# North Carolina
# Sheriff's Association


## FES22-01 Brush Truck

**June 18, 2022**

**Attachment A**

SAFE INDUSTRIES

# North Carolina Sheriff's Association

## PROPOSAL

Fire Equipment Sales and Services is pleased to offer the proposed vehicle to meet the intent of the fire department specifications. Fire Equipment Sales and Services is a manufacturer in commercial fire fighting vehicles.

**Fire Equipment Sales and Services**

1665 Stamey Livestock Road
Sumter, SC 29153
Office: (803) 494-6000
**After Hours Emergency Service Hotline: 1-864-845-7175 Option #3**

## GENERAL INFORMATION

The proposed apparatus will be constructed to withstand the severe and continuous use encountered during emergency fire fighting services. The apparatus will be of the latest type, carefully designed and constructed with due consideration to the nature and distribution of the load to be sustained.

This proposal details the general design criteria of cab and chassis components, aerial device (if applicable), fire pump and related components (if applicable), water tank (if applicable), fire body, electrical components, painting, and equipment.

All items of these proposal specifications will conform to the fullest extent possible with the National Fire Protection Association Pamphlet No. 1901, latest edition, except as noted in the Statement-of-Exceptions.

FES will furnish satisfactory evidence of our ability to construct, supply service parts and technical assistance for the apparatus specified.

## FIRE APPARATUS COMPLETION DOCUMENTATION

Fire Equipment Sales and Services will provide, at the time of apparatus delivery, at least one (1) copy of the following documents.

The apparatus manufacturer's record of apparatus construction (build) details, including the information listed below:

- Apparatus Owner's name and address
- Apparatus manufacturer, model and serial number
- Apparatus Chassis make, model and serial number
- Front tire size, and total rated capacity (in pounds)
- Rear tire size, and total rated capacity (in pounds)
- Apparatus Chassis weight distribution in pounds, with water and equipment mounted, front and rear
- Apparatus Engine make, model, serial number, rated horse power, rated speed and governed speed.
- Type of fuel(s) used by apparatus and fuel tank(s) capacity
- Apparatus electrical system - Voltage and Alternator output (in amps)
- Battery make, model and total capacity (in cold crank amps)
- Transmission make, model and serial number: If equipped, chassis transmission PTO(s) make, model and gear ratio
- Pump make, model, rated capacity in gallons per minute (GPM) and serial number
- Apparatus water tank certified capacity in gallons
- Paint manufacturer and paint number(s)

The apparatus manufacturer will include certification of "slip resistance" for all stepping, standing and walking surfaces.

If the apparatus has a fire pump, the following additional documents will be provided:

- The pump manufacturer's certification of suction capability
- Copy of the apparatus manufacturer's approval for stationary pumping applications
- Engine manufacturer's certified brake horsepower curve for the engine provided, showing the maximum governed speed.
- Pump manufacturer's certification of hydrostatic test (if it applies)
- The independent third party certification of inspection and test for the apparatus fire pump

If the apparatus has a "fixed line" voltage power source, there will be documentation of the fixed power source test certification.

If the apparatus features an air system, there will be test results of the air quality, SCBA fill station and the installation of the air system.

The apparatus manufacturer will provide documentation from a certified weight scale. This documentation will show actual loading on the front axle, rear axle(s) and overall vehicle weight. This weight will include the weight of the "full" apparatus water tank. This documentation will be provided with the completed apparatus build to determine compliance with NFPA 1901 latest addition.

Electrical performance testing documentation and a written load analysis report will be provided with the completed apparatus.

If the apparatus features a water tank, the water tank capacity certification will be supplied by the tank manufacturer.

## APPARATUS FMVSS CERTIFICATION

The proposed chassis will be certified by FES as conforming to all applicable Federal Motor Vehicle Safety Standards (FMVSS) in effect at the date of contract. This will be attested to by the attachment of a FMVSS certify caution label on the vehicle by FES, who will be recognized as the responsible final manufacturer.

## APPARATUS RECORDS RETENTION

FES will be responsible for preparing and maintaining a record file of parts and assemblies used to manufacture the proposed apparatus.

These records will be maintained in FES's factory for a minimum of twenty (20) years.

The file will contain copies of any and all reported deficiencies, all replacement parts required to maintain the apparatus, and original purchase documents including specifications, contract, invoices, incomplete chassis certificates, quality control reports and final delivery acceptance documents. The purchaser will have access to any and all documents contained in this file upon official written request.

## GENERAL CONSTRUCTION

The proposed apparatus, assemblies, subassemblies, component parts, etc., will be designed and constructed with the due consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is subjected to when placed in service. All parts of the apparatus will be designed with a factor of safety, which is equal to or greater than that which is considered standard and acceptable for this class of equipment in fire fighting service. All parts of the proposed apparatus will be strong enough to withstand general service under full load. The apparatus will be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

The apparatus will be designed and constructed, and the equipment so mounted, with due consideration to distribution of the load between front and rear axles that all specified equipment, including a full complement of specified ground ladders, full water tank, loose equipment, and firefighters will be carried without overloading or injuring the apparatus.

## SINGLE-LINE RESPONSIBILITY

FES engineers, designs, manufactures, builds and paints our own fire apparatus body, rescue apparatus body and electrical systems. All work is done in an FES owned and operated manufacturing facilities by FES direct employees. This capability provides consistent design and manufacturing procedures that will reduce warranty issues and provide ease in parts replacement.

## CERTIFICATE OF LIABILITY INSURANCE

Fire Equipment Sales and Service maintains the following insurance limits:

- Total Garage Keepers Insurance: $2,500,000.00
- Total Umbrella Liability per Occurrence Insurance: $4,000,000.00
- Total Automobile Liability Insurance: $5,000,000.00
- Total General Liability Insurance: $6,000,000
- Workers Compensation and Employers Liability Insurance: $6,000,000.00

Reference attached documentation.

## PAINT PERFORMANCE CERTIFICATION

The proposed FES apparatus meets or exceeds the required Commercial Vehicle Paint Performance Standards.

## SERVICE CENTER AND PARTS AVAILABILITY

Fire Equipment Sales and Services owns and operates a 35,000+ sq. ft. service, fabrication and office complex in Sumter, SC. In addition, our parent company, Safe Industries, has a 18,000 sq. ft. service facility in Piedmont, SC, a 20,000+ sq. ft. office/warehouse complex in Easley, SC and a 6,400 sq. ft. service center in Knoxville, TN.

Average daily parts inventory is in excess of $500,000.00

## FES FIRE APPARATUS SERVICE STATEMENT

Safe Industries is proud to offer over 100 years of combined experience in the fire service and apparatus industry. We offer a twenty-four hour service commitment with thirty (30) service technicians on call and twenty seven (27) service vehicles available across South Carolina, North Carolina and Tennessee.

Our certifications include EVT, ASE, Cummins, Hale, Waterous, Darley, Akron, and Bendix brakes.

We can perform all pump tests at your location with the Draft Commander 3000 mobile pump test trailer, to eliminate removing your apparatus from your department. In case of an emergency we can UN hook from the test and have the apparatus in operation in less than 5 minutes.

Safe Industries is fully insured with Workman's Compensation.

Contact:

## Safe Industries

5031 Highway 153
Easley, SC, 29642
Office: (864) 845-7175
Fax: (864) 845-7176
Toll Free: 1-877-997-7233
**After Hours Emergency Service Hotline: 1-864-845-7175 Option #3**

## SERVICE CENTER LOCATION

Safe Industries owns and operates three (3) facilities in the state of South Carolina and one (1) in Tennessee. Our headquarters office is located at 5031 HWY 153 Easley, South Carolina and our service building in the upstate is located at 116 Connector Park Court, Piedmont, SC 29673.

Fire Equipment Sales and Services, a wholly owned division of Safe Industries, is fully equipped with a metal fabrication and welding shop, electrical and plumbing shop, paint booths and in-house graphics.

BST Firetrucks and Emergency Vehicle Service Center was acquired by Safe Industries in 2020. Located at 3150 NW Park Drive, Knoxville, TN 37921, BST's full service facility conducts apparatus modifications, fabrication, collision repairs, pump repairs, NFPA pump and inspections tests and a wide range of diagnostic testing.

## SERVICE TECHNICIANS

Safe Industries has company owned service vehicles that will be available 24 hours a day, seven days a week to respond to customer needs. The Service Vehicles will be operated by full time EVT Certified Technicians.

## PRICES AND PAYMENTS

The apparatus bid price will be FOB FES, based on a delivered and accepted apparatus by the Fire Department.

The total price on the Fire Equipment Sales and Services proposal sheet will include all items listed in the apparatus specifications.

The computed pricing does not include federal, state or local taxes. Any applicable taxes will be added to the proposed pricing. Tax-exempt forms may be provided if applicable for tax-exempt agencies.

## APPARATUS DELIVERY TIME

Fire Equipment Sales and Services is proposing to complete the apparatus delivery time based on the number of working days, starting from the date an approved commercial chassis is received by the manufacturer.

Apparatus Delivery Time: One Hundred Eighty (180) working days after receipt of approved chassis by FES.

