

# *Metro Star*

North Central Emergency Vehicles  
18448 County Road 9  
Lester Prairie, MN 55354

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Prepared For :  
NEW ULM FIRE DEPARTMENT

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# Quotation

Description

## VEHICLE

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S	0100-011	<b>MODEL</b>	Metro Star
O	8012-111	<b>CUSTOMERS / OEMS</b>	Spartan ERV (CMF1000)[1004096]
S	8011-019	<b>MODEL YEAR</b>	Model Year - 2019
S	8001-001	<b>COUNTRY OF SERVICE</b>	Country of Service United States Of America
S	8017-001	<b>CAB AND CHASSIS LABELING LANGUAGE</b>	Cab and Chassis Labeling Language English
O	8006-009	<b>APPARATUS TYPE</b>	Apparatus Type Pumper
S	8008-001	<b>VEHICLE TYPE</b>	Vehicle Type Straight Truck
S	8008A-000	<b>VEHICLE ANGLE OF APPROACH PACKAGE</b>	Vehicle Angle of Approach NFPA Minimum 8.00 Degrees
S	0104-001	<b>AXLE CONFIGURATION</b>	Axle Configuration 4x2 (Rear Axle Drive Only)
O	0101-004	<b>GROSS AXLE WEIGHT RATINGS FRONT</b>	GAWR Front 21500#
O	0102-004	<b>GROSS AXLE WEIGHT RATINGS REAR</b>	GAWR Rear 27000#
O	8010-101	<b>PUMP PROVISION</b>	Pump Provision Driveline Midship w/Auto Park Brake "N"
O	8009-004	<b>WATER &amp; FOAM TANK CAPACITY</b>	Water & Foam Tank Capacity Up to 750 Gallons

## CAB

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O	1000-024	<b>CAB STYLE</b>	Cab Style LFD 24" Raised Roof
O	8101-105	<b>OCCUPANT PROTECTION</b>	Occupant Protection Advanced Protection System
S	1501-002	<b>CAB FRONT FASCIA</b>	Cab Frt Fascia Classic
S	1518-025	<b>FRONT GRILLE</b>	Cab Frt Grille Hinged Classic Styled
S	1551-002	<b>CAB UNDERCOAT</b>	Cab Undercoat
S	1552-002	<b>CAB SIDE DRIP RAIL</b>	Cab Side Drip Rail
O	1521-002	<b>CAB PAINT EXTERIOR</b>	Cab Paint Exterior Two Tone
S	1533-001	<b>CAB PAINT MANUFACTURER</b>	Cab Paint Manufacturer PPG
O	1522-800	<b>CAB PAINT PRIMARY/LOWER COLOR</b>	Cab Paint Primary/Lower Color PPG Red FBCH 926234
O	1523-550	<b>CAB PAINT SECONDARY/UPPER COLOR</b>	Cab Paint Sec/Upper Color PPG White FBCH 929925
O	1524-002	<b>CAB PAINT EXTERIOR BREAKLINE</b>	Cab Paint Exterior Breakline Classic
O	1515-002	<b>CAB PAINT PINSTRIPE</b>	Cab Paint Pinstripe 1/2" Gold Reflective
S	8013-042	<b>CAB PAINT WARRANTY</b>	Cab Paint Warranty 2019 (10) Year/100,000 Miles
O	1334-039	<b>CAB PAINT INTERIOR</b>	Cab Paint Int Multi-tone Onyx Blk
O	1005-001	<b>CAB ENTRY DOORS</b>	Cab Entry Doors (4)
S	1101-101	<b>CAB ENTRY DOOR TYPE</b>	Cab Entry Door Type Full Length w/Pollak Switches
S	1322-002	<b>CAB INSULATION</b>	Cab Insulation
O	1001-004	<b>REAR CAB ROOF MODIFICATION</b>	Rear Cab Roof Modification PPHE 24"RR
O	1540-101	<b>LH EXTERIOR REAR COMPARTMENT</b>	LH Ext Rr Cmpt 21"H x 11"W/32"H Hng Dr
O	5313-002	<b>LH EXTERIOR REAR COMPARTMENT LIGHTING</b>	LH Ext Rr Cmpt Lt LED Strip Lt SoundOff Signal 10"

