuminated using chrome plated or stainless steel LED lights. The lights shall function automatically with the park brake.

**GROUND/STEP LIGHTING CUTOFF SWITCH**

A ground/step light cut off switch shall be provided in the cab to allow the driver to disable the ground lights and other lights that activate when the parking brake is set. The switch shall automatically re-set itself when the parking brake is released.

**WHELEN M6 TRI--CLUSTER TAILLIGHTS - LED**

Whelen M6BTT 4" x 6" LED taillights and M6T 4" x 6" LED turn signals shall be provided. The backup lights shall be M6BUW 4" x 6" clear LED's.

M6FCV3 polished trim housings shall be provided.

**BACKUP LIGHTS PARK FUNCTION**

The backup lights shall automatically activate when the park brake is set to provide work lighting at the rear of the apparatus.

**WARNING LIGHT SWITCH - SINGLE**

A single master optical warning device switch shall be provided that will activate all minimum optical warning lighting through a single switch. Individual switches shall not be provided for any minimum optical warning lighting to ensure total compliance to the warning lighting requirements defined in NFPA 1901. All lighting controlled by this switch shall not be subject to load management.

Any warning lights that are installed on the apparatus that are not required to meet the minimum optical warning lighting requirements shall be subjected to load management and shall have individual switches to activate/de-activate the warning light.

All switches shall be clearly labeled as to their function.

**ZONE A UPPER WARNING LIGHTING**

A Whelen F4X2RRRLED lightbar shall be mounted on the top of the cab roof. The lightbar shall be 55" in length and mounted with low-profile stainless-steel brackets.

Each side of the lightbar shall have one red front/rear corner LED, three red forward-facing LED and two white forward facing LEDS. Total of fourteen light heads.

The lenses on the Officer's and Driver's shall be clear.

**FRONT GRILLE WARNING LIGHTS (4)**

Four Whelen model M4R red LED lights shall be provided in the grille area on the apparatus. The lights shall flash in a 'criss-cross' pattern. M4FC chrome trim housings shall be provided.

**INTERSECTION WARNING LIGHT - SIDES**

One Whelen model M6R red LED light shall be provided on each side as low and far forward as possible on the apparatus. A chrome bezel shall be provided around the lights.

**MID-SECTION WARNING LIGHTS - SIDES**

One Whelen LINZ6 red LED light shall be provided on each side in the mid-section of the apparatus. A chrome bezel shall be provided around the lights.

**SIDE FACING LOWER REAR WARNING LIGHTS**

One Whelen model M6R red LED light shall be provided shall be provided on each side of the apparatus as low and as far rearward as possible on the apparatus. M6FC chrome trim housings shall be provided.

**REAR FACING LOWER WARNING LIGHTS**

Two Whelen model M6 LED lights shall be provided on the lower rear of the apparatus. M6FC chrome trim housings shall be provided.

The Driver's side light shall be blue, and the Passenger's side shall be red.

**WHELEN M9R UPPER ZONE B/D WARNING LIGHTING**

Two Whelen model M9R red LED light heads shall be mounted on each side of the apparatus above the side compartments. An M9FC chrome bezel shall be provided for each light.

**WHELEN M9R/M9B UPPER ZONE C WARNING LIGHTING**

One Whelen model M9R red LED light head and one Whelen M9B blue LED light head shall be mounted on the rear of the apparatus. An M9FC chrome bezel shall be provided for each light.

The light on the driver's side shall be blue and the passenger's side shall be red.

**WHELEN 295SLSA1 SIREN**

A Whelen 295SLSA1 siren shall be provided and mounted in the cab.

**FEDERAL SIGNAL Q2B-P MECHANICAL SIREN**

A Federal Signal model Q2B-P pedestal mounted chrome plated mechanical siren shall be provided and mounted on the front bumper extension. The siren shall have a maximum sound output of 123 decibel at 10'.

**FEDERAL Q LEFT (DRIVER) SIDE**

The Q siren shall be located on the left (driver's) side of the bumper extension.