## FAIR, ETHICAL AND LEGAL COMPETITION

In order to provide fair, ethical and legal competition, the original equipment manufacturer (OEM) or the parent company of the OEM will not have ever been fined or convicted of the following in any domestic or international fire apparatus market:

- **Price Fixing**
- **Bid Rigging**
- **Collusion**

## NON-COLLUSIVE BIDDING CERTIFICATION

By submission of this bid, FES and each person signing on behalf of any bidder, certifies, and in the case of a joint bid, each party thereof certifies as to its own organization, under penalty of perjury, that to the best of their knowledge and belief:

- The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for purpose of restricting competition, as to any matter relating to sell prices with any other bidder or any competitor.
- Unless otherwise required by law, the prices that have been quoted in this bid have not been knowingly disclosed by FES and will not knowingly be disclosed by FES prior to opening, directly or indirectly, to any other bidder or to any competitor
- No attempt has been made by FES to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.
- That all requirements of the law including amendatory provisions as to non-collusive bidding have been complied with.

## MATERIAL AND WORKMANSHIP

All equipment provided will be guaranteed by Fire Equipment Sales and Services to be new and of current manufacture to meet all requirements of the purchaser's specifications.

All workmanship will be of highest quality meeting accepted standards of the apparatus industry and will be accomplished in a professional manner so as to insure a functional apparatus with a pleasing, aesthetic appearance.

## FES ENGINEER

Fire Equipment Sales and Services will designate a representative to perform FES's sales engineer functions. The sales engineer will provide a single point interface between the purchaser and FES on all matters concerning the apparatus contract.

## APPARATUS DELIVERY

Final approval, acceptance, payment and delivery shall take place at the manufacturing facility, Fire Equipment Sales and Service, at the final inspection of the apparatus.

## INSTRUCTION MANUALS / DRAWINGS

Fire Equipment Sales and Services will supply upon delivery two (2) copies of operation and service manual(s) for the completed apparatus as delivered and accepted by the customer.

These manuals will contain the items below:

- Specifications, descriptions and ratings of chassis, and pump (if provided).
- Lubrication (fluids) charts
- Operational instructions for the apparatus chassis and any major components such as a pump or auxiliary system.
- Instructions regarding the frequency and maintenance procedures recommended for the apparatus.
- Replacement parts information.

## VEHICLE FLUIDS PLATE

As required by NFPA-1901, FES will affix a permanent plate in the driver's compartment specifying the quantity and type of the following fluids used in the vehicle:

A permanent plate in the driving compartment will specify the quantity and type of the following fluids used in the vehicle:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid
- Pump primer fluid
- Drive axle(s) lubrication fluid
- Air-conditioning refrigerant
- Air-conditioning lubrication oil
- Power steering fluid
- Transfer case fluid
- Equipment rack fluid
- Air compressor system lubricant
- Generator system lubricant

## LOCATION OF MANUFACTURING FACILITY

Fire Equipment Sales and Services is located at 1665 Stamey Livestock Road in Sumter, South Carolina, 29153. We maintain a 36,000 square foot facility that is state of the art in fire apparatus manufacturing. It is the largest Fire Apparatus Manufacturing and service facility in Virginia, North Carolina and South Carolina.

Our equipment includes a precision water-jet cutter, 65' downdraft environmentally friendly paint booth as well as tig, mig, heliarc welders as well as plasma cutters.

## PROPOSAL BLUEPRINT

FES is providing a scaled drawing of the specific apparatus being proposed with the bid. The drawing has been generated by FES's engineering department in order to maintain the accuracy of the drawing.

## FIRE APPARATUS MANUFACTURER'S ASSOCIATION MEMBERSHIP

Fire Equipment Sales and Services, a wholly owned division of Safe Industries, is honored to be a member of the Fire Apparatus Manufacturers Association.

## SOUTH CAROLINA DEALER'S LICENSE

Safe Industries is a fully licensed South Carolina Motor Vehicle Dealer. A copy of a valid, current license will be included with the submission of this proposal.

## U.S.A. MANUFACTURER

The entire apparatus will be assembled within the borders of the Continental United States to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service.

**TAG ON'S/ADDITIONAL ORDERS**

At its sole discretion, the Manufacturer may allow the terms of this contract to be extended to both the purchaser and similar agencies for the purchase of a similar unit(s) under similar terms for a period of 36 months from the date of the execution of this contract. Should the Manufacturer choose to exercise this option, it will be permitted to adjust the contract pricing to account for equitable price adjustments associated with the change in the cost of the materials used to produce the unit as well as normal manufacturer yearly price increases. If there are any changes between the unit(s) purchased via this contract and any subsequent orders, those changes must be documented via properly signed and executed change orders, including any necessary price adjustments. If the purchasing agency is not the purchaser, a separate contract will be required to complete the additional purchases. This includes any similar Apparatus, Loose Equipment options, and Service and Warranty Plans.

**EXAMINATION & TEST PROPOSAL COMPLETED BY CERTIFIED THIRD PARTY**

If required by the specific chapters of NFPA-1901, the proposed unit shall be tested by a company certified third party company.

A complete written examination and test report will be provided for each inspection performed at the manufacturer's facility. This report specifies the points of inspection and results of such examinations and tests.

The company providing the test work on the units shall be certified to Level II in the required NDT methods, under the requirements outlined in ASNT document CP-189.

The actual person(s) performing the inspection shall present for review proof of Level II Certification in the required NDT methods.

FES will designate, in writing, who is qualified to witness and certify these test results.

Prior to submittal to the automotive fire apparatus manufacturer, the final Report shall be reviewed by an authorized representative of Fire Equipment Sales and Services and a Registered Professional Engineer.

When the unit successfully meets all the requirements outlined in NFPA 1901, 2016 Edition, the company completing these tests shall issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit's compliance with NFPA- 1901.

**FULL TIME SERVICE AND WARRANTY STAFF**

Safe Industries has seven (7) full time employees on staff dedicated to our service center's apparatus parts and warranty division. Safe Industries also employees one (1) dedicated full time employee to warranty.

**NFPA 1901 - STATEMENT OF EXCEPTIONS**

**Customer Name:** FES22-01 - Brush Truck
**Apparatus:** Fill in Apparatus Model, Year, VIN #

**The above referenced completed fire apparatus is not compliant with the following section of NFPA 1901:**

4.11.2 The VDR shall be capable of recording the data shown in Table 4.11.2 in that order at least once per second.

Table 4.11.2 VDR Data:

- Data Unit of Measure
- Vehicle speed mph
- Acceleration (from speedometer) mph/sec
- Deceleration (from speedometer) mph/sec
- Engine speed rpm
- Engine throttle position % of full throttle
- Anti-lock braking system event On/off
- Seat occupied status Occupied: Yes/No by position
- Seat belt status Buckled: Yes/No by position
- Master optical warning device On/off switch
- Time 24-hour clock
- Date Year/month/day

**Description of Non-Compliance:**

The seat belt system available on the Ford chassis is an integral part of the vehicle's air bag system (supplemental restraint system) and is not able to be interfaced to communicate the required information (seat occupied or seat belt buckled status) to the Vehicle Data Recorder.

**Description of Changes/Modifications Necessary to Achieve Full Compliance:**

The Ford seat belt system, which is integrated with the supplemental restraint (air bag) system, cannot be modified to achieve full compliance.

**Entity Responsible for Achieving Full Compliance:** None (not applicable)

**The above referenced completed fire apparatus is not compliant with the following section of NFPA 1901:**

14.1.3.9.1 - The warning system shall consist of an audible warning device that can be heard at all seating positions designed to be occupied while the vehicle is in motion and a visual display visible to the driver or the officer showing the condition of each seating position.

**Description of Non-Compliance:**

The seat belt system available on the Ford chassis is an integral part of the vehicle's air bag system (supplemental restraint system) and is not able to be interfaced to communicate the required information (seat occupied or seat belt buckled status) to the seat belt warning system.

**Description of Changes/Modifications Necessary to Achieve Full Compliance:**

The Ford seat belt system, which is integrated with the supplemental restraint (air bag) system, cannot be modified to achieve full compliance.

**Entity Responsible for Achieving Full Compliance:** None (not applicable)

**Acknowledgement**

By signing below, the parties acknowledge their understanding of and mutual agreement regarding the foregoing Statement of Exceptions. It is the customer's intent to place the fire apparatus into service without achieving compliance with the above sections of NFPA 1901.

| | |
|---|---|
| Fire Equipment Sales and Services | FES22-01 - Brush Truck |
| By: _____ | By: _____ |
| Authorized signature | Authorized signature |
| Name: _____ | Name: _____ |
| Title: _____ | Title: _____ |

## CAB SAFETY SIGNS

The following safety signs will be provided in the cab:

- A label displaying the maximum number of personnel the vehicle is designed to carry will be visible to the driver.
- "Occupants will be seated and belted when apparatus is in motion" signs will be visible from each seat.
- "Do Not Move Apparatus When Light Is On" sign adjacent to the warning light indicating a hazard if the apparatus is moved (as described in subsequent section).
- A label displaying the height, length, and GVWR of the vehicle will be visible to driver.
- This label will indicate that the fire department will revise the dimension if vehicle height changes while vehicle is in service.

