Riverside County Fire Department

100’ Tractor Drawn Aerial Proposal Specification

Aerial Ladder

October 2022

100' FOUR SECTION HIGH PROFILE TRACTOR DRAWN AERIAL

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Aerial Ladder Design and Construction

A 100' four-section steel aerial ladder shall be provided. The ladders shall be all steel tubular construction with round rungs and “K” bracing. The rated capacities of the aerial ladder shall be attainable with the tractor and trailer in an in-line configuration and in addition to any fire-fighting equipment installed on the aerial ladder by the manufacturer. It shall have a maximum height that will vary between 98' to 100' (pending options) at the top rung of the fly section at 75-degrees elevation. The horizontal reach from the top rung to the center of the turntable shall be 94' 4.1".

Operation on grades

The aerial shall be capable of being operated with full rated capabilities in any plane up to 5-degrees out of level with the turntable leveled as much as possible by placement of the outriggers. Operation beyond this limit shall be at the operator's discretion.

Extension And Retraction System

Two [2] 5" inside diameter cylinders, each with 2-1/2" outside diameter rods and a 62" stroke, are used in the extension and retraction system. The specified extension cylinders shall not exceed the specified length. The required length cylinders shall place the cylinder weight closer to the base of the aerial device. Smaller size cylinders are required since they are easier to handle for removal for service reasons. In addition, the specified shorter stroke cylinders provide less potential for damage to the rod by hitting an obstacle when extended.

The extension cylinders shall have counter balance valves mounted directly to them and shall extend and retract the aerial with a 4 to 1 cable cylinder arrangement from totally retracted to 100' at 75 degrees totally extended.

The extension and retraction system shall have six [6] pairs of galvanized cables. Lower-mid section cables shall have a .50" diameter and upper-mid section cables shall have a .375" diameter, and the fly section cables shall have a .3125" diameter. The sheaves, in which the cables run on, shall be galvanized, no exception. A galvanized cable running on a galvanized sheave creates a natural lubricate allowing the cables to run more freely minimizing the wear on the cables.

Each of the cylinders, cables, and sheave assemblies shall be completely independent of the other system, so as to provide a safety factor wherein a failure of one assembly shall not affect the function and operation of the other assembly. Each set of cables shall be capable of operating the ladder in the event of a failure of the other.

There are no restrictions on the waterway as the ladder is extended and retracted

State-of-the Art Technology

The aerial device materials, parts, technology or procedures used in construction of the apparatus are subject to change at the manufacturer's discretion to provide "equal or better" products and must be in compliance to applicable NFPA #1901 standards and industry standard practice.

BASE SECTION

The ladder base section length shall 345.5", with inside dimension of 39.25"; distance between the top of the handrail and the centerline of the rungs shall be 33". The base rails shall be 100,000 PSI material and the handrails shall be 100,000 PSI material. All rungs shall be spaced 14" on center.

The aerial ladder heel pin position and rear handrails shall be so designed as to provide unobstructed access to the aerial ladder when elevated.

LOWER MID SECTION

The ladder lower-mid section length shall be 352.5", with inside dimension of 33.375"; the distance between the top of the handrail and the centerline of the rungs shall be 29". The base rails shall be 100,000 PSI material and the handrails shall be 70,000 PSI steel material. All rungs shall be spaced 14" on center.

UPPER MID SECTION

The ladder upper mid-section length shall be 353.5", with inside dimension of 27.375", the distance between the top of the handrail and the centerline of the rungs shall be 25". The base rails shall be 70,000 PSI material and the handrails shall be 70,000 PSI steel material. All rungs shall be spaced 14" on center.

FLY SECTION

The ladder fly section length shall be 354.5" including the bolt-on egress, with inside dimension of 22.125"; the distance between the top of the handrail and the centerline of the rungs shall be 21.5". The handrails and base rails shall be 70,000 PSI steel material. All rungs shall be spaced 14" on center. The last three rungs on the fly section shall be modified to accept the Akron ladder pipe.

TECHNICAL DRAWINGS

Technical and engineering drawings shall be provided for the aerial ladder as follows: left side view, top view and rear view. These drawings shall include electrical and hydraulic schematics.

Complete hydraulic system diagrams reflecting pump(s), tank(s), all lines, valves, filters, safety interlocks, backup systems and all related components shall be provided. Large lubrication charts, not less than 18" x 24", shall be phantom views of the complete apparatus showing points of lubrication, the proper lubricant types and the amount to be used at each location requiring lubrication.

IN PROCESS AERIAL PHOTOS

Photos shall be taken during production to provide updates to the Fire Department. The following set of photos shall be supplied:

- Aerial Sections in assembly
- Turntable in assembly
- Torque Box after galvanizing
- Platform in assmbly (if applicable)
- Aerial loaded and ready for shipping

AERIAL OPERATION INSTRUCTIONS

As required by applicable sections of NFPA #1901, operating instructions and demonstration of the aerial apparatus shall be provided at the purchaser's location. The aerial manufacturer shall provide these instructions and demonstration of the aerial apparatus.

Personnel providing the instructions shall be professionally trained by the aerial manufacturer prior to the delivery process. All costs of these instructions shall be borne by the bidder. The bidder shall notify the purchaser a minimum of 14 days prior to the instruction period. The bidder shall provide classroom instructions, operational instruction. The instructor shall provide the all necessary material to assure proper operation of the aerial device.

This instruction period shall be for five (5) consecutive days at the purchaser's location.

AERIAL OPERATION MANUALS

At time of delivery, an aerial manual shall be supplied which shall include aerial operation overview, service documentation, wiring schematics and technical high-level bill of material drawings. The documentation shall address at a minimum the inspection, service, and operations of the fire apparatus and all major components thereof. This documentation and manuals shall be provided in the English language.

MATERIAL AND WORKMANSHIP TEN (10) YEAR WARRANTY

Rosenbauer hereby warrants each new Rosenbauer Aerial to be free from defects in material and workmanship for a warranty period of ten (10) years starting on the date the vehicle is delivered to original purchaser. Under this warranty, Rosenbauer agrees to furnish any item or items to replace those that have been found to be defective in material or workmanship where there is no indication of abuse, neglect or other than normal service. Such an item or items, at the option of Rosenbauer must be made available for our inspection at our request and returned to our factory or another location designated by Rosenbauer. Transportation of such an item or items will be arranged and covered by buyer within thirty (30) days after the date of failure and within ten (10) years from the date of delivery of the apparatus to the original purchaser, whichever occurs first. The inspection must indicate that the failure was attributed to defective material or workmanship. Authorization for repair or item replacement must be sought from Rosenbauer customer service department prior to repair or item replacement occurring.

This warranty is applicable only if the aerial device is serviced annually by an authorized Rosenbauer service facility. The cost of the annual service is the responsibility of the purchaser.

THIS WARRANTY SHALL NOT APPLY TO OR COVER THE FOLLOWING:

- Normal maintenance services or adjustments, including but not limited to, lubricants, cable adjustment, hoses, and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer, or in a manner which, at Rosenbauer's discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.

EXCLUSIONS OF DAMAGES BOTH INCIDENTAL AND CONSEQUENTIAL.

At no time shall Rosenbauer be held liable for any incidental, consequential, indirect, special and/or punitive damages whatsoever, whether coming from breach of contract, warranty, tort or equity. Such items shall include the chassis or other items sold by Rosenbauer, or their operation or their failure to operate, or defects herein, or any undertakings, acts or omissions related to, regardless whether Rosenbauer's knowledge of the possibility of any such damage.