O	1548-015	<b>LH EXTERIOR COMPARTMENT INTERIOR FINISH</b>	LH Exterior Compartment Interior Finish Multi-tone Onyx Black
O	1541-101	<b>RH EXTERIOR REAR COMPARTMENT</b>	RH Ext Rr Cmpt 21"H x 11"W/32"H Hng Dr
O	5345-002	<b>RH EXTERIOR REAR COMPARTMENT LIGHTING</b>	RH Ext Rr Cmpt Lt LED Strip Lt SoundOff Signal 10"
O	1549-015	<b>RH EXTERIOR COMPARTMENT INTERIOR FINISH</b>	RH Exterior Compartment Interior Finish Multi-tone Onyx Black
O	1007-002	<b>PUMP PANEL CUTOUT</b>	Pump Panel Cutout 70"W x 25.50" H
O	1003-002	<b>SHIPPING COVER REARWALL CUTOUT</b>	SHIPPING COVER REARWALL CUTOUT (Bustle Back Cabs)
S	8004-026	<b>CAB STRUCTURAL WARRANTY</b>	Cab Structural Warranty 2019 (10) Year/100,000 Miles
S	9001-006	<b>CAB TEST INFORMATION</b>	Cab Test Information Crash Test ECE-R29/SAE J2420/SAE J2422

## **ELECTRICAL POWER DISTRIBUTION**

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S	5000-018	<b>ELECTRICAL SYSTEM</b>	Elec System 12V DC Multiplex
O	5006-002	<b>APPARATUS WIRING PROVISION</b>	Apparatus Wiring Provision (8) Circuit Panel
O	5005-212	<b>MULTIPLEX DISPLAY</b>	MUX Display Weldon Vista (3) L/R Sw Pnl & Shiploose
O	5046-048	<b>MULTIPLEX DISPLAY SPECIAL LAYOUT</b>	Multiplex Display Special Layout Defrost Hot Mode Button
S	5004-002	<b>LOAD MANAGEMENT SYSTEM</b>	Load Management System Multiplex
S	5622-003	<b>DATA RECORDING SYSTEM</b>	Data Recording Sys Vehicle Data Weldon MUX
O	5031-010	<b>ACCESSORY POWER</b>	Accessory Pwr & Gnd Stud 40A Batt & 15A Ign w/200A Mstr Sw/300A Batt OEM Conn
O	5030-009	<b>AUXILIARY ACCESSORY POWER</b>	Aux Acc Pwr & Gnd Stud Bhd Off Seat 40A Batt Dir
O	5032-019	<b>ADDITIONAL ACCESSORY POWER</b>	Addl Acc Pwr & Gnd Stud Bhd Off Seat 40A Mstr Sw
S	5011-001	<b>EXTERIOR ELECTRICAL TERMINAL COATING</b>	Exterior Electrical Terminal Coating Spray On Plasti Dip

## **ENGINE**

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S	1701-156	<b>ENGINE</b>	Engine Diesel 380HP Cummins L9 - EPA 2017
S	1329-001	<b>CAB ENGINE TUNNEL</b>	Cab Engine Tunnel Small/Medium
S	1731-002	<b>DIESEL PARTICULATE FILTER CONTROLS</b>	DPF Ctrl Regeneration Sw & Inhibit Sw
S	1718-002	<b>ENGINE PROGRAMMING HIGH IDLE SPEED</b>	Engine Programming High Idle Speed 1250 RPM
S	1719-005	<b>ENGINE HIGH IDLE CONTROL</b>	Engine High Idle Ctrl Manual and Automatic w/MUX
S	1710-001	<b>ENGINE PROGRAMMING ROAD SPEED GOVERNOR</b>	Engine Programming Road Speed Governor Enabled
S	1713-005	<b>AUXILIARY ENGINE BRAKE</b>	Aux Engine Brake VG Turbo
O	1708-002	<b>AUXILIARY ENGINE BRAKE CONTROL</b>	Aux Engine Brake Ctrl On/Off Sw Pnl
S	1720-003	<b>ELECTRONIC ENGINE OIL LEVEL INDICATOR</b>	Elec Engine Oil Level Indicator
S	1715-001	<b>FLUID FILLS</b>	Fluid Fills Fwd For Med Displacement Cap
S	1735-001	<b>ENGINE DRAIN PLUG</b>	Engine Drain Plug
S	8002-001	<b>ENGINE WARRANTY</b>	Engine Warranty Cummins (5) Year/100,000 Miles
O	1706-011	<b>REMOTE THROTTLE CONTROL</b>	Rmt Throttle Ctrl PSG Fire Research In Control 400
O	1707-130	<b>REMOTE THROTTLE HARNESS</b>	Rmt Throttle Harness PSG FRC INControl 300/400 Top Mnt Shift Interlock