**MECHANICAL SIREN ACTIVATION SWITCHES**

Two floor mounted pad switches shall be provided to operate the mechanical siren, one on the right side and one on the left side.

**MECHANICAL SIREN BRAKE**

A siren brake push button switch shall be provided on the dash or console.

**100-WATT SPEAKER**

A 100-watt speaker shall be provided and recessed into the front bumper. The model of speaker installed shall be designed to fit bumper type.

**FRC SPA900-Q70 SCENE LIGHTS (6)**

Six FRC SPA900-Q70 scene lights shall be provided and mounted two on each side and one on each side on the rear. The lights shall be 12VDC and create up to 7,000 lumens each.

**12 VOLT SCENE LIGHT ACTIVATION SWITCHES (3)**

Three switches shall be provided to activate the 12-volt scene light(s). The driver's side lights, passenger's side lights and the rear lights shall each be individually switched. The switches shall be located on the cab control console.

**DUAL FUNCTION SCENE LIGHT(S)**

The side rear and rear facing scene light(s) shall activate automatically when the apparatus transmission is placed into reverse.

**FRC SPECTRA MAX LED TELESCOPING LIGHT - 12 VOLT**

Two (2) Fire Research SPA530-Q28 bottom raising telescoping lights shall be mounted on the pump house one each side. The light head shall be 12-volt LED and shall draw a maximum of 19.2 amps creating 28,000 lumens.

The telescoping pole shall be constructed of heavy wall anodized tube. The pole shall be secured in any raised position with a non-directional advanced twist lock locking device. The twist lock mechanism shall have a knurled positive grip.

The lights shall include a three-wire coiled cord extended from the pole bottom.

The lights shall be electrically tested so that they are safe for their intended use. The lights shall be certified by Underwriters Laboratories (UL) and shall meet/exceed NFPA 1901.

*The poles shall be equipped with a FRC "NS" no scratch kit to help prevent contact with the pole mounting surface.*

*The telescoping lights shall be equipped with an on/off switch on the pump panel.*

**FIRETECH H1VIZ 46" BROW LIGHT - 12 VOLT L.E.D.**

One (1) Firetech HiViz FT-B-46" LED brow mounted light shall be mounted on the apparatus. The light head shall be a 12-volt DC LED and shall draw 15 amps creating 12,420 effective lumens.

The light housing shall be white.

The brow light shall be switched with a single switch activating all light positions.

**PAINT PROCEDURE - PPG DELFLEET BASE COAT/CLEAR COAT**

The apparatus body shall remain its natural # 4 brushed stainless steel finish. No paint shall be applied to the apparatus body.

**Masking or taping off of any portion of the apparatus during the paint process shall not be acceptable. All compartment doors that are to be painted shall be painted separate from the apparatus body.**

All seams or flanges on the apparatus body shall be caulked or properly sealed to prevent moisture accumulation in flanged areas.

**PPG CERTIFIED 10 YEAR LIMITED PAINT WARRANTY**

The apparatus body exterior finish paint shall have a 10-year limited warranty. The warranty shall be certified by the manufacturer of the paint. Documentation of this shall be provided to the end user. Any warranty that is extended by the apparatus manufacturer and not backed by the paint manufacturer will not be acceptable.

**PPG Commercial OEM Product Warranty Coverage:****Warranty Inclusions:**

- Delamination of the topcoat and/or other layers of paint.
- Cracking or checking due to failure of the product.
- Excessive loss of gloss caused by cracking, checking and hazing.
  
- Warranty Exclusions:
  - Paint deterioration caused by blisters, bubbles, flaking or other degradation due to rust or corrosion originating from the substrate.
  - Hazing, chalking or loss of gloss caused by improper care, abrasive polishes, cleaning agents, heavy-duty pressure washing, or aggressive mechanical wash systems.
  - Paint deterioration caused by abuse, scratches, chips, gloss reduction, accidents, acid rain, chemical fallout, road treatment materials/chemicals or acts of nature.
  - Any paint that was not applied by Toyne, Inc.
  - Claims presented without proper Warranty documentation.
  - Failure on finishes performed by Non-PPG Commercial Certified Technicians.
  - Failure on finishes due to inadequate film builds.
  - Failures due to improper cleaning or surface preparation or failure to follow the product use instructions.