Without limitation of the generality of the preceding statements, Rosenbauer categorically disclaims any and all liability for property and personal injury, damages, penalties for lost revenue and/or profit, loss of aerial or products and associated pieces of equipment, the expense of substituting chassis and/or products, or the out of service expenses, resulting from damages and/or delays, that creates down time expenses and/or create economic losses, or any third party claims for damages.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

HYDRAULIC WARRANTY FIVE (5) YEAR

Rosenbauer hereby warrants each new Rosenbauer Aerial hydraulic to be free from defects in material and workmanship for a warranty period of five (5) years starting on the date the vehicle is delivered to original purchaser. Under this warranty, Rosenbauer agrees to furnish any item or items to replace those that have been found to be defective in material or workmanship where there is no indication of abuse, neglect or other than normal service. Such an item or items, at the option of Rosenbauer must be made available for our inspection at our request and returned to our factory or another location designated by Rosenbauer. Transportation of such an item or items will be arranged and covered by buyer within thirty (30) days after the date of failure and within five (5) years from the date of delivery of the apparatus to the original purchaser, whichever occurs first. The inspection must indicate that the failure was attributed to defective material or workmanship. Authorization for repair or item replacement must be sought from Rosenbauer customer service department prior to repair or item replacement occurring. Hydraulic seals shall be covered for a period of five (5) years.

This warranty is applicable only if the aerial device is serviced annually by an authorized Rosenbauer service facility. The cost of the annual service is the responsibility of the purchaser.

THIS WARRANTY SHALL NOT APPLY TO OR COVER THE FOLLOWING:

- Normal maintenance services or adjustments, including but not limited to, lubrication, greasing, cleaning, and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer, or in a manner which, at Rosenbauer's discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.

EXCLUSIONS OF DAMAGES BOTH INCIDENTAL AND CONSEQUENTIAL

At no time shall Rosenbauer be held liable for any incidental, consequential, indirect, special and/or punitive damages whatsoever, whether coming from breach of contract, warranty, tort or equity. Such items shall include the chassis or other items sold by Rosenbauer, or their operation or their failure to operate, or defects herein, or any undertakings, acts or omissions related to, regardless whether Rosenbauer's knowledge of the possibility of any such damage.

Without limitation of the generality of the preceding statements, Rosenbauer categorically disclaims any and all liability for property and personal injury, damages, penalties for lost revenue and/or profit, loss of aerial or products and associated pieces of equipment, the expense of substituting chassis and/or products, or the out of service expenses, resulting from damages and/or delays, that creates down time expenses and/or create economic losses, or any third party claims for damages.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

AERIAL TESTING

THIRD PARTY TESTING

The aerial ladder shall be inspected and tested by a third party. A non-destructive test shall be performed on each unit at a rate of 100% inspection by the Underwriters Laboratories inspector, exceeding the requirements applicable section of NFPA #1901 for new apparatus. All non-destructive procedures shall be fully documented and meet or exceed the requirements of applicable sections of NFPA #1901.

PERFORMANCE WATER FLOW TESTING

The waterway flow test shall be conducted by an accredited third party testing organization with certified results provided on delivery of the apparatus. If the aerial device is equipped with a permanent water system and has a rated vertical height of 110 ft (34 m) or less, standard model flow test data shall be provided to the purchaser.

If the water system has been modified from the standard model configuration, a new flow test shall be conducted to determine that the friction loss in the water system between the base of the swivel and the monitor outlet does not exceed 100 psi (700 kPa) with 1000 gpm (3748 L/min) flowing and with the water system at full extension.

A flow test shall be conducted on each vehicle to determine that the water system is capable of flowing 1000 gpm (3748 L/min) (or rating as specified in these specifications) at 100 psi (700 kPa) nozzle pressure with the aerial device at full elevation and extension.

Where the apparatus is equipped with a fire pump designed to supply the water system, the test shall be conducted using the onboard fire pump.

The intake pressure to the fire pump shall not exceed 20 psi (140 kPa).

AERIAL PAINT

Before assembly, in preparation for the final painting, the aerial ladder sections and turntable shall be thoroughly cleaned and prepared to conform to good painting practices. The aerial ladder sections and turntable shall be primed with two (2) coats of PPG or equal lead free primer. Ladder sections and turntable shall then be sprayed with one (1) coat of color using PPG or equal paint.

The color of the ladder sections shall be: WHITE #FLNA41528

STRUCTURAL DESIGN WARRANTY TWENTY (20) YEAR

Rosenbauer hereby shall warranty each new Rosenbauer aerial device to be free from structural failure caused by defective design and workmanship for a warranty period of twenty (20) years or 100,000 miles starting on the date the vehicle is delivered to original purchaser. Under this warranty, Rosenbauer agrees to furnish any item or items to replace those that have been found to be defective in material or workmanship where there is no indication of abuse, neglect or other than normal service. Such an item or items, at the option of Rosenbauer must be made available for our inspection at our request and returned to our factory or another location designated by Rosenbauer. Transportation of such an item or items will be arranged and covered by buyer within thirty (30) days after the date of failure and within two (2) years from the date of delivery of the apparatus to the original purchaser, whichever occurs first. The inspection must indicate that the failure was attributed to defective material or workmanship. Authorization for repair or item replacement must be sought from Rosenbauer customer service department prior to repair or item replacement occurring.

This warranty is applicable only if the aerial device is serviced annually by an authorized Rosenbauer service facility. The cost of the annual service is the responsibility of the purchaser.

THIS WARRANTY SHALL NOT APPLY TO OR COVER THE FOLLOWING:

- Normal maintenance services or adjustments, including but not limited to, filters, lubricants, cable adjustment, hoses, and other incidentals.
- Any item that has been repaired, replaced or altered by a facility not approved in advance by Rosenbauer, or in a manner which, at Rosenbauer's discretion, may adversely affect the safe operation or durability of the vehicle or item.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any malfunction resulting from misuse, negligence, alteration, accident or lack of operational knowledge, lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.

EXCLUSIONS OF DAMAGES BOTH INCIDENTAL AND CONSEQUENTIAL.

At no time shall Rosenbauer be held liable for any incidental, consequential, indirect, special and/or punitive damages whatsoever, whether coming from breach of contract, warranty, tort or equity. Such items shall include the chassis or other items sold by Rosenbauer, or their operation or their failure to operate, or defects herein, or any undertakings, acts or omissions related to, regardless whether Rosenbauer's knowledge of the possibility of any such damage.

Without limitation of the generality of the preceding statements, Rosenbauer categorically disclaims any and all liability for property and personal injury, damages, penalties for lost revenue and/or profit, loss of chassis or products and associated pieces of equipment, the expense of substituting chassis and/or products, or the out of service expenses, resulting from damages and/or delays, that creates down time expenses and/or create economic losses, or any third party claims for damages.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

PAINT WARRANTY TEN (10) YEAR

Rosenbauer hereby warrants the paint on the Rosenbauer aerial of each new fire & rescue vehicle to be free from blistering, peeling, corrosion or any other adhesion defect caused by defective manufacturing methods or paint material selection for a warranty period of ten (10) years starting on the date the vehicle is delivered to original purchaser. Under this warranty, Rosenbauer agrees to furnish any item or items to replace those that have been found to be defective in material or workmanship where there is no indication of abuse, neglect or other than normal service. Such an item or items, at the option of Rosenbauer must be made available for our inspection at our request and returned to our factory or another location designated by Rosenbauer. Transportation of such an item or items will be arranged and covered by buyer within thirty (30) days after the date of failure and within ten (10) years from the date of delivery of the apparatus to the original purchaser. The inspection must indicate that the failure was attributed to an adhesion defect caused by defective manufacturing methods or paint material selection. Authorization for repair or item replacement must be sought from Rosenbauer customer service department prior to repair or item replacement occurring.

This warranty is applicable only if the aerial device is serviced annually by an authorized Rosenbauer service facility. The cost of the annual service is the responsibility of the purchaser.