## CHASSIS DATA LABELS

The following information will be on labels affixed to the vehicle:

Fluid Data:

- Engine Oil
- Engine Coolant
- Chassis Transmission Fluid
- Pump Transmission Lubrication Fluid
- Pump Primer Fluid (if applicable)
- Drive Axle(s) Lubrication Fluid
- Air Conditioning Refrigerant
- Air Conditioning Lubrication Oil
- Power Steering Fluid
- Cab Tilt Mechanism Fluid
- Transfer Case Fluid (if applicable)
- Equipment Rack Fluid (if applicable)
- Air Compressor System Lubricant
- Generator System Lubricant (if applicable)
- Front Tire Cold Pressure
- Rear Tire Cold Pressure
- Aerial Hydraulic Fluid (if applicable)
- Maximum Tire Speed Rating

Chassis Data:

- Chassis Manufacturer
- Production Number
- Year Built
- Month Manufactured
- Vehicle Identification Number

Manufacturers weight certification:

- Gross Vehicle (or Combination) Weight Rating (GVWR or GCWR)
- Gross Axle Weight Rating, Front
- Gross Axle Weight Rating, Rear

**PRINCIPAL APPARATUS DIMENSIONS & G.V.W.R.**

- Overall Length: TBD"
- Overall Width: 100"
- Overall Height: TBD"
- Wheelbase: TBD"

The axle and total weight ratings of the completed apparatus will not be less than the following minimum acceptable weight ratings:

- Minimum Total G.V.W.R.: lbs.

FES will include the principal dimensions, front G.A.W.R., rear G.A.W.R., and total G.V.W.R. of the proposed apparatus. Additionally, FES will provide a weight distribution of the fully loaded, completed vehicle; this will include a filled water tank, specified hose load, miscellaneous equipment allowance in accordance with NFPA-1901 requirements, and an equivalent personnel load of 250 lbs. per seating position.

2022 F-550 Chassis 4x4 SD Super Cab 192" WB DRW XL (XSH)

Price Level: 230

# As Configured Vehicle

| Code | Description |
|---|---|
| **Base Vehicle** | |
| X5H | Base Vehicle Price (X5H) |
| **Packages** | |
| 660A | Order Code 660A<br>*Includes:*<br>*- Transmission: TorqShift 10-Speed Automatic 10R140 with neutral idle and selectable drive modes: normal, tow/haul, eco, deep sand/snow and slippery.*<br>*- Tires: 225/70Rx19.5G BSW A/P*<br>*- Wheels: 19.5" x 6" Argent Painted Steel Hub covers/center ornaments not included.*<br>*- HD Vinyl 40/20/40 Split Bench Seat Includes center armrest. cupholder, storage and driver's side manual lumbar.*<br>*- Radio: AM/FM Stereo w/MP3 Player Includes 6 speakers.*<br>*- SYNC Communications & Entertainment System Includes enhanced voice recognition, 911 Assist, 4.2" LCD center stack screen, AppLink, 1 smart-charging USB port and steering wheel audio controls.* |
| **Powertrain** | |
| 99T | Engine: 6.7L 4V OHV Power Stroke V8 Turbo Diesel 820<br>*Includes Diesel Exhaust Fluid (DEF) tank, intelligent oil-life monitor and manual push-button engine-exhaust braking.*<br>*Includes:*<br>*- Dual 78-AH 750 CCA Batteries* |
| 44G | Transmission: TorqShift 10-Speed Automatic<br>*10R140 with neutral idle and selectable drive modes: normal, tow/haul, eco, deep sand/snow and slippery.* |
| X8L | Limited Slip w/4.88 Axle Ratio |
| 68M | GVWR: 19,500 lb Payload Plus Upgrade Package<br>*Includes upgraded frame, rear-axle and low deflection/high capacity springs. Increases max RGAWR to 14, 706. Note: See Order Guide Supplemental Reference for further details on GVWR.* |
| **Wheels & Tires** | |
| TGJ | Tires: 225/70Rx19.5G SSW N P |
| 64Z | Wheels: 19.5" x 6" Argent Painted Steel<br>*Hub covers/center ornaments not included.* |
| **Seats & Seat Trim** | |

2022 F-550 Chassis 4x4 SD Super Cab 192" WB DRW XL (XSH)

Price Level: 230

## As Configured Vehicle (cont'd)

| Code | Description |
|---|---|
| **A** | HD Vinyl 40/20/40 Split Bench Seat<br>*Includes center armrest, cupholder, storage and driver's side manual lumbar.* |
| **Other Options** | |
| PAINT | Monotone Paint Application |
| 192WB | 192" Wheelbase |
| STDRD | Radio: AM/FM Stereo w/MP3 Player<br>*Includes 6 speakers.*<br>*Includes:*<br>*- SYNC Communications & Entertainment System*<br>*Includes enhanced voice recognition, 911 Assist, 4.2" LCD center stack screen, AppLink, 1 smart-charging USB port and steering wheel audio controls.* |
| 62R | Transmission Power Take-Off Provision<br>*Includes mobile and stationary PTO modes.* |
| 98R | Operator Commanded Regeneration |
| 678 | 397 Amp Alternators |
| 872 | Rear View Camera & Prep Kit<br>*Pre-installed conte11t includes cab wiring a11d frame wiring to the rear most cross member. Upfitters kit includes camera with mounting brac<et, 20' jumper wire and camera mounting/aiming i11structions.* |
| **Fleet Options** | |
| 47J | Fire/Rescue Prep Pkg w/EPA Special Emissions (LPO)<br>Requires valid FIN code.<br>*Includes 7,000 lbs. max fro11t springs/GAWR rating for co11figuration selected. Incomplete vehicle package - requires further manufacture ,nd certification by a final stage manufacturer. Ford urges Fire/Rescue vel1icle manufacturers to follow the recommendations of the Ford Incomplete Vehicle Manual and the Ford Truck Body Builders Layout Book (and pertinent supplements). NOTE 1: Stationary Elevated Idle Control (SEIC) has been integrated into the engine control module. NOTE 2: Engine calibratio11 significantly reduces the possibility of depower mode when in stationary PTO operation. NOTE 3: Operator commanded regen allowed down to 30% of DPF filter full, instead of 100%. NOTE 4: Must meet the definition of an emergency vehicle, an Ambulance or Fire Truck per 40 CFR 86.1803.01 in the federal register. NOTE 5: California Code of Regulations allows for the sale of federally certified emergency vehicles in California.*<br>*Includes:*<br>*- 397 Amp Alternators*<br>*- Operator Commanded Regeneration* |
| **Emissions** | |
| 425 | 50-State Emissions System |
| **Interior Color** | |

2022 F-550 Chassis 4x4 SD Super Cab 192" WB DRW XL (X5H)

Price Level: 230

## As Configured Vehicle (cont'd)

| Code | Description |
|---|---|
| AS_01 | Medium Earth Gray |
| **Exterior Color** | |
| PQ_01 | Race Red |

**WARN PORTABLE ELECTRIC WINCH**

A multi-mount 12 volt electric portable Warn 9,500 pound winch, 9.5CTI, 97550, will provided to mount in the specified Winch receivers. The winch will be equipped with a portable framework and 12 volt quick connection.

The portable winch have the following features:

- Massive protective structure combined with sophisticated operator feedback
- Contactor control features exceptional durability, extra long life, and superior weather sealing
- Series Wound motor and 3-stage planetary gear train deliver 9,500 lbs. of pulling capacity, fast line speeds, and long duty cycles
- Extreme duty winch sealing system
- Motor-mounted thermal sensor relays temperature information to winch operator by way of the hand-held remote control with LED indicator
- Remote control with thermometric indicator light
- High gloss, chip-resistant black powder coat finish over a massive cast-aluminum alloy housing
- Includes 9.5cti winch, multi-mount carrier, and quick connect wiring for front of vehicle. Winch comes with 125 ft. of 5/16" wire rope, hook, remote control on 12' lead, and hawse fairlead
- Limited Lifetime Warranty for Mechanical Components. Limited Seven (7) year warranty for Electrical Components.

The winch will meet all SAE J 706 requirements as outlined NFPA -1901.

**WARN TRANS4MER GEN III - FULL GRILLE GUARD**

A Warn Winch Trans4mer Gen III bolt on full grille guard will be provided and installed, 103012. The grille guard will be constructed with heavy gauge steel, constructed of 2" tubes and cross members with a durable black powder coated finish to protect against corrosion. The grille guard will include welded uprights and headlamp guards. Welded tabs allow for mounting lights and replaceable rubber trim adds protection and style.

**WARN TRANS4MER GEN III MID FRAME MOUNTING KIT**

A Warn Mid Frame Mounting Kit will be provided and installed on the grille guard, 106816. The mount will be constructed from heavy gauge steel with a durable black coat finish to protect against corrosion. THe kit shall include mounting brackets, winch carrier, J-hooks to assist with vehicle recovery and provisions to mount lights.

**CENTER CONSOLE**

A center console fabricated from 1/8" aluminum will be furnished and will be located between the driver and officer's seats.

The forward area of the console will have a mounting surface for emergency lighting switch panels and/or electronic siren control boxes within reach of the driver or officer. In addition, the console will be equipped with two (2) map/notebook storage pockets at the rear of the console.

The console will be finished with a textured gray paint to match the interior color of the cab.