THESE ARE THE ONLY WARRANTIES THAT PPG MAKES, AND ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATIONS, ANY WARRANTY OF FITNESS FOR PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY PPG.

**ELECTROLYSIS CORROSION CONTROL**

The apparatus shall be assembled using ECK or electrolysis corrosion control, on all high corrosion potential areas, such as door latches, door hinges, trim plates, fenderettes, etc. This coating is a high zinc compound that shall act as a sacrificial barrier to help minimize electrolysis and corrosion between dissimilar metals. This shall be in addition to any other barrier material that may be used.

**APPARATUS BODY UNDERCOATING**

The apparatus body shall be undercoated after assembly is completed. A bituminous based automotive type undercoat shall be used. Care shall be taken to avoid undercoat application to items that would hinder normal maintenance.

**COMPARTMENT INTERIORS - BRUSHED STAINLESS FINISH**

The compartment interiors shall be brushed stainless steel # 4 finish. The brushed finish shall be as provided by the manufacturer of the material.

Interiors with any type of paint, sprayed-on coatings, DA finish, or standard "mill finish" will not be acceptable.

**LETTERING**

The apparatus dealer shall provide and apply all vehicle lettering and numbering.

**1"-4" NFPA REFLECTIVE STRIPE**

A 4" reflective stripe shall be applied to the apparatus.

A 1" gap shall be provided on the top of the 4" stripe followed by a 1" reflective stripe above the upper gap. A single 6" stripe shall be applied to the front if space does not permit for the 2-stripe pattern.

The striping shall be applied to a minimum of 50% of the length of the apparatus on each side and 25% across the front of the apparatus. The stripe shall comply with NFPA 1901 requirements.

**PRIMARY REFLECTIVE STRIPE COLOR - WHITE**

The primary reflective stripe shall be 680-10 white.

**SECONDARY UPPER REFLECTIVE STRIPE COLOR - WHITE**

The secondary upper reflective stripe shall be 680-10 white.

**REFLECTIVE STRIPE - HORIZONTAL**

The reflective stripe shall be applied in a straight horizontal line from front to rear. The height of the stripe on the chassis cab and the body shall be as close as possible.



**INNER CAB DOOR REFLECTIVE STRIPING - 4 DOOR**

A minimum of 100 square inches of reflective material shall be provided on the inner door liner of each cab door.

**REAR CHEVRON STRIPING**

A minimum of 50 percent of the rear vertical surface of the apparatus shall be covered with 6 inch alternating red and fluorescent yellow green retro-reflective striping. The striping shall slope downward away from the centerline of the apparatus at a 45-degree angle.

The retro-reflective material shall conform to the requirements of ASTM D 4956 "Standard Specification for Retro-Reflective Sheeting for Traffic Control", Type I or better.

**MOUNTING OF LOOSE EQUIPMENT**

The dealership will be responsible for mounting of the Department supplied loose equipment, to include misc. electrical devices (TIC's, radio chargers, gas meters etc.), and hand tools. The dealership shall also provide all needed bracketry as needed. The department will identify all loose equipment during the pre-construction conference. The Department will have all loose equipment present at the dealer's facility two weeks prior to the arrival of the vehicle from factory.

Should the Department wish to have additional equipment mounted after completion of the final inspection; or does not have the equipment on hand to be mounted prior to the delivery of the vehicle, the dealership will charge its normal hourly rate to include any travel for mounting that equipment.

**FIRE HELMET MOUNTING**

The end user of the apparatus shall be responsible for ensuring that all helmets are either stored in an exterior compartment or a securely mounted to NFPA 1901 standards inside the cab.