THIS WARRANTY SHALL NOT APPLY TO OR COVER THE FOLLOWING:

- Any item that has been repaired, repainted or altered by a facility not approved in advance by Rosenbauer.
- Special, incidental or consequential damages including, but not limited to, loss of time, inconvenience, loss of use, lost profits or transportation fees or charges to or from any facility.
- Any defect resulting from misuse, negligence, alteration, accident or lack of normal or required maintenance or adjustments, exposure to corrosive agents, fire, severe environmental conditions or acts of God.
- Painted items which are manufactured by a party other than Rosenbauer and which are separately warranted by that party.

EXCLUSIONS OF DAMAGES BOTH INCIDENTAL AND CONSEQUENTIAL

At no time shall Rosenbauer be held liable for any incidental, consequential, indirect, special and/or punitive damages whatsoever, whether coming from breach of contract, warranty, tort or equity. Such items shall include the chassis or other items sold by Rosenbauer, or their operation or their failure to operate, or defects herein, or any undertakings, acts or omissions related to, regardless whether Rosenbauer's knowledge of the possibility of any such damage.

Without limitation of the generality of the preceding statements, Rosenbauer categorically disclaims any and all liability for property and personal injury, damages, penalties for lost revenue and/or profit, loss of chassis or products and associated pieces of equipment, the expense of substituting chassis and/or products, or the out of service expenses, resulting from damages and/or delays, that creates down time expenses and/or create economic losses, or any third party claims for damages.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities on our part. We neither assume nor authorize any person to assume for us any liability or make any alteration to this warranty in connection with the sale of our apparatus unless expressly given in writing by Rosenbauer.

NOTE: Surety bond, if required, will cover standard one year warranty period only and will not cover any extended warranties allowed by seller or other component manufacturers.

EGRESS PAINT

The fly section shall have a bolt-on egress section. The egress area shall be painted red PPG 71663.

LADDER BED

A heavy duty ladder bed shall provide support of the aerial in the travel position.

On the base section of the aerial device, a stainless steel scuff plate shall be installed where the aerial comes in contact with the travel support.

GALVANIZED OUTRIGGERS

The aerial outriggers assemblies, beam, outer jack tube, inner jack tube, jack cover plate, and jack pad shall be galvanized.

The outriggers shall be galvanized inside and out. The process shall eliminate the rusting, scratching or paint chips on the outriggers. The galvanizing process shall permeate the metal and shall not be an "over-coating only" on outside surfaces. The galvanized components shall lessen the potential for corrosion and eliminates the requirement for finish paint. The process shall negate any later requirement for touch-up paint or total repaint of the outrigger/stabilizer assemblies.

The galvanizing shall provide the steel outriggers with both barrier and cathodic protection from corrosion. The galvanizing process shall immerse the complete outrigger components in molten zinc. The galvanizing diffusion process shall allow the zinc to bond to the steel, at the molecular level. The galvanized zinc coating shall provide a barrier that shields the steel from the environment.

CORROSION RESISTANT WARRANTY

A galvanized steel corrosion protection warranty shall be provided for the aerial outriggers and stabilizers for a period of twenty-five (25) years. The conditions of the corrosion protection warranty shall be as follows.

1. This warranty shall cover parts and labor to correct the affected area or parts only and shall not be deemed to include entire outrigger or stabilizer assemblies. This warranty does not include the turntable, aerial ladder sections, or torque box.

2. Should any warranty claim occur, the affected area shall be inspected, reviewed and approved by the aerial manufacturer prior to any work being completed.

3. Any authorized warranty work shall be only performed by the aerial manufacturer or its designated repair personnel or facility. Any repairs completed by un-authorized repair shops or personnel shall cause this warranty to be invalid.

4. Transportation costs associated with this corrosion protection warranty shall be the responsibility of the purchaser.

5. Warranty shall not cover damage due to lack of specified normal maintenance and service as outlined and required in the service and operating manuals provided with the apparatus..

6. Warranty shall not cover damage from accidents, abuse, physical and mechanical damage, and all other conditions not considered as "normal" operating conditions.

7. The obligations of the aerial manufacturer pursuant to the foregoing warranty with respect to the outriggers and stabilizers shall be limited to the cost of bringing the affected area into compliance with the specifications or of removing any defects in materials or workmanship.

GALVANIZED TORQUE BOX

The torque box shall be hot dip galvanized inside and out. The galvanizing shall include the top and bottom and sides of the torque box, outrigger electrical compartment, and outrigger valve control compartment.

The torque box shall be totally hot dip galvanized. The galvanizing process shall not be an over-coating only to outside surfaces but shall permeate the metal. The galvanizing process shall prevent or greatly lessen rust and corrosion on the torque box and in areas between the torque box and chassis frame rails, as well as areas which cannot be reached when washing the unit and which cannot be visually inspected, and shall eliminate the need to finish paint the torque box.

The galvanizing process shall provide the steel torque box assembly with both barrier and cathodic protection from corrosion. The galvanizing process shall immerse the complete torque box component in molten zinc. The galvanizing diffusion process shall allow the zinc to bond to the steel, at the molecular level. The galvanized zinc coating shall provide a barrier that shields the steel from the environment.

The front part of the torque box (gooseneck) shall be galvanized and then painted to match the lower cab. The painted area shall be from the front of the gooseneck to 2' rearward of the front outriggers.

The 5th wheel area of the tiller shall be thoroughly cleaned and prepared to conform to good painting practices. The 5th wheel shall be primed with two (2) coats of PPG or equal lead free primer and sprayed with one (1) coat of color using PPG paint. The color of the 5th wheel shall match the lower color of the cab.

RUNG COVERS

For ease of climbing the ladder rungs shall be equally spaced on a maximum 14" centers and minimum 11.75" centers and shall have a skid-resistant surface or covering.

For added safety, skid-resistant rung covering shall be provided. The rung covering shall not twist and shall cover at least 60 percent of the climbing area of each rung.

Round rungs shall be provided and shall have a minimum outside diameter of 1-1/4", including the skid-resistant surface or covering.

For maximum strength, the minimum design load for each rung shall be 500lb distributed over a 3-1/2" wide area at the center of the length of the rung with the rung oriented in its weakest position.

Each aerial rung shall be covered with one (1) continuous piece of a protective, Hi-Traction safety walk non- skid material. There shall be neon glowing stripping to run down the center or the rung cover.

WEAR PADS

The aerial wear pads shall be "PET" type and shall incorporate semi-crystalline hardness, rigidity, mechanical strength with exceptional sliding properties and very low sliding wear. The pads shall be used between the telescoping sections for maximum weight distribution, strength, and smooth operation. Side wear pads shall be nylatron GSM, stainless steel adjustment screws shall be provided on the side wear pads to permit proper side clearance.

SIGN PANEL BRACKETS

The aerial manufacturer shall supply aerial sign brackets welded to the base section of the aerial. These brackets shall be located on both sides of the base section.

CRADLE COVER BRACKETS

Brackets shall be installed on the cradle of the aerial for the installation of the cover. Design and installation shall be done by the final OEM.

EXTENSION MARKINGS

To improve safety and to provide the operator with vital information, extension markings shall be provided. For best visibility the base section of the ladder shall include markings on the outside of the left handrail and the inside of the right handrail to indicate extension position of the ladder in operation. The markings shall be BLACK reflective numbers that will mark every 10 feet with a hash mark between the numbers.

FOLDING STEPS

The ladder shall be equipped with four (4) folding steps, two each side of the ladder at the upper end of the fly section. These steps are spring loaded to hold in the stowed position. Once lowered, steps lock in the lowered position for use.

When steps are in the use position there shall be approximately a 7-1/2" diameter circular space for a hose to be placed on the rungs. The folding steps shall comply to applicable standards of NFPA #1901.