S	1721-001	<b>ENGINE PROGRAMMING REMOTE THROTTLE</b>	Engine Program Rmt Throttle Off
S	1727-001	<b>ENGINE PROGRAMMING IDLE SPEED</b>	Engine Programming Idle Speed 700 RPM

## COOLING

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S	2704-002	<b>ENGINE FAN DRIVE</b>	Engine Fan Drive Clutch
S	2701-019	<b>ENGINE COOLING SYSTEM</b>	Engine Cooling Sys Serial Flow Medium/Package Drop-Out Prov/Rwd Sight Glass
S	2711-005	<b>ENGINE COOLING SYSTEM PROTECTION</b>	Engine Cooling System Protection Light Duty Skid Plate Paint Frame Color
S	2708-001	<b>ENGINE COOLANT</b>	Engine Coolant Extended Life
O	2707-002	<b>ENGINE COOLANT FILTER</b>	Engine Coolant Filter
S	2706-003	<b>ELECTRONIC COOLANT LEVEL INDICATOR</b>	Elec Low Coolant Level Indicator
O	2705-004	<b>ENGINE PUMP HEAT EXCHANGER</b>	Engine Pump Heat Exchanger w/Pre-Plumbed 38' Loop OEM Pump Conn
S	2709-004	<b>COOLANT HOSES</b>	Coolant Hoses Silicone Heater & Radiator w/Cab Int Rubber Hoses
O	2710-002	<b>ENGINE COOLANT OVERFLOW BOTTLE</b>	Engine Coolant Overflow Bottle

## AIR INTAKE

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S	2801-009	<b>ENGINE AIR INTAKE</b>	Engine Air Intake Filtration and Restriction w/SS Housing & Replaceable Element
S	2802-003	<b>AIR INTAKE PROTECTION</b>	Air Intake Protection Light Duty Skid Plate Painted Frame Color

## EXHAUST

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S	2901-068	<b>ENGINE EXHAUST SYSTEM</b>	Eng Exhaust Sys Under Frm RH Single Module Aftertreatment Inboard
O	2907-003	<b>DIESEL EXHAUST FLUID TANK</b>	Diesel Exhaust Fluid Tank LH 6 Gal Fill Thru Rr Step
O	2902-030	<b>ENGINE EXHAUST ACCESSORIES</b>	Engine Exh Acc Exh Temp Mitigation w/Drop Tail Pipe
S	2906-002	<b>ENGINE EXHAUST WRAP</b>	Engine Exhaust Wrap

## TRANSMISSION

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S	1801-015	<b>TRANSMISSION</b>	Transmission Allison 3000 EVS
O	1806-002	<b>TRANSMISSION MODE PROGRAMMING</b>	Transmission Mode Programming 5th Startup/5th Mode
O	1811-004	<b>TRANSMISSION FEATURE PROGRAMMING</b>	Transmission Feature Programming Allison Gen V-E I/O Package 198/Pumper
S	1815-002	<b>ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR</b>	Elec Transmission Oil Level Indicator
S	1807-005	<b>TRANSMISSION SHIFT SELECTOR</b>	Transmission GEN V-E Shift Sel Key Pad/Push Button
S	1814-002	<b>TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE</b>	2nd Gear Pre-Select
S	1808-007	<b>TRANSMISSION COOLING SYSTEM</b>	Transmission Cooling System
S	1817-001	<b>TRANSMISSION DRAIN PLUG</b>	Transmission Drain Plug
S	8005-001	<b>TRANSMISSION WARRANTY</b>	Transmission Warranty Allison (5) Year

## POWER TAKE OFF

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O	2004-004	<b>LH PTO</b>	LH PTO Cust Installed
O	2001-108	<b>LH PTO MODEL</b>	LH PTO Model Chelsea 280-GSFJP-B8RK
O	2010A-001	<b>RH PTO INSTALLED</b>	RH PTO INSTALLED
O	2010-004	<b>RH PTO</b>	RH PTO Cust Installed
O	2008-078	<b>RH PTO MODEL</b>	RH PTO Model Chelsea 280-GDFJP-B5RK
S	2005-009	<b>PTO LOCATION</b>	PTO Location 8:00/4:00