## ANTENNA INSTALLATION

One (1) antenna mounting base(s) model #MATM with 17' of coaxial cable will be provided and installed on the cab roof. The attached antenna wire(s) will be run to the center console.

The Fire Department is responsible to have the correct antenna whip installed once the apparatus is delivered.

## NERF OVAL STEP BARS

A set of Premier 4 Oval Nerf step bars with a black finish will be installed on the apparatus to provide step support under the apparatus cab doors. The step bars will feature anti-slip step pads below each chassis cab door.

## CAB STEP LIGHTS

TecNiq E-03 step lights will be provided, one (1) near each cab door to illuminate the cab stepping surfaces. The step lights will be mounted in a convenient location so as to provide appropriate illumination to the cab stepping surfaces. The step lights will automatically activate automatically when the exit doors are opened, when the parking brake is applied and marker lights are active.

## WHEEL TRIM KITS

Wheel trim kits consisting of stainless steel baby moons, high hats and lug nut covers will be installed on the front and rear axles of the single rear axle chassis.

## 3M REFLECTIVE CAB DOOR MATERIAL - RED/WHITE

There will be 3M Brand reflective alternating Red/White striping material with the FES logo installed on the inside of the driver and officer side cab doors.

******* CHASSIS/BODY ELECTRICAL & ACCESSORIES *******

**COMMERCIAL CHASSIS ELECTRICAL SYSTEM**

The commercial chassis electrical system will be provided as furnished by the original manufacturer. A customized interface will be provided and designed, so as not to disturb any of the required chassis functions. The necessary interfaces will only be provided in areas where load management is allowed or with accessory components provided on the chassis.

**12 VOLT ELECTRICAL SYSTEM TESTING**

The apparatus low voltage electrical system will be tested and certified by the manufacturer. The certification will be provided with the apparatus. All tests will be performed with air temperature between 0°F and 100°F.

The following three (3) tests will be performed in order. Before each test, the batteries will be fully charged.

**TEST #1-RESERVE CAPACITY TEST**

The engine will be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine will be shut off and the minimum continuous electrical load will be activated for 10 minutes. All electrical loads will be turned off prior to attempting to restart the engine. The battery system will then be capable of restarting the engine. Failure to restart the engine will be considered a test failure.

**TEST #2-ALTERNATOR PERFORMANCE TEST AT IDLE**

The minimum continuous electrical load will be activated with the engine running at idle speed. The engine temperature will be stabilized at normal operating temperature. The battery system will be tested to detect the presence of battery discharge current. The detection of battery discharge current will be considered a test failure.

**TEST #3-ALTERNATOR PERFORMANCE TEST AT FULL LOAD**

The total continuous electrical load will be activated with the engine running up to the engine manufacturers governed speed. The test duration will be a minimum of 2 hours. Activation of the load management system will be permitted during this test. However, an alarm sounded due to excessive battery discharge, as detected by the system, or a system voltage of less than 11.7 volts DC for a 12 volt system, for more than 120 seconds, will be considered a test failure.

## LOW VOLTAGE ALARM TEST

Following completion of the preceding tests, the engine will be shut off. The total continuous electrical load will be activated and will continue to be applied until the excessive battery discharge alarm is activated.

The battery voltage will be measured at the battery terminals. With the load still applied, a reading of less than 11.7 volts will be considered a test failure. The battery system will then be able to restart the engine.

At time of delivery, documentation will be provided with the following information:

- Documentation of the electrical system performance test
- A written load analysis of the following;
- Nameplate rating of the alternator
- Alternator rating at idle while meeting the minimum continuous electrical load
- Each component load comprising the minimum continuous electrical load.
- Additional loads that, when added to the minimum continuous load, determine the total connected load.
- Each individual intermittent load.

## LOAD MANAGEMENT SYSTEM

An "Intelligent" load management system will be provided. The load management system will be capable of offering load sequencing, load shedding, fast idle control, low voltage warning, scene mode operation and response mode operation.

The load management will have a digital display to indicate system voltage in normal operation mode and also indicate the output configuration during programming mode.

The load management will also be protected against reverse polarity and shorted outputs and be enclosed in a metal enclosure to enhance EMI/RFI protection.

## VOLTAGE MONITOR SYSTEM

A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

**ELECTRICAL HARNESS REQUIREMENT**

To ensure dependability, all 12-volt wiring harnesses installed by the manufacturer will conform to the following specifications:

- SAE J 1128 - Low tension primary cable
- SAE J 1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring
- SAE J 163 - Low tension wiring and cable terminals and splice clips
- SAE J 2202 - Heavy duty wiring systems for on-highway trucks
- NFPA 1901 - Standard for automotive fire apparatus
- FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses
- SAE J 1939 - Serial communications protocol
- SAE J 2030 - Heavy-duty electrical connector performance standard
- SAE J 2223 - Connections for on board vehicle electrical wiring harnesses
- NEC - National Electrical Code
- SAE J 561 - Electrical terminals - Eyelet and spade type
- SAE J 928 - Electrical terminals - Pin and receptacle type A.

For increased reliability and harness integrity, harnesses will be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into its mounting location. Routing of harnessing which requires pulling of wires through tubes is never allowed at the manufacturer.

Wiring will be run in loom or conduit where exposed and have grommets or other edge protection where wires pass through metal. Wire colors will be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires will not be allowed. Function and number codes will be continuously imprinted on all wiring harness conductors at 3.00" intervals. All wiring installed between the cab and into doors will be protected by a wire conduit to protect the wiring. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids. Electrical wiring and equipment will be installed utilizing the following guidelines:

- All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
- Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
- For low cost of ownership, electrical components designed to be removed for maintenance will be quickly accessible. For ease of use, a coil of wire will be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.
- Corrosion preventative compound will be applied to non-waterproof electrical connectors located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation of the plug.
- Any lights containing non-waterproof sockets in a weather-exposed area will have corrosion preventative compound added to the socket terminal area.
- All electrical terminals in exposed areas will have protective coating applied completely over the metal portion of the terminal.
- Rubber coated metal clamps will be used to support wire harnessing and battery cables routed along the chassis frame rails.
- Heat shields will be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust will be protected by a heat shield.
- Cab and crew cab harnessing will not be routed through enclosed metal tubing. Dedicated wire routing channels will be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab will allow for easy routing of additional wiring and easy access to existing wiring.

**ELECTRICAL HARNESS REQUIREMENT, CONT'D.**

- All standard wiring entering or exiting the cab will be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

**BATTERY CABLE INSTALLATION**

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer will conform to the following requirements:

- SAE J 1127 - Battery Cable
- SAE J 561 - Electrical terminals, eyelets and spade type
- SAE J 562 - Nonmetallic loom
- SAE J 836 A - Automotive metallurgical joining
- SAE J 1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
- NFPA 1901 - Standard for automotive fire apparatus.

Battery cables and battery cable harnessing will be installed utilizing the following guidelines:

- Splices will not be allowed on battery cables or battery cable harnesses.
- For ease of identification and simplified use, battery cables will be color coded. All positive battery cables will be marked red in color. All negative battery cables will be black in color.
- For ease of identification, all positive battery cable isolated studs throughout the cab and chassis will be red in color.
- For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus will be coated to prevent corrosion.
- An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

**12 VOLT BATTERY CHARGING RECEPTACLE**

A 12 volt, polarized battery charging receptacle, with a weather tight cover, will be provided. This receptacle will allow a purchaser supplied external 12 volt battery charger to be utilized. A label will be provided indicating voltage and amperage ratings.

**SHORELINE POWER INLET PLATE**

A shoreline power receptacle information plate will be permanently affixed at or near the power inlet. The plate will indicate the following:

- Type of Line Voltage
- Current Rating in Amps Power Inlet Type (DC or AC).

The shoreline receptacle will be located in the driver's cab step well in a pre-determined location by FES.

## EMERGENCY/AUXILIARY SWITCHES

The commercial cab will be equipped with and area for component switching within easy reach of the driver and or officer. This switch package will separate the emergency/auxiliary electrical functions from the regular chassis functions. A minimum of four (4) programmable switches with integral indicator lights will be provided.

The four (4) switches will be green backlit and located in the cab near the driver for warning lights and auxiliary controls.

All switches, (other than the master switch), will have switch function labeling and an integral indicator light.

## "DO NOT MOVE APPARATUS" WARNING LIGHT WITH AUDIBLE ALARM

A Truck-Lite 2.5" round, red flashing warning light with an audible alarm, will be functionally located in the cab and will be activated automatically whenever the apparatus parking brake is not fully engaged and of the following conditions exist:

- Any driver, passenger or equipment compartment door is not closed
- Any ladder or equipment rack is not in the stowed position
- Stabilizer system is not in its stowed position
- Powered light tower is not stowed
- Any other device permanently attached to the apparatus is open, extended or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved

This light will be labeled "Do Not Move Apparatus When Light Is On."

## BLUE SEA FUSE BLOCK - 6 CIRCUIT IN CENTER CONSOLE

A Blue Sea 5025B, 6 circuit fuse block will be installed. This block has a maximum amperage of 60 Amps per block and 30 Amps per circuit.

## VISION & CAMERA SYSTEM EQUIPMENT

## BACKUP CAMERA SYSTEM

The backup camera system will be provided by the chassis manufacturer and shipped loose for FES to install.