ROPE RESCUE EYELETS, VENTURA SPREADER BAR, REAR ANCHOR BAR

Two (2) rope rescue eyelets shall be installed one on each side of the fly section, with each anchor being rated at 250 pounds, for a total combined weight rating of 500 pounds.

The special spreader bar with center roller and rope retainer has two (2) eyelets one (1) on each side of the roller rated at 250 pounds per eyelet. The spreader bar shall fit between the rope rescue eyelets on the fly section and shall be held in place with retaining pins. The spreader bar is rated for a total of 500 pounds. The bar shall be painted yellow PPG #: FDG 82150.

There shall be an anchor bar with two (2) eyelets rated at 250 pounds per eyelet 500 pounds total. The anchor bar shall fit between the base rail handrails and shall be held in place with retaining pins. The bar shall be painted yellow PPG# FDG 82150.

ROOF LADDER BRACKETS FLY

There shall be welded plates and bolt on roof ladder mounting brackets installed on the inside of the fly section.

ROOF LADDER

A Duo Safety Model 775-A, 14 foot aluminum roof ladder with folding steel roof hooks on one end and feet on the other end shall be provided on the inside of the fly section. The ladder width shall be 19" and not exceed the height of the handrails.

AXE & PIKE POLE WELDMENTS

Welded-in mounting plates shall be installed for an axe mounting on the right side and a pike pole mounting on the left side of the fly section.

RUBBISH HOOK BRACKETS: FLY

Bolt on mounting brackets for two (2) rubbish hook shall be installed on the driver side of the tip in the fly section.

PIKE POLE

Install two (2) Classic Nupla Roof Ventilation Pole, Round W/ Grip (36561 (RH-6DA))

CHAIN SAW HOLSTERS

Two (2) chain saw bar holsters shall be manufactured from aluminum treadplate measuring 18"L x 5"W x 1"D and mounted at an angle on the tip section of the aerial ladder. The bottom of the holster shall be matching the curve of the tip of the chainsaw. Each bracket and mounting shall be capable of securely holding a Stihl model number MS 460 Rescue Chainsaw during aerial ladder operations. The saws shall not be provided.

AERIAL ROTATION SYSTEM

The rotation system shall be powered by a hydraulic motor to drive an eccentric planetary gearbox, capable of field adjustment, to rotate the aerial.

A 43.6" pitch diameter external tooth bearing shall be provided for 360 degree continuous rotation in either direction. As turntable bearing bolts are required to be checked and re-torqued at regular intervals, to make this task relatively simple, the ability to re-torque all bolts from the top of the turntable is mandatory.

The bearing shall be bolted to the bearing base plate using sixty (60) 5/8" SAE Grade 8 bolts and shall also be bolted to the turntable using fifty five (55) 5/8" SAE Grade 8 bolts.

A hydraulic release spring applied brake shall provide a positive lock for the rotation.

Two [2] pressure relief valves shall control the force of the rotation to protect the aerial from excessive side loads.

CONTROL PANEL LANGUAGE

All panels including main operations stations, outrigger stations, warning labels and load charts shall be written in English.

COMMAND PEDESTAL

The Aerial Command Pedestal is monitored by programmable logic control. The programmable logic control operating system shall use absolute encoders for elevation and rotation to be able to monitor the following functions continuously to offer maximum safety. The monitored aerial control functions are as follows:

The turntable shall have a stand up Aerial Command Pedestal. The following items shall appear on the panel at the main control station:

- One (1) aerial Smart Screen
- One (1) system pressure gauge, 0-5,000 psi minimum
- One (1) emergency stop button
- One (1) joystick controller
- Monitor switches

The system shall be capable of performing simultaneous aerial functions.

Smart Screen

One (1) aerial smart screen shall be installed at the main control station. The screen shall consist of multiple pages. All screen shall have the same information.

The first page on the screen shall be the main aerial information. It shall give the following information:

- Aerial rotation: as the aerial is rotated 180 degrees left and right of the ladder bed, positive and negative numbers shall indicate how far right or left the aerial is rotated.

- Aerial height: as the aerial extends and elevates the distance from of the top of the handrail to the ground shall be indicated on the screen.

- Aerial reach: as the aerial extends the reach shall be indicated on the screen from the tip of the aerial to the center of the turntable.

- Aerial extension remaining: as the aerial extends the amount of feet remaining to extend shall be indicated.

- Rungs aligned indicator: as the aerial extends the rungs aligned indicator shall illuminate on the smart screen, indicating safety for climbing. The indicator shall not illuminate when the rungs are not aligned.

- Operational envelop indicators: prior to the aerial coming upon an unsafe operating position, while operating over the short jacked side of the truck or to close to the cab and body, the collision protection shall ramp to a stop. The right disable, down disable and/or left disable indicators shall appear on the screen indicating to the operator the function that is inoperable based on the position of the aerial.

The aerial shall be programed so it shall not make contact with the cab or body or any equipment as identified during the build process. Programmable cab and body collision protection shall alert the operator with indicators on the screen stating Right Rotation Disabled, Down Disabled and Left Rotation Disabled. Each individual indicator shall illuminate when the corresponding aerial function(s) (right rotation, left rotation or lowering) are disabled. All three indicators shall illuminate when the E-STOP is pushed or the outrigger interlock is active.

- Emergency stop engaged indicator: when the emergency stop button is engaged an indicator shall appear on the screen. An emergency stop button on the control panel shall be used for immediate emergency stopping of all aerial functions at all operating locations.

- Aerial load gauge: a load indicator shall appear on the screen to visually allow the operator to know they are within the safe operating parameters. The indicator shall change colors, green (safe), amber (caution) and red (overloaded) to alert the operator of the load on the aerial. The red load indicator shall flash and begin to sound a warning alarm at 100 pounds over the rated load.

- Outrigger short set indicator: when any outrigger is not fully extended and the jack is not supporting some of the truck weight a pie chart shall flash to indicate the outrigger has not been set for aerial operations. The outrigger diagram shall show the percent the outriggers have been extended. The outrigger diagram shall not change color until the jack has been set. Once the outrigger has been set the outrigger diagram shall change colors to match the pie charts display of color and safe operational envelop.

The aerial shall be able to be rotate 360 degrees over the short jacked side of the truck. A programmable logic control system allows the aerial to rotate over the short jacked outriggers while maintaining safe operating parameters. An indicator shall appear on all the smart screens to warn the operator that one or more outriggers have been short set. An operational pie chart shall also be on the smart screen to indicate the safe operating parameters depending on the short set outrigger. In the event the vehicle has been set up with one or more of the outriggers short set, any attempted operation outside the predetermined parameters shall automatically ramp the operation to a feather-soft stop. A corresponding disable light shall appear on the screen to alert the operator of the disabled function. The operator shall be able to return the aerial back to the safe operating parameters without the use of overrides.

- Auto bedding indicator and switch: an indicator shall appear when the aerial is in the 20/20/20 zone (within 20 degrees left or right of the ladder bed, below 20 degrees elevation and 20 percent retraction remaining) indicating the ladder can now be automatically stowed. By pushing a momentary button on the side of the screen the aerial shall rotate, retract and lower into the bed while avoiding cab and body collision.

- Tip lights switch: a button on the side of the screen shall turn all of the tip lights and the rung lights on and off.

- Tracking lights switch: a button on the side of the screen shall turn all of the tracking lights, panel lights and rung lights on and off.

- Flow and Pressure gauge: an indicator on the screen shall give a continuous reading of the monitors flow and presser. Total gallons shall be saved until the truck master switch has been turned off.

- Hydraulic tank level: an icon will indicate the amount of oil left in the tank.

- Dirty fliter: a picture will illuminate when the aerial filters are dirty and need to be replaced.