## DRIVELINE

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S	3001-001	<b>DRIVELINE</b>	Driveline Spicer 1710
O	3005-022	<b>MIDSHIP PUMP / GEARBOX</b>	Midship Pump Jackshaft w/Spartan ER Full Body Pump Mount Holes
O	3008-085	<b>MIDSHIP PUMP / GEARBOX MODEL</b>	Midship Pump/Gearbox Model Waterous CSUC20 Fwd
O	3048-007	<b>MIDSHIP PUMP GEARBOX DROP</b>	Midship Pump Gearbox Drop Waterous "C"
O	3009-007	<b>MIDSHIP PUMP RATIO</b>	Midship Pump Ratio 2.27:1
O	3010-1125	<b>MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE</b>	Midship Pump Location C/L Suction to C/L Rear Axle 112.5"
O	5013-014	<b>PUMP SHIFT CONTROLS</b>	Pump Shift Ctrl Air Ctrl in Ctr Pnl Low LH Pmp Act Down
O	3049-003	<b>PUMP SHIFT CONTROL PLUMBING</b>	Pump Shift Control Plumbing Pre-Plumb Elec/Air

## FUEL SYSTEMS

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O	3109-059	<b>FUEL FILTER/WATER SEPARATOR</b>	Fuel Filter/Wtr Separator Fleetguard FS1098 Htd w/Lt & Alarm
S	3111-001	<b>FUEL LINES</b>	Fuel Lines Nylon
O	3104-013	<b>FUEL SHUTOFF VALVE</b>	Fuel Shutoff Valve (2) at Primary Filter
S	3103-008	<b>ELECTRIC FUEL PRIMER</b>	Electric Fuel Primer Engine Sply Electric Lift Pump
S	3101-101	<b>FUEL TANK</b>	Fuel Tank 50 Gallon
S	3130-001	<b>FUEL TANK MATERIAL AND FINISH</b>	Fuel Tank Material Steel & Finish Painted Frame Color
S	3131-001	<b>FUEL TANK STRAP MATERIAL AND FINISH</b>	Fuel Tank Strap Material Steel & Finish Painted Frame Color
O	3102-010	<b>FUEL TANK FILL PORT</b>	Fuel Tank Fill Port LH Rwd/RH Rwd
S	3115-002	<b>FUEL TANK DRAIN PLUG</b>	Fuel Tank Drain Plug Magnetic

## FRONT AXLE

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O	2401-004	<b>FRONT AXLE</b>	Frnt Axle Meritor MFS 21500# Beam
S	8059-015	<b>FRONT AXLE WARRANTY</b>	Front Axle Warranty Meritor 2019
O	2405-002	<b>FRONT WHEEL BEARING LUBRICATION</b>	Frnt Wheel Bearing Lube Synthetic

## FRONT SUSPENSION

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S	2502-002	<b>FRONT SHOCK ABSORBERS</b>	Frnt Shock Absorbers Bilstein
O	2501-016	<b>FRONT SUSPENSION</b>	Frnt Suspension 10 Leaf 20000-21500#

## STEERING

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S	2601-006	<b>STEERING COLUMN/WHEEL</b>	Steering Column/Wheel Tilt/Telescopic 18" 4 Spoke
S	2609-002	<b>ELECTRONIC POWER STEERING</b>	Elec Power Steering Fluid Level Indicator

## FLUID LEVEL INDICATOR

S	2603-011	<b>POWER STEERING PUMP</b>	Power Steering Pump TRW w/Passive Cooler
O	2606-009	<b>FRONT AXLE CRAMP ANGLE</b>	Front Axle Cramp Angle 48L/44R Degrees
O	2610-003	<b>POWER STEERING GEAR</b>	Power Steering Gear TRW TAS 65 w/Assist
S	2608-001	<b>CHASSIS ALIGNMENT</b>	Chassis Alignment