****** BODY ELECTRICAL SYSTEM ******

## 12 VOLT BODY ELECTRICAL SYSTEM

All electrical lines in the body will be protected by automatic circuit breakers, conveniently located to permit ease of service. Flashers, heavy solenoids and other major electrical controls will be located in a central area near the circuit breakers.

All lines will be color and function coded every 3", easy to identify, oversized for the intended loads and installed in accordance with a detailed diagram. A complete wiring diagram will be supplied with the apparatus.

Wiring will be carefully protected from weather elements and snagging. Heavy duty loom will be used for the entire length. Grommets will be utilized where wiring passes through panels.

In order to minimize the risk of heat damage, wires run in the engine compartment area will be carefully installed and suitably protected by the installation of heat resistant shielded loom.

All electrical equipment will be installed to conform to the latest federal standards as outlined in NFPA 1901.

## DOT MARKER LIGHTS AND REFLECTORS

Cab marker lights and signaling devices will be as provided on the commercial chassis cab from the original chassis manufacturer. FMVSS reflectors will be provided as required.

Two (2) Optronics model MCL82RDB low profile, flush mount rectangular red LED marker lights with reflex lens will be provided at the lower side rear, one (1) each side.

Two (2) TecNiq model SL15-RC00-1 red LED with clear lens clearance side marker lights will be provided on the apparatus rear upper, one (1) each side at the outermost practical location.

Three (3) Optronics model MCL82RDB low profile, flush mount rectangular red LED marker lights with reflex lens will be provided on the apparatus rear center.

## LED LICENSE PLATE LIGHT - REAR

One (1) TecNiq model L10 LED license plate light will be provided above the mounting position of the license plate. The light will be clear in color and will have a chrome finish.

**WHELEN BRAKE/TAIL/TURN AND BACK UP LIGHTS**

Two (2) Whelen M6 Series Model # M6BTT brake/tail/turn lights will be provided. The M6BTT configuration will consist of 72 red 5mm Super-LEDs® and a red non-optic polycarbonate lens. The M6BTT will include two Scan-Lock™ flash patterns of Steady (Brake) Default and SignalAlert™ Steady.

Two (2) Whelen M6 Series Model # M6T turn arrow light will be provided. The M6T configuration will consist of 64 amber 5mm Super-LEDs® and an amber non-optic polycarbonate lens. The turn arrow, with the aid of two screws, will have the ability to be installed as a surface mount warning light. The M6T will include two Scan-Lock flash patterns of Steady (Brake) Default and SignalAlert™ Steady.

Two (2) Whelen M6 Series Model # M6BUW back-up light will be provided. The steady burn back-up light will incorporate Linear Super-LED® and technology. The M6BUW configuration will consist of 12 clear Super-LEDs and a clear optic polycarbonate lens. The M6BUW will utilize optic collimators, a metalized reflector, and optic lens for maximum illumination.

The encapsulated assembly will be resistant to water, moisture, dust, and other environmental conditions. The hard coated lens will provide extended life/luster protection against UV and chemical stresses. The light engine will be installed at the rear of the unit and be vacuum tested to ensure proper sealing. The PC board will be conformal coated for additional protection.

The brake/tail/turn and backup lights will meet SAE specifications J1398, J585, J1395, J586, and J1330. The M6BTT is covered by a five year factory warranty.

Two (2) Whelen M6 series chrome flanges model # M6FCV3 will be provided.

**TECNIQ EON-3 LED BODY STEP LIGHTS**

Two (2) polished stainless steel, TecNiq Eon 3-LED horizontal surface mounted body step lights will be provided. The lights will automatically activate when the exit doors are opened and marker lights are activated. Step lights will be located to properly illuminate all body access steps and walkway areas and will include a mounting gasket to provide a watertight seal.

**TECNIQ E10 LED GROUND LIGHTS - BELOW CAB DOORS**

One (1) TecNiq LED, 6" long ground light with stainless steel mounting bracket, will be provided under each side cab door entrance step, two (2) total.

Each light will illuminate an area at a minimum 30" outward from the edge of the vehicle.

**TECNIQ E10 LED GROUND LIGHTS - BELOW REAR BODY CORNERS**

One (1) TecNiq LED, 6" long ground light with stainless steel mounting bracket, will be provided under each rear body corner, two (2) total.

**GROUND LIGHT SWITCHING - ENGAGE WITH PARKING BRAKE**

The cab and body ground lights will activate by engaging the parking brake.

**COMPARTMENT LIGHT ACTIVATION**

Compartment lighting will be switched from an integral switch as provided by the roll up door manufacturer.

**TECNIQ LED COMPARTMENT STRIP LIGHTS**

The compartments will be equipped with TecNiq LED flexible white light strips on each side of the interior door opening, E41-W010-1. The light strips are ultra thin, 3/16", producing 150 lumens per 4.5" section and installed with 3M abrasive tape back. The lights will be designed and manufactured to be water proof meeting the IPX7 industry standard. Approximately  4.5" sections Four (4) be needed for the compartments.

## NFPA AUDIBLE AND LIGHTING WARNING PACKAGE

The following warning light package will include all of the minimum warning light and actuation requirements for the current revision of NPFA 1901 Fire Apparatus Standard. The lighting as specified will meet the requirements for both "Clearing Right of Way" and "Blocking Right of Way" which includes disabling all white warning lights when the apparatus is in "Blocking Right of Way" mode.

## LIGHT PACKAGE ACTUATION CONTROLS

The entire warning light package will be actuated with a single warning light switch located on the cab switch panel. The wiring for the warning light package will engage all of the lights required for "Clearing Right of Way" mode when the vehicle parking brake is not engaged. An automatic control system will be provided to switch the warning lights to the "Blocking Right of Way" mode when the vehicle parking brake is engaged.

## WARNING LIGHT FLASH PATTERN

All of the perimeter warning lights will be set to an NFPA compliant flash pattern by the apparatus manufacturer.

## UPPER LEVEL LIGHTING - WHELEN

### NFPA ZONE A, UPPER

Whelen # JE2NFPA "Justice", 56" LED cab roof warning light bar will be furnished and rigidly mounted on top of the cab roof.

The light bar will be equipped with the following:

- Clear Lenses
- Four Corner Red Linear 6 LEDs
- Six Red Forward Facing CON 3 LEDs
- Two White Forward Facing CON 3 LEDs.

If equipped, the forward facing white lights will be automatically disabled for the "Blocking Right of Way" mode.

### NFPA ZONE C, UPPER

Two (2) Whelen Series SurfaceMax™ model # C6LRC LED warning lights will be furnished and mounted one (1) each side on the upper rear face of the body, facing rear.

Each light head will be equipped with red LED lights and clear lenses.

The lights will be installed with a chrome plated mounting flange, C6FC.

### NFPA ZONES B & D, UPPER REAR

NFPA Zones B & D Upper Rear lights are covered by the Zone C Upper lights.

### NFPA ZONES B & D, UPPER FRONT

NFPA Zones B & D Upper Front lights are covered by the Lightbar and are not required.

**LOWER LEVEL LIGHTING - WHELEN**

**NFPA ZONE A, LOWER**

Two (2) Whelen LINZ6™ series Linear Super-LED® model # LINZ6R will be furnished and mounted one (1) each side.

Each light head will be equipped with red LED lights and clear lenses.

The lights will have a black polycarbonate powder coated housing with hardware for surface mounting.

The lower zone A warning lights will be mounted in the commercial chassis grille no higher than 62" from ground level.

**NFPA ZONE C, LOWER**

Two (2) Whelen Series SurfaceMax™ model # C6LRC LED warning lights will be furnished and installed one (1) each side directly below the DOT stop, tail, turn and backup lights.

Each light head will be equipped with red LED lights and clear lenses.

The lights will be installed with a chrome plated mounting flange, C6FC.

**NFPA ZONES B & D FRONT, LOWER**

Two (2) Whelen LINZ6™ series Linear Super-LED® model # LINZ6R will be furnished and installed one (1) each side.

Each light head will be equipped with red LED lights and clear lenses.

The lights will have a black polycarbonate powder coated housing with hardware for surface mounting.

The lower zone B & D warning lights will be mounted on the sides of the commercial chassis hood at or forward of the centerline of the front axle. The light will be mounted no higher than 62" from ground level.

**NFPA ZONES B & D REAR, LOWER**

Two (2) Whelen LINZ6™ series Linear Super-LED® model # LINZ6R will be furnished and installed one (1) each side.

Each light head will be equipped with red LED lights and clear lenses.

The lights will have a black polycarbonate powder coated housing with hardware for surface mounting.

**WARNING LIGHT SYSTEM CERTIFICATION**

The warning light system(s) specified above will not exceed a combined total amperage draw of 45 AMPS with all lights activated in either the "Clearing Right of Way" or the "Blocking Right of Way" mode.

The warning light system(s) will be certified by the light system manufacturer(s), to meet all of the requirements in the current revision of the NFPA 1901 Fire Apparatus Standard as noted in the General Requirements section of these specifications. The NFPA required "Certificate of Compliance" will be provided with the completed apparatus.

Any large truck as defined by NFPA will have the lower zone warning lights mounted no higher than 62" to the optical center of the warning light from ground level.