The second page shall display the following information:

- Side to side leveling: a picture and number (positive or negative) indicating how level the truck is left to right.
- Front to back leveling: a picture and number (positive or negative) indicating how level the truck is front to back.
- Aerial hour meter: continual reading of the operational hours on the aerial.
- Outrigger extension: an outrigger with percentage shall appear indicating how far the outrigger is extended: red (25%-49% extension), orange (50%-74% extension), yellow (75%-95% extension), or green (96%-100% extension). The percentage shall co-inside with the operational pie chart on the next page to show the operator the parameters in which the aerial shall be able to operate.
- Hydraulic tank temperature: an icon will indicate the temperature of the oil in the hydrulic tank.

The third page shall display the following engine diagnostics information:

- Engine RPM: shows live readings of the engines RPM's
- Engine coolant temperature: shows live readings of the engines coolant temperature
- Engine oil pressure: shows live readings of the engines oil pressure.
- Battery charging condition: shows live readings of the engine's battery condition
- Transmission fluid temperature: shows live readings of the transmission fluid temperature.
- Fuel level: shows live readings in percentage of the amount of fuel remaining.

The fourth page shall display the following information:

- Aerial operations pie chart: an operational pie chart shall show in the corresponding color (red, orange, yellow or green) how far each outrigger out is extended and aerial's operational parameters based on each outrigger set up.

The fifth page shall display the following information:

- Load and reach chart: an aerial load and reach chart shall be displayed to inform the operator of the operational capabilities of the aerial wet and dry.

Aerial Speed

The aerials speed functions are proportionally regulated by the elevation and extension of the aerial. The aerial shall have proportional slow down on full extension and full retraction. The elevation system shall proportionally reduce the speed at sixty (60) degrees and ramp to off at full elevation. Lowering shall proportionally reduce the speed at three (3) degrees and ramp to off at minus twelve (-12) degrees. When the aerial is fully retracted the aerial speed shall be 20 percent faster than when fully extended.

The controls are also proportionally regulated during rotation, extension and elevation operations. The aerial shall smoothly ramp up to full operation speed to prevent jerking of the aerial. Should the operator release the controller during any of the three operations, the aerial shall ramp to a smooth soft stop.

Joystick Controller

A single joystick controller shall control aerial left/right, extend/retract and raise/lower functions. The joystick shall operate with the natural movement of the operator's hand for rotation and elevation. There shall be a thumb lever on the joystick to operate extension and retraction. The joystick shall have built in ramp up and ramp down capabilities.

The safety interlock trigger on the back side of the joystick must be engaged to operate all aerial functions. With the trigger activated the RPM's shall increase to 1,250 RPM and maintain there for two (2) seconds after returning to the neutral position.

Lighting

LED Lights shall illuminate the main control station and turntable work area for added operator visibility and safety.

PEDESTAL LOCATION

The operators control pedestal shall be installed on the driver's side of the turntable.

GAUGES & VISUAL DISPLAY UNITS

All gauges and visual display on the aerial apparatuses at the operating positions shall readout in the following measurements:

- Distances shall be displayed in feet and inches
- Loads shall be displayed in pounds
- Flows shall be displayed in gallons/psi
- Engine information shall be displayed in F/PSI

CONTROL STAND LID

There shall be a lid installed on the command pedestal to give extra protection to the screen and joystick.

TURNTABLE

The turntable shall be three sided (left, rear & right) with the corners cut to allow for personnel to enter and exit the turntable. The turntable walking area shall be covered with NFPA #1901 compliant skid resistant black Line-X material, with a 2-1/2" lip. Three (3) 42" high, slip resistant handrails capable of withstanding a 225 pound force applied from any direction shall be installed on the turntable.

HANDRAIL STAINLESS STEEL

The handrails shall be knurled stainless steel.

HANDRAIL ORIENTATION

The turntable handrails shall be orientated in a U-like configuration. The handrail shall have an opening that allows for equipment to pass through from the ground to the aerial.

TURNTABLE MAN SAVER BARS

Two (2) Fire Research ManSaver bars shall be installed on the left and right side of the turntable. The safety bars shall lift either upward or inward to open, and be spring loaded to automatically return to the horizontal closed position. The safety bar assembly shall be made of aluminum and stainless steel.

MANSAVER BAR COLOR

The mansaver bar vinyl cover shall be yellow.

TURNTABLE FINISH

The aerial control console will be constructed from smooth aluminum and painted to match the ladder sections. The back of the control panel will have one (1) full hinged door. The front of the control panel will have one (1) 8" x 8" hinged door. These doors are provided for maintenance and emergency operation of the aerial.

TURNTABLE LID DOOR AJAR LIGHT

The cover of the turntable control console shall be designed to indicate when the lid is open. The light will be connected to the door ajar/outirgger extended light in the cab.

OUTRIGGER CONTROL PANEL

The outrigger control panel shall have a switch to energize the hydraulic system for outrigger functions.

Control Panel

The control panel shall include a Smart Screen that will display the same information as the other Smart Screens on the aerial, no buttons shall be active that will allow for aerial operation (i.e. auto bedding). There shall be three (3) switches not located on the screen at the rear of the truck.

A. Manual override system to override the outrigger/aerial interlock system
B. One (1) switch for the emergency power unit.
C. Outrigger on/off switch

HYDRAULIC HIGH PRESSURE FILTER

The hydraulic system shall be equipped with a 'high pressure' hydraulic oil filter between the pump and the control valve designed to meet the flow requirements of the system. There shall be a filter replacement light on the outrigger control panel for the convenience of the mechanic. The return filter and pressure filter shall be connected together to the same light on the outrigger control panel to indicate replacement of filters.

HYDRAULIC EXTRA HIGH PRESSURE FILTER

One (1) hydraulic oil high pressure replaceable filter element shall be shipped loose.

HYDRAULIC RETURN FILTER

A 10 micron low pressure return line filter element shall be connected to the hydraulic reservoir. The 10 micron return line replaceable filter. There shall be a filter replacement light on the outrigger control panel for the convenience of the mechanic. The return filter and pressure filter shall be connected together to the same light on the outrigger control panel to indicate replacement of filters.

HYDRAULIC EXTRA RETURN LINE FILTER

One (1) return line filter element, SE10, 10 micron filter shall be shipped loose.

WARNING LABELS

Danger, caution, and warning labels shall be installed at all aerial control stations, individual controls, and at various locations on the aerial device. These labels shall be in compliance to industry warning symbols, ASME, SAE, and applicable NFPA #1901 standard. These labels shall be with symbols commonly used in the fire industry.

AIR HORN

A momentary switch shall be provided for controlling the vehicle's air horn at the turntable control console. The button shall be in the smart screen.

ROPE TIE DOWN AT GOOSENECK

There shall be four (4) rope tie down points installed on the tiller gooseneck. Two (2) shall be installed on each side one in the forward and one in rearward position. The tie downs will be rated for straight line pull of 9,000 lbs. and will be galvanized.

OUTRIGGER COMPONENTS

The aerial device outriggers and stabilizers shall be designed to function with the standard hydraulic components. Each outrigger shall have a pad that pivots left-to-right and front-to-rear.

Extension Beams

The extension beams shall entirely enclose the extension cylinders to prevent damage to the rods and hoses. Each outrigger shall be controlled with an independent controller which can extend and lower the outrigger at the same time or raise and retract the outrigger at the same time.

A double box design shall enclose the jack cylinders completely to protect the rods from damage that could result from exterior circumstances.

Jack Cylinders

The jack cylinders shall have pilot operated check valves for both the raised and lowered positions. Each jack tube shall be drilled for mechanical pin locks for a safety backup.

The outrigger jack cylinders shall be mounted so they can be removed from the top of the outrigger jack tube. Jack cylinders that are removed from the bottom of the outrigger jack tube will not be accepted.