## REAR AXLE

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O	3401-003	<b>REAR AXLE</b>	Rear Axle 27000# Meritor RS-25-160
O	3403-002	<b>REAR AXLE DIFFERENTIAL LUBRICATION</b>	Rear Axle Differential Lubrication Synthetic
S	8061-012	<b>REAR AXLE WARRANTY</b>	Rear Axle Warranty Meritor 2019
O	3411-002	<b>REAR WHEEL BEARING LUBRICATION</b>	Rear Wheel Bearing Lubrication Synthetic
O	3407-010	<b>REAR AXLE DIFFERENTIAL CONTROL</b>	Rear Axle Differential Ctrl DCDL MUX
O	3408-008	<b>VEHICLE TOP SPEED</b>	Vehicle Top Speed 68 MPH

## REAR SUSPENSION

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O	3501G-001	<b>REAR SUSPENSION AUX SPRING</b>	REAR SUSPENSION AUX SPRING
O	3501-001	<b>REAR SUSPENSION</b>	Rear Susp Reyco 79KB Spring 21000-33000# w/Helper
O	3503-002	<b>REAR SHOCK ABSORBERS</b>	Rear Shock Absorbers Bilstein

## TIRES

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O	3601-061	<b>FRONT TIRE</b>	Frt Tire 425/65R 22.5 Michelin XFE
O	3602-012	<b>REAR TIRE</b>	Rear Tire 12R 22.5 Michelin XDN2
O	3413-513	<b>REAR AXLE RATIO</b>	Rear Axle Ratio 5.13
S	3614-030	<b>TIRE PRESSURE INDICATOR</b>	Tire Pressure Ind Frt & Rr LED

## WHEELS

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O	3701-033	<b>FRONT WHEEL</b>	Frt Wheel Alcoa LvL One 22.5 x 12.25 Alum
O	3703-029	<b>REAR WHEEL</b>	Rr Whl Alcoa LvL One/Accuride 22.5 x 8.25 Alum/Steel
S	3710-059	<b>WHEEL PAINT</b>	Wheel Paint White Powder Coat
O	3702-002	<b>WHEEL TRIM</b>	Wheel Trim Hub & Nut Covers SS Shiploose
O	3725-003	<b>WHEEL GUARDS</b>	Wheel Guards Between Dual Wheels & All Axles

## BRAKES

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O	3205-014	<b>BRAKE SYSTEM</b>	Brake System ABS/ATC/ESC Sgl Axle MUX Btn
O	3206-003	<b>FRONT BRAKES</b>	Frt Brakes Meritor EX225 Disc 17"
O	3207-005	<b>REAR BRAKES</b>	Rr Brakes S-Cam Drum 16.5" x 7" Cast Iron Shoe
S	3208-001	<b>PARK BRAKE</b>	Prk Brake Rr Wheels Only
O	3204-035	<b>PARK BRAKE CONTROL</b>	Prk Brake Ctrl LH Tunnel Mnt, Integrated w/Shift Pod Console w/Guard
S	3214-001	<b>REAR BRAKE SLACK ADJUSTERS</b>	Rr Brake Slack Adjusters Meritor
S	3202-005	<b>AIR DRYER</b>	Air Dryer Wabco System Saver 1200 Bhd LH Batt Box
O	3215-004	<b>FRONT BRAKE CHAMBERS</b>	Frt Brake Chambers MGM Type 24 Long Stroke

O 3210-015 **REAR BRAKE CHAMBERS** Rr Brake Chambers TSE 30/36 Long Stroke

## **AIR SUPPLY SYSTEMS**

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S 3320-001 **AIR COMPRESSOR** Air Compressor Wabco SS318 18.7 CFM  
S 3339-004 **AIR GOVERNOR** Air Governor Mnt on Air Dryer Bracket  
O 3305-001 **AUXILIARY AIR RESERVOIR** Aux Air Reservoir 1200 Cu In  
O 3303-010 **MOISTURE EJECTORS** Moisture Ejectors Auto Htd w/Cable  
S 3307-001 **AIR SUPPLY LINES** Air Sply Lines Nylon  
O 3309-033 **AIR INLET CONNECTION** Air Inlet Connection  
O 3349-002 **AIR INLET LOCATION** Air Inlet Location LH Lwr Frt Step Fwd  
O 3326-002 **AIR INLET/OUTLET FITTING TYPE** Air Inlet/Outlet Manual Conn Tru-Flate Interchange 1/4"  
O 3334-002 **AIR TANK SPACERS** Air Tank Spacers Inboard 1.5"  
S 3338-002 **REAR AIR TANK MOUNTING** Rear Air Tank Mnt Any Bhd Rear Axle Perpendicular w/Frame