***** AUDIBLE WARNING EQUIPMENT *****

**BACK-UP ALARM**

A 97 dB(A) Whelen back-up alarm, will be provided and installed at the rear of the apparatus under the tailboard. The back-up alarm will activate automatically when the transmission is placed in reverse gear and the ignition is "on".

**ELECTRONIC SIREN**

One (1) Whelen Siren Amplifier model # 295SLSA1 will be provided. The siren amplifier will incorporate a 12V/200W siren installed on an aluminum alloy chassis covered by a black polycarbonate powder coated housing for maximum protection. The 295SLSA1 will have the ability for either 100 or 200 watt output. The operating controls will consist of a power switch, manual button, PA volume switch, horn button, and rotary switch.

The siren amplifier will have a "Siren in Use" icon driver and adjustable preset repeat radio volume. The 295SLSA1 will have a "Park Kill" feature that disables the siren when the vehicle is in park. The PTT (push to talk) switch on the microphone will override all siren functions. The 295SLSA1 will have a combination On/Off and horn ring transfer switch with Bi-polarity horn/ring activation control. The 295SLSA1 will have SI Test® capability to perform a complete diagnostic silent test of amplifier and speaker(s). The siren amplifier will have a quick disconnect plug.

The electronic siren and speaker will meet the NFPA required SAE certification to ensure compatibility between the siren and speaker.

**ELECTRONIC SIREN SPEAKER - DRIVER'S SIDE OF FRONT BUMPER**

One (1) Whelen, model # SA315P composite black siren speaker, will be provided, recessed on the driver's side of the front bumper and wired to the electronic siren

****** PUMP AND PLUMBING ******

**300 GALLON UPF/DEFENDER III SKID UNIT TANK**

**TANK CAPACITY**

The tank will have a capacity of 300 US gallons of water and will be constructed of PT3™ polypropylene material. This material will be a non-corrosive stress relieved thermoplastic and UV stabilized for maximum protection. Tank shell thickness may vary depending on the application and may range from ½ to 1" as required. Internal baffles are generally 3/8" in thickness.

The tank will have two full length booster reel mounting blocks and one (1) 4' wide 8' long skid platform with pump area. Standard foot print for the 300 Defender III tank will be 96" long x 48" wide.

**TANK CONSTRUCTION**

The poly tank will be constructed of 1/2" thick polypropylene sheet stock with AccTuf™ resin. The material will be of a certified, high quality, non-corrosive, stress relieved thermo plastic, black in color with a textured finish, and UV stabilized for maximum protection. The skid type booster tank will be of a standard configuration and will be so designed to have complete modular slide in capability. All joints and seams are to be fully nitrogen welded and electronically tested for maximum strength. The unit will incorporate transverse partitions manufactured of 3/8" polypropylene which will interlock with a series of longitudinal partitions constructed of 1/2" polypropylene. All swash partitions will be so designed to allow for maximum water and air flow between compartments and are fully welded to each other as well as to the inside of the tank. The rear wall of the tank will have a standard tube with ball indicator for tank level indication.

**FILL TOWER AND TANK COVER**

The tank will be equipped with a combination vent/overflow and manual fill tower. The fill tower will be an 8" square by 6" high with a molded drop-on type cover. The cover will be fastened to the tower with a tether to prevent loss. The tower will be located in the right rear corner of the tank. There will be a vent / overflow installed inside and to the extreme rear of the tower approximately 2" down from the top. This vent / overflow will be of a standard schedule 40 polypropylene pipe with minimum ID of 3". The vent / overflow will be piped internally within the tank to exit as far to the rear as possible.

The tank cover will be constructed of 1/2" thick polypropylene, black in color; UV stabilized, and incorporates an exclusive self locking design. The tank covers will be flush mounted and individually removable with up to 100% access for inspection or repair if necessary. The cover will incorporate four (4) 2" polypropylene for hold-down and lifting provisions. These dowels will be tapered for ½" -13 threads to accommodate a lifting eye with a minimum security factor of 3 to 1. These dowels will be welded into the transverse baffles, and will assist in minimizing cover flex during normal operation.

**TANK OUTLETS**

There will be two standard tank outlets located on the rear wall of the tank. One (1) 3" female NPT tank to pump suction fitting and one (1) 1-1/2" female NPT tank fill fitting with flow deflector.

## HALE HPX200-B18 PORTABLE PUMP - MAX 245 GPM

No competitive pump can match Hale's construction or performance.

**Performance**

The pump/engine will be capable of meeting the NFPA 1906 performance rating of 50 GPM @ 150 PSI. Typical pump performance from 5 foot draft at sea level will be: 70 GPM @ 150 PSI, 150 GPM @ 100 PSI and 240 GPM @ 25 PSI.

**Pump**

The pump body will be made of anodized alloy aluminum castings coupled together with a stainless steel band clamp with an O-ring seal which allows quick pump volute removal for servicing. The pump end will be factory hydrostatically tested to 300 PSI. The impeller will be bronze. The renewable clearance rings will be made of bronze to inhibit galvanic corrosion. The impeller will be 8.75 inches (222.3 mm) in diameter and designed with a sleeve back end to prevent water from coming in contact with the engine shaft. The pump shaft seal will be an automatically adjusting, maintenance free, mechanical type. The pump body will be equipped with a petcock drain valve.

**Priming**

The pump will be equipped with an exhaust venturi primer of brass and stainless steel construction. The primer will be capable of priming at 13 feet lift. The primer will be actuated with a spring return, single control lever located at the operator's panel. The primer to pump line will be equipped with an automatic check valve for priming from an open body of water and a manual shut -off for pumping from a pressurized water source.

**Suction/Discharge**

The suction port will be female pipe thread, designed and located to accept applicable hose thread adapters (3" NPT / 4" Victaulic Suction, 2.5" NPT Discharge flange).

**Engine**

The engine will be a 4 cycle gasoline Briggs and Stratton Vanguard 356447 series V-Twin, overhead valve, air cooled design. Engine rating will be 18 BHP at 4000 RPM with a torque of 30-lb-ft at 2600 GPM. Engine displacement will be 570cc and will be designed to meet current CARB (California Air Resources Board) and EPA (Environmental Protection Agency) standards. A 12-volt electric system will be provided with electric starter and a 16 amp alternator. Recoil backup engine starting will provided. Engine will be equipped with a residential muffler with USDA approved spark arrestor.

## SUCTION PIPING

All piping on the suction side will be made of stainless steel with welded joints and / or vacuum rated flexible hose. The hose will be positioned to maintain a straight a run of pipe as possible to minimize flow losses.

## DISCHARGE PIPING

All piping will be stainless steel piping or high pressure flexible hose. A stainless steel round manifold will be connected to the discharge outlet of the pump via high pressure flexible hose. Attached to this discharge manifold, by means of welded pipe nipples, will be all the discharge valves.

**PIPING FINISH**

The stainless steel piping will remain unpainted. All welds will be cleaned to present a pleasing appearance.

**MANIFOLD DRAIN**

The manifold will have a quarter turn petcock valve at the base to provide drainage.

**PUMP BY-PASS / COOLING LINE**

A 3/8" line will be provided from the pump outlet to the water tank. This line will be equipped with a check valve to prevent vacuum loss during priming. It will also be equipped with a shut-off valve to allow complete blow-down of the plumbing. The line will provide continuous, low-volume cooling flow for pump-and-roll operations if no other discharges are open.

**RE-ROUTE ENGINE OIL DRAIN**

A flexible tube with shutoff valve will be provided from the pump engine oil pan to a more easily accessible location at the rear of the unit to allow the pump engine oil to be drained.

**TANK TO PUMP**

The suction piping will consist of a 2-1/2" tank to pump line with a 2-1/2" flexible rubber suction hose to minimize flex and vibration between the pump and the tank. Between the tank and the pump there will be a 2-1/2" Akron valve. This valve will remain open to pump from the tank.

A check valve will be provided to prevent accidental pressurization of the water tank through the pump connection. The suction connection will be ungated with a 2-1/2" FNST swivel adapter, 54R2525, and a 2-1/2" NST plug with retaining cable, CC2552.

**TANK FILL**

There will be a 1-1/2" valve piped from the discharge manifold as a means for refilling the tank. The valve will be a quarter turn valve handle, and will be connected to the tank fill port by 1-1/2" high pressure flexible hose.

**REAR 2-1/2" DISCHARGE**

There will be one (1) 2-1/2" discharge piped from the discharge manifold to the rear of the apparatus. The discharge will have a 2-1/2" MNST adapter with a cap and chain. The Akron valve will be controlled at the discharge location.

**OPERATOR PANEL, BASE - AUXILIARY ENGINE DRIVEN PUMP**

The pump controls and indications will be mounted on a stainless steel panel with light hood at the rear of the unit. The panel will be designed to minimize the size of the panel while still providing maximum access to the pump and plumbing controls. If necessary to provide access to the pump engine service points, a hinged door will be provided to allow access to filters, fluid checks, and basic maintenance.

**PUMP ENGINE FUEL TANK**

The pump engine will be supplied by a 6 gallon remote EPA and CARB Certified fuel tank located adjacent to the pump at the rear of the unit. The tank will be connected with a quick disconnect and a strap so that the tank may be removed to fill the tank on the ground.