Outrigger Deployment Alarm and Warning System

The outrigger deployment alarm, of not less than 87 DBA, shall sound at all times while the outrigger master switch is in the on position and stops sounding only when the outrigger switch is turned off. The audible alarm shall warn personnel that outrigger movement is possible at any time the switch is on.

Safety Features

The outrigger system provides the following safety features:

4. A cradle interlock system shall be provided, to prevent the lifting of the aerial from the nested position until the operator has positions all the stabilizers in a load supporting configuration.

2. Amber indicator light at the outrigger control station shall indicate circuit completion to show that the unit is ready for aerial operation.

3. Red warning lights at the outrigger and aerial operator's control consoles shall warn the operator that one (1) or more outriggers has been short set. In the event the vehicle has been set up with one or more of the outriggers short set, any rotation of the turntable by 10 degrees to the short set side shall activate the aerial short jacking system.

Lighting

A Whelen V-Series, model 5V3R, shall be mounted to the inside of the vertical outrigger jack beam. The warning light shall consist of 12 red Super-LED's installed on a V-light PC board with a TIR V-light reflector. The flashing lights shall alert personnel on either side of the outrigger of its location. The V-light PC board shall have four white Super-LED's installed below that work independently as the ground illumination light. The lights shall activate with the ladder power switch.

Outrigger and Stabilizer Specifications

The specified outriggers and torque box system shall provide a 1-1/2 to 1 stability safety factor when the aerial is in any operating position.

The stability requirements shall be met by the apparatus on which the aerial device is mounted when that apparatus is in a service-ready condition but with all normally removable items such as water, hose, ground ladders, and loose equipment removed.

The aerial device shall be capable of sustaining a static load 1-1/3 times its rated capacity in every position in which the aerial device can be placed when the apparatus is on a slope of 5 degrees downward in the direction most likely to cause overturning.

All outriggers and stabilizers that protrude beyond the body of the apparatus shall be striped or painted with reflective material so as to indicate a hazard or obstruction. Each outrigger or stabilizer shall also be provided with one or more red warning light(s) located either on the stabilizer or in the body panel visible on the side of the apparatus where the stabilizer is located.

OUTRIGGERS

Two (2) front out and down outriggers shall be provided on the apparatus.

The outrigger assemblies shall consist of the following components:

4. A 2" inside diameter cylinder with a 1.125" outside diameter rod shall extend and retract the outrigger 48".
5. A 5" inside diameter cylinder with a 3" outside diameter rod shall raise and lower each jack tube a distance of 22".

The internal and external jack tubes shall be designed in a way to prevent binding or excessive movement within the assembly.

The total width from the center of pivot pin to center of pivot pin when the outriggers are fully extended shall be 15' 6". Each outrigger shoe shall have a minimum contact surface of 370 square inches and shall be fabricated from a minimum 80,000 psi yield strength 1/2” steel plate. Surface gussets shall be provided to prevent folding in soft material.

OUTRIGGER CONTROL PANEL

The outrigger control panel shall have a switch to energize the hydraulic system for outrigger functions. The switch shall increase the engine speed to 1,200 RPM when in the "ON" position. In the "OFF" position, the engine speed shall return to normal idle speed and the hydraulic system shall be de-energized.

Control Panel

The control panel shall include the following:

6. Manual override system to override the outrigger-aerial interlock system
7. One (1) switch to start and stop all aerial and outrigger operations.
8. One (1) switch for the emergency power unit.
9. Amber indicating lights shall signal when the outriggers are extended or supporting sufficient load.
10. A pulsing beeper shall be activated when the outrigger system is in use.
11. One (1) red flashing light shall be provided to indicate if outriggers have been short set.
12. One (1) aerial hour meter connected to the PTO shall be installed at the outrigger control station.
13. One (1) hydraulic pressure filter indicator light.

AMBER INDICATING LIGHTS

If an outrigger is extended and not lowered an amber indicator light shall flash rapidly, indicating the jack cylinder is not supporting any load. If the outrigger is fully extended and the jack cylinder is supporting sufficient load the amber indicator light shall be solidly lit. If an outrigger is short-jacked the amber indicator light shall flash slowly.

All Smart Aerials can operate all functions over a short-jacked outrigger. If the aerial were to become overloaded or unsafe the ladder would slow to a smooth stop and the right disable, left disable or down disable light shall illuminate indicating the direction the operator is no longer able to rotate. The aerial can operate away from the unsafe position with one operator.

OUTRIGGER PLATES

An auxiliary outrigger plate shall be provided and permanently attached to each outrigger. Pin to be installed on the vertical outrigger tube (if there is enough room) with cable.

OUTRIGGER STOWED INDICATOR LIGHT

An outrigger stowed indicator light will be provided in the cab. The light shall indicate if one or more outriggers is not fully retracted and fully raised. The light will be connected to the door ajar light in the cab.

PERFORMANCE CAPABILITIES

The following are aerial ladder and water capabilities for the operation of this unit in the unsupported configuration with the truck level, the outriggers fully extended and lowered to relieve the chassis weight from the axles. The capabilities are based upon 360-degree continuous rotation and up to full extension.

The following capabilities are based upon continuous 360-degree rotation and up to full extension. The aerial ladder and water system shall be designed to permit the following flows:

1,000 GPM: 90-degrees to the side of the ladder centerline
1,000 GPM: 135-degrees down from a line parallel to the centerline

Elevation	Capabilities DRY		Capabilities WET	
	Tip Load	Evenly Distributed	Tip Load	Evenly Distributed
-10 degrees to 30 degrees	500 lbs	1,000 lbs	500 lbs	750 lbs
30 degrees to 45 degrees	500 lbs	1,500 lbs	500 lbs	750 lbs
45 degrees to 60 degrees	750 lbs	2,000 lbs	500 lbs	1,500 lbs
60 degrees to 75 degrees	1,000 lbs	2,500 lbs	500 lbs	2,000 lbs

The above ratings shall be based on average weight of personnel on the ladder at 250 pounds each. The ladder meets the 2:1 safety factor requirement for material based on the weight of the ladder plus a 500 pound live load at the tip of the aerial, and flowing 1,000 GPM of water at 90 degrees to the side of the aerial at zero degrees elevation.

If a monitor is ordered that can elevate above 0 degrees the tip load shall be reduced to 250 lbs. The manufacturer shall describe the rated capacity of each configuration in both the operations manual and on a plate at the operator's control station.

Operational Capabilities

The bare ladder shall be able to operate in the following scenarios:

- Hoisted from bedded position to 75 degrees inclination in 25 seconds maximum.
- Move from the bedded position to the fully hoisted position in 40 seconds maximum.
- 360 degrees rotation in 60 seconds, in either direction, at a 30 degrees angle of elevation or higher
- Extend from full retraction to full extension in 30 seconds maximum at any angle of elevation.
- Attaining a fully hoisted and extended position at 90 degrees to the trailer from the bedded position in 80 seconds maximum, at normal operating pressures.
- The bare ladder shall be capable of 360 degrees rotation in 60 seconds, in either direction, at a 30 degrees angle of elevation or higher.
- The aerial ladder, at 0 degrees inclination and positioned at a 90 degrees angle to trailer, shall be capable of full extension or retraction under normal hydraulic system operating pressure in 45 seconds maximum.

- The ladder, at a 75 degrees inclination, shall be capable of being fully extended and retracted with a 500 lb. load on the end of the fly section; stopping and starting a minimum of four (4) times without the use of ladder locks and without the ladder creeping downward or drifting at any time.

SWIVEL

There shall be a modular two component swivel provided with the truck to give 360 degrees continuous rotation. It shall be installed through the turntable and torque box. It shall have a separate electrical swivel and hydraulic swivel that when connected shall form one component. The two individual swivel pieces shall not affection the operations of any other part of the swivel. The hydraulic oil for the aerial shall be directed through a three-port hydraulic swivel with 360 degrees continuous rotation. Individual replacement of each individual portion of the swivel shall be capable.