**DUO SAFETY 24' 2-SECTION ALUMINUM LADDER**

One (1) Duo Safety 900A 24' NFPA compliant two section aluminum extension ladder provided.

**DUO SAFETY 14' ALUMINUM ROOF LADDER**

One (1) Duo Safety model 775A 14' NFPA compliant aluminum roof ladder with folding hooks shall be provided.

**DUO SAFETY 10' ALUMINUM FOLDING ATTIC LADDER**

One (1) Duo Safety 585A 10' NFPA compliant aluminum folding attic ladder shall be provided.

**6" x 10' HARD SUCTION HOSES (2)**

Two sections of Harrington 6" diameter x 10' length clear lightweight PVC hard suction hose shall be provided.

NOTE: The long handles on the FNST end shall be folding type.

**DOT DRIVE AWAY KIT**

Three triangular warning reflectors with carrying case and one 5 lb. ABC fire extinguisher with bracket shall be provided.

**ZIAMATIC AC-2 ALUMINUM WHEEL CHOCKS**

One (1) set(s) of two Zico model AC-2 wheel chocks shall be provided. Two "underbody" horizontal brackets (per set) shall be provided and installed under the body compartments.

**BATTERY DANGERS LABEL - FAMA01**

A permanent label shall be provided near the battery location that warns of potential injury or death that could be caused by the batteries. The label shall also state precautions that should be taken while working on or around the batteries.

**ROTATING SHAFTS DANGER LABEL - FAMA02**

A permanent label shall be provided on each side of the frame rail and in any other location(s) where rotating shaft hazards are apparent. The label shall warn of potential injury or death that could be caused by the movement of the shaft(s) as well as precautions that should be taken while working on or around them.

**HOT SURFACE DANGERS LABEL - FAMA03**

A permanent label shall be provided near any hot surface that warns of potential injury or death that could be caused by contact with the surface. The label shall also state precautions that should be taken while working on or around the surface.

**HOT EXHAUST DANGERS LABEL - FAMA04**

A permanent label shall be provided near any hot exhaust surface that warns of potential injury or death that could be caused by contact with the surface. The label shall also state precautions that should be taken while working on or around the surface.

**SPINNING ENGINE FAN DANGER LABEL - FAMA05**

A permanent label shall be provided on both sides of the engine fan. The label shall warn of potential injury or death that could be caused by the movement of the fan as well as precautions that should be taken while working on or around them.

**SEATED AND BELTED WARNING LABEL - FAMA07**

A permanent label shall be provided that is visible to all occupants that states that they should be seated and belted while the apparatus is in motion. The label shall also state potential injuries or death that could be caused if the safety belts are not used properly.

**AIR CONDITIONING REFRIGERANT WARNING LABEL - FAMA09**

If the apparatus is equipped with any type of air conditioning system, a permanent label shall be provided that is in an area that would be visible to service personnel. The label shall state that the system contains R134A, the necessary precautions that should be taken and the dangers of working on or around the system.

**CAB INTERIOR EQUIPMENT MOUNTING DANGER LABEL - FAMA10**

A permanent label shall be provided inside of the cab warning of the dangers of unsecured equipment inside the cab. The label shall state that all equipment shall be properly secured and warn of potential injury or death that could be caused by failing to do so.

**SCBA SEAT DANGER LABEL - FAMA11**

If the apparatus is equipped with SCBA seats in the cab, a permanent label shall be provided inside of the cab warning of the dangers of using the seat without the SCBA properly secured or seat insert in place. The label shall warn of potential injury or death that could be caused by improper use of the seat.

**FIRE SERVICE TIRE RATING LABEL - FAMA12**

A permanent label shall be provided inside of the cab in view of the driver while entering the cab warning of the dangers of improper use of the tires on the apparatus. The label shall also warn of potential injury or death that could be caused by improper tire use or condition.