## APPARATUS BODY DESIGN CONSTRUCTION

The body side and compartment assemblies will be designed and assembled to provide maximum strength and durability under all operating conditions.

Special attention will be taken to minimize corrosion on all fabricated parts and structural members of the body. All bolt-on components will be provided with a dissimilar metals isolation barrier to prevent electric corrosion.

The body assembly will be an all-welded configuration and will be completely isolated from the cab.

## BODY AND COMPARTMENT FABRICATION - 3/16" ALUMINUM

All compartment floor and back wall panels will be entirely 3/16" aluminum (5052-H32). All compartment roof and side wall panels, component storage sleeves (unless specified otherwise), and body side sheets will be entirely 1/8" aluminum (5052-H32). Each compartment panel and/or body side sheet will be both plug welded and stitch welded to ensure proper weld penetration on all panels while avoiding the possible warping caused by a full seam weld. A full seam weld will not be used due to the applied heat which could distort sheet metal and remove the protective coating from the perimeter of the welded area. All seams will be caulked prior to finish paint to ensure proper compartment seal.

## HEADBOARD

The front of the body will have a framed headboard to support the light bar and to protect the back of the cab. The main frame will be 2" x 4" box extending vertically from the longitudinal sills with a 4" channel to contour the bar to the shape of the cab.

## REAR TAILSKIRT

The rear end of the body will be finished with a tail skirt that extends approximately 18 inches below the bottom of the flatbed side rail. The tail skirt will be framed with 4 inch channel and reinforced to support the folding steps. The rearward portion of the skirt will be clad with tread plate unless rear chevron striping is provided.

## BODY SUBFRAME - ALUMINUM

The body subframe will be an all welded configuration constructed from ten (10) 3" x 2-5/16" x 8' structural aluminum I beams.

The rest of the body subframe structure will be an all-welded configuration utilizing a combination of 4"x 2" 6061-T6 aluminum 1/4" (.250") wall tubing, 3" x 2" 6061-T6 aluminum 1/4" (.250") wall tubing, 2" x 2" 6061-T6 aluminum 3/16" (.1875") wall tubing, 2" x 1" 6061-T6 aluminum 1/8" (.125") wall tubing, 3" x 1" 6061-T6 aluminum 1/8" (.125") wall tubing, and 3" x 3/4" (.75") 6061-T6 aluminum flatbar.

The body subframe will also utilize 2" x 2" 6061-T6 aluminum 1/4" (.25") angle and 3" x 1.5" 6061-T6 aluminum 1/4" (.25") c-channel in areas that require additional support or mounting locations.

This body subframe will be designed to totally support the full length, height, and width of the body.

## STEPPING, STANDING, & WALKING SURFACES

All stepping, standing, and walking surfaces on the body will meet NFPA #1901 anti-slip standards. 3/16" (.1875") 3003-H22 aluminum tread plate utilized for stepping, standing, and walking surfaces will be ALCOA no slip type. Upon request by the Purchaser, the manufacturer will supply proof of compliance with this requirement.

## COMPARTMENT LAYOUT

Two (2) freestanding compartment assemblies will be mounted on top of each side of the flatbed. Each assembly will include the doors and the shell. The compartments will be constructed from aluminum tread plate and will remain unpainted.

## DRIVER'S SIDE COMPARTMENTS

The driver's side of the apparatus body will be approximately 110.75" in length, 48" in height and 23" in depth and contain two (2) compartments.

**L1 -** The forward compartment will be approximately 50" wide x 30" high and 23" deep.

**L2 -** The rearward compartment will be approximately 50" wide x 30" high x 23" deep.

## DRIVER'S SIDE COFFIN COMPARTMENT

Mounted on top of the driver's side compartment will be a coffin compartment approximately 106" long x 12" high x 22" deep.

## OFFICER'S SIDE COMPARTMENTS

The officer's side of the apparatus body will be approximately 110.75" in length, 48" in height and 23" in depth and contain two (2) compartments.

**R1 -** The forward compartment will be approximately 50" wide x 30" high and 23" deep.

**R2 -** The middle compartment will be approximately 50" wide x 30" high x 23" deep.

## OFFICER'S SIDE COFFIN COMPARTMENT

Mounted on top of the officer's side compartment will be a coffin compartment approximately 106" long x 12" high x 22" deep.

## FLATBED SKID UNIT TREADPLATE COMPARTMENT DOORS

The compartment doors will be constructed from .3/16" aluminum treadplate and have full length horizontally hinged treadplate lift up style doors with D-ring turn latches. The doors will be reinforced with C-Channel for rigidity.

Each door will have a weather seal applied to prevent moisture from entering the compartment.

## COMPARTMENT DOOR GAS SHOCKS

Gas shock type door hold open devices will be provided for each door.

## COATED FASTENERS

All exterior fasteners will be coated stainless steel screws. Screw threads will be coated with reusable, self-locking, sealing material to provide vibration resistance. Screw heads will be coated with a sealing element to prevent galvanic corrosion between dissimilar metals. Non-coated screws will only be provided as part of vendor supplied component installations.

## COMPARTMENT LOUVERS

Ventilation between compartments to atmosphere will be provided and located to avoid water entry into compartments.

**REAR STEP**

The rear step will be fabricated from 3/16" polished aluminum tread plate, and will be rigidly reinforced. The rear step will extend 8" past the rear edge of the body and will be 96" wide.

The rear edge of the step will be designed to accommodate the rear clearance lights, recessed for protection in the step reinforcement channel. The step will be bolted to the body sub-frame for ease of replacement.

**FOLDING STEP(S)- BODY REAR DRIVER SIDE**

One (1) Innovative Controls large lighted folding step(s) (IC-3004234-33-1-1-1-1-0 LED), with a textured chrome plate finish, will be provided on driver side body rear to provide NFPA compliant access (maximum 18" height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

**FOLDING STEP(S)- BODY REAR OFFICER SIDE**

One (1) Innovative Controls large lighted folding step(s) (IC-3004234-33-1-1-1-1-0 LED), with a textured chrome plate finish, will be provided on officer side body rear to provide NFPA compliant access (maximum 18" height between steps) to an upper horizontal walking surface (compartment cap, dunnage area, fabricated step, or upper body compartments).

**REAR MUD FLAPS**

Heavy duty mud flaps will be provided behind the rear wheels.

**PAINTED REAR TOW EYES**

Two (2) painted tow eyes will be furnished on the rear of the vehicle. The tow eyes will be made from plate steel and will be bolted directly to the chassis frame rails with grade 8 bolts and will extend below the body. The tow eyes will be smooth and free from sharp edges and have a minimum eyelet hole of 2-1/2". The tow eyes will be painted.

**WINCH RECEIVER POINT- REAR OF BODY**

A 2" square receiver point will be provided below the rear of the body for a portable winch. The receiver point will be a 2 1/2" x 2 1/2" x 1/4" seamless steel tube welded and gusseted to 3" x 1 1/2" steel channel directly bolted to four points on the chassis frame rails. A 12V electrical connection with a quick disconnect compatible with the portable winch will be provided adjacent to the receiver point. A plastic end cap will be provided for the quick disconnect.

**ADDITIONAL ITEMS SUPPLIED WITH THE VEHICLE**

- 1 - Pint of touch up paint for each color
- 1 -Bag of assorted stainless steel nuts and bolts

**WHEEL CHOCKS**

Two (2) ZICO #SAC-44-E folding wheel chocks will be mounted forward of the rear wheels on the driver side below the side running board compartments.

## PAINT, PREPARATION AND FINISH

The apparatus body will be painted Sikkens [#COL]. The paint process will meet or exceed current state regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water, and soil. Contractor will, upon demand, provide evidence that the manufacturing facility is in compliance with State EPA rules and regulations.

The exterior will have no mounted components prior to painting to assure full coverage of metal treatments and paint to the exterior surfaces of the body. Any vertically or horizontally hinged smooth-plate compartment doors will be painted separately to assure proper paint coverage on body, door jambs and door edges.

Paint process will feature Sikkens high solid LV products and be performed in the following steps:

- Corrosion Prevention - all aluminum surfaces will be pre-treated with the Alodine 5700 conversion coating to provide superior corrosion resistance and excellent adhesion of the base coat.
- Sikkens Sealer/Primer LV - acrylic urethane sealer/primer will be applied to guarantee excellent gloss hold-out, chip resistance and a uniform base color.
- Sikkens High Solid LVBT650 (Base coat) - a lead-free, chromate-free high solid acrylic urethane base coat will be applied, providing excellent coverage and durability. A minimum of two (2) coats will be applied.
- Sikkens High Solid LVBT650 (Clear coat) - high solid LV clear coat will be applied as the final step in order to ensure full gloss and color retention and durability. A minimum of two (2) coats will be applied.

Any location where the material is penetrated after painting, for the purpose of mounting steps, hand rails, doors, lights, or other specified components will be treated at the point of penetration with a corrosion inhibiting pre-treatment (ECK Corrosion Control). The pre-treatment will be applied to the aluminum sheet metal or aluminum extrusions in all locations where the aluminum has been penetrated. All hardware used in mounting steps, hand rails, doors, lights, or other specified components will be individually treated with the corrosion inhibiting pre-treatment.

After the paint process is complete, the gloss rating of the unit will be tested with a 20 degree gloss meter. Coating thickness will be measured with a digital MIL gauge and the orange peel with a digital wave scan device.