WIRELESS RADIO REMOTE

There shall be a radio receiver for the aerial, monitor and outriggers controls supplied at the aerial control panel and powered by the chassis 12-volt electrical system. The radio receiver shall have proportional outputs to drive the 12-volt electric proportional aerial and outrigger control hydraulic valves, as well as the on/off output for monitor control.

The radio remote control transmitter/receiver shall be powered by two AA batteries and shall operate approximately 300 feet from the truck, no tether shall be required. The transmitter / receiver shall have a belt strap for comfortable operations. The remote shall control following:

Aerial Controls	Monitor Controls	Outrigger Controls
Raise & Lower	Stream & Shape	Extend & Retract
Extend & Retract	Up & Down	Raise & Lower
Left & Right Rotation	Left & Right Rotation	

The following items shall be included on the remote:

Enable Switch: shall allow the remote to talk to the transmitter located at the main control station. Hitting the momentary enable switch shall allow the operator to begin operations of any function on the remote. If the operator does not choose a function after engaging the enable switch the remote will cease communication with the transmitter after 5 seconds. This switch serves as a dead man switch to the controls on the remote.

Full / Half Speed Switch: there shall be a turtle and rabbit indicator on the remote to allow the operator to run the aerial operations at full (rabbit) or half (turtle) speed.

Air Horn Switch: shall allow the operator to engage the air horn on the truck (if there is one).

Emergency Stop Button: if enabled, shall lock out all operations of all controls from every operator station. This serves as a safety back up in case the operator gets the aerial into an unsafe situation. The operator will have to disengage this switch before being able to operate the aerial from any control station.

Auto Bed Switch: is a momentary switch that when engaged will rotate, retract and lower the aerial into the bedded position while avoiding cab and body collision. Once the aerial is in the 20/20/20 zone (within 20 degrees left or right of the ladder bed, below 20 degrees elevation and 20 percent retraction remaining) the ladder can now be automatically stowed.

LCD Display: shall give the operator continuous readings of the aerial information. This information shall include:

- Aerial rotation: as the aerial is rotated 180 degrees left and right of the ladder bed, positive and negative numbers shall indicate how far right or left the aerial is rotated.
- Aerial height: as the aerial extends and elevates the distance from of the top of the handrail to the ground shall be indicated on the screen.
- Aerial reach: as the aerial extends the reach shall be indicated on the screen from the tip of the aerial to the center of the turntable.
- Aerial elevation: as the aerial is elevated the elevation angle is indicated.
- Aerial extension remaining: as the aerial extends the amount of feet remaining to extend shall be indicated.
- Operational Envelop Disabled: shall be indicated on the screen if the left, right or down function is disabled.
- Overload Condition: shall display on the screen to alert the operator.
- Outrigger Not Set: is displayed if the outriggers still need to be set.
- Outrigger Not Extended: when any outrigger is not fully extended and the jack is not supporting some of the truck weight the operator shall be notified of the exact outrigger that needs to be adjusted.
- Breathing Air (optional): shall be reported if the breathing air is low or off.

PROPORTIONAL ELECTRIC OUTRIGGER CONTROLS

The aerial shall be equipped with two (2) out and down outriggers with proportionally control the electric outrigger valves activated by momentary rocker switches. The proportionally controlled outriggers shall allow the outrigger to deploy at full speed up until the very end of positioning at which time the valve shall back off and allow the outrigger to come to a smooth soft stop. The main controls shall be located on the driver's side by the pump panel and shall control both the driver and passenger's side outriggers. There shall be controls on the passenger's side of the truck to control just the outriggers on that side. Additional controls for the outriggers shall be located on a wireless radio remote and shall control both the driver and passenger side outriggers.

ALL JACKS UP SWITCH

There shall be a switch on the smart screen to raise all of the outrigger jacks up at the same time. Once all aerial operations are complete, the safety pins are pulled; activate the all jacks up button to stow the outrigger jacks. All the jacks will raise up until they are in their stowed position. The operator shall then manually retract the outriggers to the stowed position.

MONITOR

Provide one (1) Akron ***#1494 CAN Electric aluminum ladder pipe*** monitor assembly including shutoff, ladder pipe, and a 5177 electronic CAN MS nozzle. The Akron clamp on monitor shall be equipped with 2½" NSTF threads. The clamp-on monitor mount shall be designed with rung spacing to accommodate the clamp on monitor. A mount shall be provided for the Akron ladder pipe to securely be carried/stored. Final mounting location shall be made at the final inspection.

MONITOR COLOR

The monitor shall be Akron standard red in color.

INTERCOM

The two station intercom communication system shall have the master station at the turntable and secondary intercom and speaker at the tip of the aerial. The master station shall have a volume control and a push-to-talk button. The remote station shall operate "hands free" and constantly transmit to the master station and speaker, unless the master station push-to-talk button is pressed. The intercom shall be designed for exterior aerial application. Each station shall have a weather resistant and protective housing and water resistant speakers.

Fire Research Intercom

Fire Research ACT Intercom model ICA900-112 two-way system shall be installed. The intercom kit shall include two control modules, one that is hands free and one that has a push-to-talk button, two speakers, and cables. The control modules shall have an LED volume display and push-button volume control. The hands free module shall constantly transmit to the other module unless the push-to-talk button is pressed. The intercom shall be designed for exterior use. The control module shall be no more than 2 7/8" high by 5 1/8" wide by 1 7/8". The speaker shall be no more than 5 1/8" high by 5 1/8" wide by 1 1/2" deep. The power requirements for each control module with a speaker shall not exceed 1/2 amp at 12 VDC.

LIGHT HOUSING COLOR

All light housing shall be white in color.

TRACKING LIGHTS:

Two FireTech HiViz area and work lights Model # FT-WL-X-5H-FT-W shall be installed at the lower end of the base section ahead of the lift cylinders of the ladder. The 35 watt +12 DC, 2.91 Amp, light head configuration shall incorporate 5 white LED's. High-quality construction and components enable the light to withstand vibration up to 21Grms. Build-in reverse polarity protection helps prevent accidental damage caused by incorrect installation. Electronic thermal management ensures that if the light is subjected to a massive heat overload, that a self-protection protocol is engaged to reduce the light output, until such time as the heat overload retreats to normal parameters. The HiViz lights shall be activated from the tracking lights switch on the main control station. The FT-WL-X-5H-FT-W lights shall have 4,000 raw lumens (3,305 effective lumens).

TIP LIGHTS:

Two FireTech HiViz area and work lights Model # FT-WL-X-5H-FT-W shall be installed at the tip of the ladder. The 35 watt +12 DC, 2.91 Amp, light head configuration shall incorporate 5 white LED's. High-quality construction and components enable the light to withstand vibration up to 21Grms. Build-in reverse polarity protection helps prevent accidental damage caused by incorrect installation. Electronic thermal management ensures that if the light is subjected to a massive heat overload, that a self-protection protocol is engaged to reduce the light output, until such time as the heat overload retreats to normal parameters. The HiViz lights shall be activated from the tracking lights switch on the main control station. The FT-WL-X-5H-FT-W lights shall have 4,000 raw lumens (3,305 effective lumens).

TIP LIGHTS

Two (2)Fire Research Spectra LED Scene Light SPA570-K20 top mount fixed pedestal light shall be installed at the tip of the aerial one on each side. The pedestal shall allow the lamphead to rotate 450 degrees and have a self adjusting friction brake to prevent arbitrary rotation. The pedestal shall have a round mounting base. The lights shall be activated by the tip lights switch.