**ELECTRONIC STABILITY CONTROL LABEL - FAMA13**

If the apparatus is equipped with an electronic stability control system, a permanent label shall be provided inside of the cab in view of the driver warning of the dangers of improper operation of the apparatus and the importance of safe driving. The label shall also warn of potential injury or death that could be caused by improper operation of the apparatus.

**MAXIMUM OCCUPANCY LABEL - FAMA14**

A permanent label shall be provided inside of the cab in view of the driver stating the maximum number of personnel that can ride in the apparatus. The label shall also warn of potential injury or death that could be caused by exceeding the stated capacity.

**DO NOT WEAR HELMET LABEL - FAMA15**

A permanent label shall be provided inside of the cab in view of all seated positions stating that helmets should not be worn in cab. The label shall also warn of potential injury or death that could be caused by wearing helmet in cab.

**VEHICLE BACKING LABEL - FAMA17**

A permanent label shall be provided inside of the cab in view of the driver advising of proper procedures to following when the apparatus is in reverse motion. The label shall also warn of potential injury or death that be caused by failing to follow proper procedures.

**INTAKE/DISCHARGE CAP PRESSURE LABEL - FAMA18**

A permanent label shall be provided in all areas that intakes and discharges are capped. The label shall give instruction on how to properly remove the cap. The label shall also warn of potential dangers, injury or death that be caused by failing to follow proper cap removal procedures.

**DO NOT MIX BRAND/TYPES OF FOAM LABEL - FAMA19**

A permanent label shall be provided near the foam controls warning operator not to mix brands and types of foam. The label shall also warn of potential dangers, equipment failures or injury or death as a result of poor conditions.

**HOSE RESTRAINT LABEL - FAMA22**

A permanent label shall be provided near any hose storage area. The label shall instruct the operator to insure that all hose is properly secured prior to placing the apparatus in motion and to provide warning of potential dangers, including injury or death, in failing to do so.

**ACCESS STEPS/LADDER LABEL - FAMA23**

A permanent label shall be provided at any area of the apparatus where personnel will be boarding or exiting the apparatus. The label shall instruct the operator in the proper method of climbing into or onto the apparatus as well as exiting and provide indication of potential injury or death that could occur in failing to do so.

**DO NOT RIDE ON REAR STEP WARNING LABEL - FAMA24**

A permanent label shall be provided at the rear step area stating that riding in this area while the vehicle is in motion is prohibited and shall warn of the potential dangers, including injury or death, in doing so.

**TRAINED OPERATOR ONLY LABEL - FAMA25**

A permanent label shall be provided on the pump panel that states that only properly trained personnel should operate the apparatus and shall indicate that injury or death could occur as a result.

**NOT A STEP WARNING LABEL - FAMA26**

A permanent label shall be provided in any horizontal location that a firefighter may feel tempted to use as a step but is not designed, constructed or intended to be a stepping, standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

**COMPARTMENT TOP WARNING LABEL - FAMA26**

A permanent label shall be provided on the front and rear of the compartment tops on both sides warning that the area is not designed, constructed or intended to be a stepping, standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

**FRONT BUMPER EXTENSION WARNING LABEL - FAMA26**

A permanent label shall be provided on the front bumper extension warning that the area is not designed, constructed or intended to be a stepping, standing or walking surface. The label shall state that the surface is not intended for this purpose and indicate potential injury or death in doing so.

**SIREN NOISE WARNING LABEL - FAMA42**

A permanent label shall be provided inside the driver's door warning of potential injury that could be received from the noise of the siren. The label shall also state safety precautions that should be taken when the siren is in use.

**SIREN NOISE WARNING LABEL - FAMA42**

A permanent label shall be provided inside the driver's door warning of potential injury that could be received from the noise of the siren. The label shall also state safety precautions that should be taken when the siren is in use.

**TANK FILL RATE LABEL**

A permanent label shall be provided near any tank fill location clearly stating the following tank fill limitations and procedures:

- Do not exceed 100 psi when filling tank.
- Fill rate in GPM = tank size capacity.
- For tanks over 1000 gallons, do not exceed maximum fill rate of 1,000 GPM.
- Gate back fill when water reaches top of the tank.