## BODY PRIMER & PREPARATION

All exposed welds will be ground smooth for final finishing of areas to be painted if applicable. The compartments and doors are totally degreased and phosphatized. After final body work is completed, grinding (36 and 80 grit), and finish sanding will be used in preparation for priming.

## BODY FINISH

The aluminum body will remain unpainted. The welds will be clean and uniform to present a pleasing appearance.

The entire body will be buffed and detailed.

## UNDERBODY BODY PAINT

The inside and underside areas of the complete body assembly will be painted black using a Sikkens paint system, prior to the installation of the body on the chassis.

**COMPARTMENT FINISH**

The interior of the aluminum body compartments will have an unpainted "DA" finish inside. All seams will be caulked with a clear silicone type caulking.

**SINGLE COLOR CHASSIS CAB PAINT**

The commercial cab exterior will be finish painted in a single color by the chassis manufacturer with Purchaser's choice of color as available.

**COMMERCIAL CAB PAINT FINISH GUIDELINES**

The chassis will be painted and detailed as provided from the chassis OEM and will meet their quality guidelines.

**WHEEL PAINT**

The chassis wheels will be painted as provided by the commercial chassis manufacturer.

**TOUCH-UP PAINT**

One (1) pint of each exterior color paint for touch-up purposes will be supplied when the apparatus is delivered to the end user.

**FINALIZATION & DETAILING**

Prior to delivery of the vehicle, the interior and exterior be cleaned and detailed. The finalization process detailing will include installation of NFPA required labels, checking fluid levels, sealing and caulking required areas of the cab and body, rust proofing, paint touch-up, etc.

**UNDERBODY ANTI-CORROSION PAINT TREATMENT**

Upon completion, the underside of the apparatus, from the pump enclosure-back, will have anti-corrosion textured paint applied to help inhibit rust and the corrosion process. The Quick Dry Rubberized undercoat paint will be applied using an air driven spray gun. The paint will be applied as a minimum to the following areas: body substructure, underside of all body compartments, running board supports and rear step supports. No paint will be applied directly to the exhaust system or wheel wells.

****** LETTERING AND STRIPING ******

**COMPUTER GENERATED LETTERING**

The lettering and striping will be custom designed utilizing state of the art computer software and computerized cutting machines. The manufacturer will employ a full time artist / designer to generate all lettering, decals, and striping to meet the requirements of the Fire Department. The artwork for the lettering and striping will be kept on record by the apparatus manufacturer to allow for ease in duplication for the Fire Department.

******NFPA REQUIRED SCOTCH-LITE STRIPING ******

**SCOTCH-LITE STRIPE**

A four (4) inch high "Scotch-Lite" stripe will be provided. The stripe will be applied on a minimum of 60 percent of each side of the unit, 60 percent on the rear of the unit and 40 percent on the front of the unit. The Scotch-Lite stripe layout will be determined by the Fire Department.

The Scotch-Lite will be white in color.

**REAR CHEVRON STRIPING**

At least 50% of the rear facing vertical surface will be covered with alternating strips of reflective striping.

The striping will be 6" Scotch-Lite.

The Scotch-Lite will be Ruby Red and Yellow in color.

**FES WARRANTY, STARTING ON IN-SERVICE DATE**

Warranty coverage by FES will begin when the customer places the unit in service. This date may not exceed 60 days from the date of delivery to the customer.

The Customer must email feswarranty@safeindustries.com within 60 days of delivery, or the warranty start date will default to the original delivery date.

**ONE (1) YEAR - NEW PRODUCT MATERIAL AND WORKMANSHIP WARRANTY**

FES (the "Company") warrants each new item of fire and rescue apparatus manufactured by it against defects in material and workmanship provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original user-purchaser for a period of one year from the date of delivery to the original user-purchaser.

FES's obligation under this warranty is strictly limited to replacing or repairing, as the Company may elect, any part or parts of such apparatus which the Company's examination discloses to be defective in material or workmanship.

The Company reserves the right to require any such repairs to be made either at a Company owned service facility or another approved service facility at the Company's option. Transportation cost to and from the servicing location is the responsibility of the user-purchaser.

The FES warranty shall not apply to:

- Major components or trade accessories such as purchased chassis, engines, transmissions, tires, pumps, signaling devices, or batteries that have a separate warranty by the original manufacturer or to ancillary equipment used in fire fighting.
- Normal adjustments and maintenance services.
- Replacement of consumable parts including, but not limited to; filters, lubricants, belts, light bulbs, wiper blades, brake linings and brake pads.
- Failure resulting from the apparatus being operated in a manner or for a purpose not recommended by FES.
- Any apparatus, which shall have been repaired, modified or altered in any way so as, in the Company's sole judgment, to have adversely affected the unit's stability or reliability.
- Items subjected to misuse, negligence, accident or improper maintenance.
- Loss of time or use of the vehicle, inconvenience or other incidental expenses.

Nothing contained in this warranty shall make FES liable beyond the express limitations hereof, for loss, injury or damage of any kind to any person or entity resulting from any defect or failure in this vehicle.

To the extent permitted by law, THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

To the extent permitted by law, this warranty is also in lieu of all other obligations or liabilities on the part of FES or the Seller, including liability for incidental and consequential damages.

FES makes no representation that the vehicle has the capacity to perform any functions other than as contained in the Company's written literature, catalogs or specifications accompanying delivery of the vehicle.

No person or affiliated Company representative is authorized to give any other warranties or to assume any other liability on behalf of FES in connection with sale, service or repair of any apparatus manufactured by the Company.

**ONE (1) YEAR - NEW PRODUCT MATERIAL AND WORKMANSHIP WARRANTY, CONT'D.**

FES reserves the right to make design changes or improvements in its products without imposing any obligation upon itself to change or improve previously manufactured products.

Whenever a performance bond is required under a contract or purchase order, coverage under the performance bond shall only extend for one year from the delivery date of the equipment. This limitation under the performance bond shall not affect any extended warranties offered by FES or any OEM's.

**TEN (10) YEAR BODY STRUCTURE WARRANTY**

The proposed body will be warranted against structural defects for a period of ten (10) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

**TEN (10) YEAR CORROSION WARRANTY**

The proposed body will be warranted against rust-through or perforation, due to corrosion from within, for a period of ten (10) years. Perforation is defined as a condition in which an actual hole occurs in a sheet metal panel due to rust or corrosion from within. Surface rust or corrosion caused by chips or scratches in the paint is not covered by this warranty.

**SEVEN (7) YEAR PAINT WARRANTY**

The proposed paint finish will be warranted for a period of seven (7) years from the date of acceptance of the unit. Details of warranty coverage, limitations and exclusions are included in the specific warranty document.

**FIVE (5) YEAR LETTERING WARRANTY**

Fire Equipment Sales and Services (FES) shall provide a five (5) year warranty against defects in material and workmanship for all graphic processes. Any valid claims must be made in writing with in 15 days of the determination of any defects to FES. FES will at its option make any necessary repairs either at a local authorized service center or at the factory, if required. FES will make the final decision as to where the
repairs are to be made and any transportation cost are the owners responsibility, FES will at its option repair or replace any verified defects in workmanship or materials at no cost to the owner provided all the requirements of this warranty have been met.

FES shall not be liable to the original purchaser or anyone else for consequential, incidental, special or direct damages, including, but not limited to, any claims for loss of profits, down time, loss of use or inconvenience. THE COMPANY MAKES NO OTHER WARRANTY, EXPRESSED OF IMPLIED, AND SPECIFICALLY, DISCLAIMS ANY IMPLIED WARRANTY INCLUDING THE WARRANTY OF MERCHANTABILITY.

FES continually strives to improve its products and therefore, reserves the right to make improvements or changes without incurring any obligations to make such changes or additions on equipment previously sold.

**ONE (1) YEAR BRIGHTWORK WARRANTY**

Fire Equipment Sales and Services (FES) warrants all bright finish components used in the construction of FES Apparatus against defects and workmanship provided the apparatus is used in a normal and reasonable manner. This warranty is extended only to the original user-purchaser for a period of one (1) year from the date of delivery / acceptance to the original user-purchaser, whichever occurs first.

The expressed warranty excludes corrosion or degradation of bright finished components caused by damage to the component.

**LIFETIME WATER TANK WARRANTY**

The proposed water tank will be warranted by the water tank manufacturer for the "Lifetime" of the unit. A copy of the manufacturer's warranty will be supplied to define additional details of the warranty provisions.

**STANDARD HALE FIRE PUMP WARRANTY**

Hale Products, Incorporated ("Hale") hereby warrants to the original buyer that products manufactured by Hale will be free of defects in material and workmanship for a period of five (5) years from the date product is first placed into service or five and one-half (5 1/2) years from date of shipment by Hale, whichever period will be first to expire. Within this warranty period Hale will cover parts and labor for the first two (2) years and parts only for years three (3) through five (5).

**AKRON HEAVY DUTY VALVES WARRANTY**

Akron Brass warrants Heavy Duty Swing-Out Valves for a period of ten (10) years after purchase against defects in material or workmanship. Akron Brass will repair or replace any Heavy Duty Swing Out Valve which fails to satisfy this warranty.