The lamphead shall have sixty (60) ultra-bright white LEDs, 48 for flood lighting and 12 to provide a spot light beam pattern. It shall operate at 120 volts AC, draw 2 amps, and generate 20,000 lumens of light. The lamphead shall have a unique lens that directs flood lighting onto the work area and focuses the spot light beam into the distance. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall be no more than 5 5 3/8" high by 14" wide by 3 3/4" deep and have a heat resistant handle. The lamphead and mounting arm shall be powder coated. The LED scene light shall be for fire service use.

LADDER RECEPTACLE

One (1) 120-volt AC circuit shall be run through the collector ring swivel, with a 20 amp breaker, 15 amp receptacle mounted on tip of fly section. Only one box will be provided. The receptacle(s) shall be a twist-lock three prong type with a weather proof cover.

TIP MARKER LIGHTS

Two (2) TIR3 Whelen LED lights, model # RSR03ZCR and RSG03ZCR, shall be installed at the tip of the fly section. The driver side red and officer side green. These lights shall be activated from the tip light switch.

RUNG LIGHTING

The ladder rungs of each aerial section shall be equipped with 12-volt LED Luma-bar lighting. The Luma-bar shall run the full length of the climbing portion of each section on each side of the aerial. These lights shall be activated from the turntable tracking light switch. The ladder rung lights shall be "red" in color.

COLOR CAMERA

An Intec color camera, model # CVC404HXL, shall be installed at the tip of the aerial. The camera shall incorporate a 1/3" high density CCD interline transfer pickup device with at least 250,000 [510 (H) x 492 (V)] pixels. The camera shall produce a horizontal resolution of at least 330 lines. The camera shall deliver a usable color picture at a scene illumination of 0.5 lux. The camera shall provide a horizontal field of view of at least 123 degrees and a vertical field of view of at least 91 degrees. The camera/cable connection shall be qualified as waterproof to IP68. The camera shall be able to transmit images on all Smart Screens.

HYDRAULIC SYSTEM

The hydraulic system shall have a load sensing, variable gallonage, hydraulic piston pump with a 12-volt pressure reducing system. To reduce the normal time for aerial set up, the hydraulic pump shall be of the load sensing design. The hydraulic system shall have sufficient oil flow to provide the capability of performing multiple functions simultaneously without reducing operating speeds of the selected functions.

The hydraulic oil for the aerial shall be directed through a hydraulic swivel with 360 degrees continuous rotation. Enclosed in the hydraulic swivel shall be a minimum of twenty (20) electrical collector rings and a maximum of thirty-six (36) electrical collector rings with 360-degrees continuous rotation.

The hydraulic pump shall be large enough to provide oil to meet all of the requirements needed for aerial and outrigger operation standards.

A pressure reducing valve set at 500 PSI above the system pressure shall be connected to the hydraulic pump. This pressure reducing valve shall be a safety device for hydraulic pump failure. The hydraulic oil shall be directed through high pressure hydraulic hose and tubing.

The hydraulic system shall be designed to direct oil to the outriggers only while the ladder is in the bedded position. The oil can be directed to the aerial operation only when all of the outriggers are supporting sufficient load. This operation is made available through the use of electrical diverter valves with a manual override system for safety backup.

Hydraulic System Installation

The non-sealing moving parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four times the maximum operating pressure to which the component is subjected.

Dynamic sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall not begin to extrude or otherwise fail at pressures at or below two times the maximum operating pressure to which the component is subjected.

Static sealing parts of all hydraulic components, whose failure results in motion of the aerial device, shall have a minimum bursting strength of four (4) times the maximum operating pressure to which the component is subjected.

All hydraulic hose, tubing, and fittings shall have a minimum bursting strength of at least three times the maximum operating pressure to which the components are subjected. All hydraulic hoses shall have a stamped embedded on one end of the metal fitting to include the date, technicians creating the hose identification number, PSI of hose and the company the hose was made by. This shall assist a mechanic in determining the age of the hydraulic hose.

All other hydraulic components shall have a minimum bursting strength of at least two times the maximum operating pressure to which the components are subjected.

The hydraulic system shall be provided with an oil pressure gauge at the control station position.

Hydraulic Reservoir

The hydraulic system shall be supplied by a 35 gallon oil tank with a 10 micron filter on the return line and a 100 mesh filter on the pump inlet side.

A means for checking and filling the hydraulic reservoir shall be readily accessible.

The fill location shall be conspicuously marked with a label that reads “Hydraulic Oil Only.”

Instructions for checking and filling the hydraulic reservoir shall be provided.

The hydraulic system components shall be capable of maintaining, under all operating conditions, oil cleanliness and temperature that comply with the component manufacturer's recommendations.

HYDRAULIC GATED DRAIN LINE

One (1) quarter turn shut-off valve shall be connected in the drain line of the hydraulic oil tank..

HYDRAULIC GATED DRAIN LINE

One (1) quarter turn shut-off valve shall be supplied between the suction line of the hydraulic oil tank and the inlet of the hydraulic pump.

HYDRAULIC OIL ISO 32

United MV Extreme Hydraulic Oil is a multi-grade hydraulic lubricant engineered for extreme temperature ranges. The low pour point of -58° F enables this fluid to flow quickly in extreme cold climates, avoiding pump cavitation that results in pump wear. The high viscosity index of this fluid addresses the extreme hot climates and operating temperatures, thinning out less at high temperatures than typical hydraulic fluids.

United MV Extreme Hydraulic Oil is formulated with rust inhibitors, oxidation inhibitors, anti-wear agents and anti-foam additives. This fluid is fortified with a friction modifier lubricity agent necessary in hydraulic systems operating wet clutches and/or wet brakes, commonly found in industrial cranes and other off-road equipment. United MV Extreme Hydraulic is has very good water separation so that contaminant water may be drained from the reservoir when the machine is at rest. In-plant filtration systems insure ISO cleanliness standards during blending and container filling, providing a clean product for your expensive hydraulic system.

HYDRAULIC GATED DRAIN LINE

One (1) quarter turn shut-off valve shall be connected in the drain line of the hydraulic oil tank..

HYDRAULIC GATED DRAIN LINE

One (1) quarter turn shut-off valve shall be supplied between the suction line of the hydraulic oil tank and the inlet of the hydraulic pump.

ELEVATION SYSTEM

The hydraulic elevation system shall have two (2) 6" inside diameter cylinders that have 3-1/2" diameter rods and a 36" stroke. The elevation system shall elevate the aerial from -10 degrees to +75 degrees. The cylinders shall be equipped with spherical bushings to minimize cylinder rod wear. Each cylinder shall have lock valves connected directly to the barrel of the cylinder.

A pressure-reducing valve shall limit the force of the aerial when lowering and the system pressure limits the force when elevating the aerial.

All hydraulic cylinders utilized in the aerial elevation and extension system shall be commercially available and shall be of standard sizes and lengths rather than special sizes or of proprietary manufacture. This requirement is important since it assures quicker parts availability, shorter down time, and less costly replacement parts for cylinders.

Provide a hydraulic ladder bed locking device or system that shall retain the aerial ladder in the bed when the apparatus is in motion. Provide a red indicator light in the tractor cab overhead to indicate whenever ladder is not bedded.

PTO

Provide a Chelsea or equal "Hot-Shift" heavy-duty power takeoff and a direct mount hydraulic pump. The power takeoff shall be controlled by a switch labeled “LADDER POWER”, mounted in a driver accessible location in the tractor cab. Provide an electrical interlock to prevent the power takeoff from being engaged above 800 engine rpm. Provide an electrical interlock to prevent the power takeoff from being engaged anytime the parking brakes are released.

EMERGENCY BACK UP PUMP

An emergency hydraulic system shall be provided for capability for limited ladder functions and to stow the ladder and outriggers in case of prime motor failure. The emergency system shall be powered from the 12-volt electrical system from the apparatus battery system and shall not be load managed. Location to be determined at the pre-construction conference and approved by the District.

Provide a red emergency indicator light at both outrigger control stations.