## **FRAME**

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O 2103-2065 **WHEELBASE** Wheelbase 206.5"  
O 2106-0530 **REAR OVERHANG** Rear Overhang 53.0"  
O 2101-002 **FRAME** Frame Double Channel 35.00" Width  
S 8007-024 **FRAME WARRANTY** Frame Warranty Lifetime 2019  
O 2111-124 **MISC FRAME OPTIONS** Misc Frame Options Spartan ERV Vibratorque Hole Pattern HF9R7C  
O 2118-004 **REAR TOW DEVICE** Rear Tow Device Spartan ERV Pumper Pattern  
S 2110-201 **FRAME PAINT** Frame Paint Hot Dipped Galvanized - Frame Only Addl Comp Blk Powder Coat  
O 2105-002 **REAR MUD FLAP** Rear Mud Flap & Fender Temp Mnt

## **BUMPER**

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S 2201-001 **FRONT BUMPER** Frt Bumper Stainless Steel Flat  
S 2202-001 **FRONT BUMPER EXTENSION LENGTH** Frt Bumper Extension Length 6"  
O 5501-029 **AIR HORN** Air Horn (2) 12"/15" Round Buell  
O 2216-017 **AIR HORN LOCATION** Air Horn Location (2) Shiploose w/Brkts  
O 2232-002 **AIR HORN RESERVOIR** Air Horn Reservoir (1) 1200 Cu In  
O 5504-068 **ELECTRONIC SIREN SPEAKER** Elect Siren Speaker (2) 100W Whelen SP123BMC  
O 2217-013 **ELECTRONIC SIREN SPEAKER LOCATION** Elec Siren Speaker Location (2) Shiploose

## **CAB TILT**

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S 2301-001 **CAB TILT SYSTEM** Cab Tilt System  
O 2303-002 **CAB TILT LIMIT SWITCH** Cab Tilt Limit Sw  
S 2305-001 **CAB TILT CONTROL RECEPTACLE** Cab Tilt Ctrl Receptacle Temp  
S 2306-002 **CAB TILT LOCK DOWN INDICATOR** Cab Tilt Lock Down Indicator

## **CAB GLASS**

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S 1401-009 **CAB WINDSHIELD** Cab Windshield  
O 1402-002 **GLASS FRONT DOOR** Glass Frt Dr Pwr