The label shall also state that failure to follow procedure could result in over-pressurization, premature tank failure and possibly void tank warranty.

**FLUID CAPACITY LABEL**

A permanent plate shall be mounted in the driver's compartment specifying the quantity and type of the following fluids used in the apparatus (if applicable) for normal maintenance:

- Engine oil.
- Engine coolant.
- Chassis transmission fluid.
- Pump transmission fluid.
- Pump primer fluid.
- Drive axle fluid.
- Air conditioning refrigerant.
- Air conditioning lubrication oil.
- Power steering fluid.
- Cab-tilt mechanism fluid (if applicable).
- Transfer case fluid.
- Equipment rack fluid.
- CAFS compressor system lubricant.
- Generator system lubricant.
- Front tire cold pressure.
- Rear tire cold pressure.
- Maximum tire speed ratings.

**LENGTH, HEIGHT, WEIGHT LABEL**

A permanent plate or label shall be provided in the cab stating the overall length, height and the gross vehicle weight rating (GVWR), in tons, of the completed apparatus.

The wording on this label shall indicate that the information on the plate/label was current at the time of manufacture and if the overall height of the apparatus changes while the vehicle is in service, the purchaser shall revise the height dimension on the plate.

**FOAM SYSTEM PERFORMANCE SPECIFICATION LABEL - NFPA**

A label shall be permanently attached to the apparatus near the operator's control panel. The label shall state the following information pertaining to the performance operating specifications of the foam system:

- Foam classification type.
- Maximum and minimum proportioning rates (%).
- Maximum and minimum water flow (GPM).
- Maximum and minimum operating pressures.
- The statement "Use only concentrates that are compatible with this foam proportioning system. Refer to the foam proportioning system manufacturer's operating manual".

**PUMP CERTIFICATIONS**

Where applicable, the following documents shall be provided with the completed apparatus:

- Pump manufacturer's certification of suction capability.
- Special condition certifications, if any.
- Pump manufacturer's approval for stationary pumping.
- Engine manufacturer's certified brake horsepower curve showing maximum governed speed.
- Pump manufacturer's certification of hydrostatic test.
- Pump manufacturer's certification of hydrodynamic test, if required. Certification of inspection and tests for the fire pump.

**FOAM SYSTEM TEST/CERTIFICATION**

The foam system shall be properly installed, tested and certified to NFPA 1901 20.11. The system manufacturer's certification of accuracy and the installer's certification shall be provided with the completed apparatus.

**OPTICAL WARNING LIGHT CERTIFICATION**

The emergency warning light system shall be certified using one of the available methods provided for in NFPA 1901 13.8.16.

**SIREN CERTIFICATION**

The siren manufacturer shall certify the siren to NFPA 1901 13.9.1.1.

**ELECTRICAL SYSTEM PERFORMANCE CERTIFICATION**

A written load analysis and the results of the electrical system performance test shall be provided with the completed apparatus. The load analysis shall include the following:

- Nameplate rating of the alternator.
- The alternator rating under the conditions specified in NFPA 1901 13.3.2.
- Each of the component loads specified in NFPA 1901 13.3.3 that make up the minimum continuous electrical load.
- Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load.
- Each individual intermittent electrical load.

**BOOSTER TANK CAPACITY CERTIFICATION**

The manufacturer shall certify the capacity of the booster tank. Certification shall be documented on the Manufacturer's Record of Construction document.

**CLASS A FOAM TANK CERTIFICATION**

Certification of class A foam tank capacity shall be provided.

**NFPA SLIP RESISTANCE CERTIFICATION**

Any materials used as a stepping, standing or walking surface shall be certified to be compliant with NFPA 1901 15.7.4. Documentation shall be provided with the completed apparatus.

**WEIGHT CERTIFICATION**

Documents from a certified scale showing actual loading on the front, rear and overall apparatus shall be provided. The apparatus shall be scaled with the water tank full but without personnel, equipment and hose.

**VEHICLE ROLLOVER STABILITY**

The apparatus chassis shall be equipped with a stability control system and shall be certified to NFPA 1901 Rollover Stability requirements.

**UNDERWRITER'S LABORATORIES TESTING**

The apparatus shall undergo an Underwriter's Laboratories Certification Test to ensure that the completed apparatus meets the requirements of NFPA 1901. The certificate shall be provided to the purchaser upon completion. Underwriter's Laboratories shall also perform the required testing on the entire installed electrical system. Self-certification by the apparatus manufacturer will not be acceptable.

**MANUFACTURER'S RECORD OF APPARATUS CONSTRUCTION**

All information required to comply with NFPA 1901 4.20.1 shall be provided with the completed apparatus.



**OPERATIONS AND SERVICE DOCUMENTATION**

The apparatus shall be complete with all operation and service documentation covering the apparatus as delivered and accepted. The documentation shall address the inspection, service and operations of the apparatus and all major components as required in NFPA 1901 4.20.2.

**"AS BUILT" APPARATUS BODY OWNERS MANUALS (2)**

Two "as built" apparatus body owner's manual USB drives shall be provided with the apparatus. All apparatus body electrical schematics shall be provided as well as all instructional and maintenance manuals on components provided and permanently mounted on the apparatus. A copy of the final apparatus body build specifications shall also be included on the drive. The USB shall be "read only" and shall not allow modification.

To eliminate component confusion, generic documentation with equipment that is not provided on the apparatus body shall not be acceptable.

**FAMA FIRE APPARATUS SAFETY GUIDE**

One (1) FAMA Fire Apparatus Safety Guide(s) shall be provided with the completed apparatus.

**STATEMENT OF EXCEPTION - NFPA MISCELLANEOUS REQUIRED EQUIPMENT**

The customer shall be responsible for providing all NFPA required miscellaneous equipment that is not contained within these specifications. All required equipment must be properly installed on the apparatus and in working condition prior to the apparatus being placed into service.

**FAMILIARIZATION AND DEMONSTRATION**

Upon completion of the new apparatus, an authorized properly trained representative of the manufacturer shall perform a "Familiarization and Demonstration" overview of the apparatus and related components.

The Department shall provide the representative with a written list, by full proper names, of the individual(s) that are to receive the overview. Upon completion of the overview, each person in attendance will be required to acknowledge, by signature, that they understand the operation of the apparatus and all related components.

**CHASSIS FAMILIARIZATION**

Familiarization of the apparatus shall include the following:

- How to locate gauges or indicators and check all fluid levels and operational use of the apparatus.
- How to tilt the chassis cab or hood assembly for access to the engine, fire pump (if applicable), or aerial control (if applicable), or any other device to allow access to fluids or for required maintenance.
- Interior cab controls, instruments, mirrors, safety devices or alarms, brake operations, transmission control, pump controls (if applicable) exhaust regeneration (if applicable), seat adjustments, warning light engagement and other operational equipment.

**FIRE PUMP FAMILIARIZATION**

Familiarization of the apparatus shall include the following items related to the fire pump system:

- Setting the parking brake, proper transmission gear and the fire pump engagement operations.
- Throttle control.
- Primer and tank-to-pump operation.
- Use of pressure control device.
- Tank refilling operations.
- Proper operation of discharge controls.
- Proper shutdown and draining of the system.

**FOAM SYSTEM FAMILIARIZATION**

Familiarization of the apparatus shall include the following items related to the foam system:

- Start up, operation and shut down of the foam system.
- Setting of foam percentages and other operational settings.
- Proper flushing and draining of the system.

**POST ACCEPTANCE TRAINING REQUIREMENTS**

After apparatus acceptance, the Department shall be responsible for ongoing training of personnel. The Department shall not allow untrained or undertrained personnel to operate the apparatus or any included feature of the apparatus.