S	1407-001	<b>GLASS TINT FRONT DOOR</b>	Glass Tint Frt Dr Automotive Green
O	1419-008	<b>GLASS REAR DOOR RIGHT HAND</b>	Glass Rr Dr RH Pwr
O	1430-001	<b>GLASS TINT REAR DOOR RIGHT HAND</b>	Glass Tint Rr Door RH Automotive Green
O	1412-008	<b>GLASS REAR DOOR LEFT HAND</b>	Glass Rr Dr LH Pwr
O	1431-001	<b>GLASS TINT REAR DOOR LEFT HAND</b>	Glass Tint Rr Door LH Automotive Green
O	1410-003	<b>GLASS SIDE MID RIGHT HAND</b>	Glass Side Mid RH Fxd 16"W x 26"H
O	1432-001	<b>GLASS TINT SIDE MID RIGHT HAND</b>	Glass Tint Side Mid RH Automotive Green
O	1409-003	<b>GLASS SIDE MID LEFT HAND</b>	Glass Side Mid LH Fxd 16"W x 26"H
O	1433-001	<b>GLASS TINT SIDE MID LEFT HAND</b>	Glass Tint Side Mid LH Automotive Green
O	1405-004	<b>GLASS REAR WALL OUTER UPPER</b>	Glass Rr Wall Outer Upper Fxd 16"W x 16"H
O	1436-001	<b>GLASS TINT REAR WALL OUTER UPPER</b>	Glass Tint Rr Wall Outer Upper Automotive Green
O	1413-006	<b>GLASS UPPER SIDE FRONT</b>	Glass Upper Side Frt (2) R/L Fxd 12"W x 11"H
O	1437-001	<b>GLASS TINT UPPER SIDE FRONT</b>	Glass Tint Upper Side Frt Automotive Green
O	1415-002	<b>GLASS UPPER SIDE MID</b>	Glass Upper Side Mid (2) R/L Fxd 16"W x 14"H
O	1438-001	<b>GLASS TINT UPPER SIDE MID</b>	Glass Tint Upper Side Mid Automotive Green
O	1417-002	<b>GLASS UPPER SIDE REAR DOOR</b>	Glass Upper Side Rr Door (2) R/L Fxd 27"W x 14"H
O	1439-001	<b>GLASS TINT UPPER SIDE REAR DOOR</b>	Glass Tint Upper Side Rr Door Automotive Green
O	1421-002	<b>GLASS UPPER SIDE REAR</b>	Cab Glass Upper Side Rr (2) R/L Fxd 8"W x 14"H
O	1440-001	<b>GLASS TINT UPPER SIDE REAR</b>	Glass Tint Upper Side Rr Automotive Green
O	1427-002	<b>GLASS UPPER SIDE REAR PPHE</b>	Glass Upper Side Rr PPHE (2) R/L Fxd 16"W x 16"H
O	1441-001	<b>GLASS TINT UPPER SIDE REAR PPHE</b>	Glass Tint Upper Side Rr PPHE Automotive Green
O	1423-002	<b>GLASS REAR WALL CENTER</b>	Glass Rr Wall Ctr Fxd 41"W x 16"H
O	1442-001	<b>GLASS TINT REAR WALL CENTER</b>	Glass Tint Rr Wall Center Automotive Green
O	1403-004	<b>GLASS UPPER FRONT</b>	Glass Upper Frt 6"W x 11"H
O	1443-001	<b>GLASS TINT UPPER FRONT</b>	Glass Tint Upper Frt Automotive Green
O	1424-002	<b>GLASS REAR WALL OUTER LOWER</b>	Glass Rr Wall Outer Lwr Fxd 5"W x 30"H
O	1444-001	<b>GLASS TINT REAR WALL OUTER LOWER</b>	Glass Tint Rr Wall Outer Lwr Automotive Green
O	1428-002	<b>GLASS REAR WALL EXTENSION LOOKDOWN</b>	Glass Rr Wall Ext Lookdown (2) Fxd 5"W x 17"H
O	1445-001	<b>GLASS TINT REAR WALL HORIZONTAL</b>	Glass Tint Rr Wall Horiz Automotive Green

## **CLIMATE CONTROL**

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O	1614-204	<b>CLIMATE CONTROL</b>	Climate Ctrl Htr Defroster A/C SGM Ovrhd Alum 10-24" RR Short Plenum
O	1632-002	<b>CLIMATE CONTROL DRAIN</b>	Climate Control Drain Gravity
O	1617-108	<b>CLIMATE CONTROL ACTIVATION</b>	Climate Ctrl Actv MUX
O	1620-019	<b>HVAC OVERHEAD COVER PAINT</b>	HVAC Overhead Cover Paint Multi-tone Onyx Black
O	1606-003	<b>AUXILIARY CLIMATE CONTROL FRONT UNDERSEAT</b>	Aux Climate Ctrl Frt Underseat Htr MUX
O	1603-003	<b>A/C CONDENSER LOCATION</b>	A/C Condenser Location Roof Mnt Fwd Ctr
O	1601-013	<b>A/C COMPRESSOR</b>	A/C Compressor TM-31/QP-31
O	1609-002	<b>CAB CIRCULATION FANS REAR</b>	Cab Circulation Fans Rear (2) Outboard
S	1530-001	<b>UNDER CAB INSULATION</b>	Under Cab Insulation Engine Tunnel



## CAB INTERIOR

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O	1327-002	<b>INTERIOR TRIM FLOOR</b>	Interior Trim Floor w/TPlt Overlay
S	1302-001	<b>INTERIOR TRIM</b>	Interior Trim Vinyl
O	1306-006	<b>HEADER TRIM</b>	Header Trim XDuty
O	1305-015	<b>TRIM CENTER DASH</b>	Trim Center Dash XDuty w/Gas Cylinder Stays
O	1339-102	<b>TRIM LEFT HAND DASH</b>	Trim LH Dash XDuty
O	1321-004	<b>TRIM RIGHT HAND DASH</b>	Trim RH Dash XDuty Glove Cmpt/MDT Prov
S	1307-002	<b>ENGINE TUNNEL TRIM</b>	Eng Tnl Trim Flr Mat
O	5040-064	<b>POWER POINT DASH MOUNT</b>	Pwr Pnt Dash Mnt Batt Dir (2) Sw Pnl/(1) Rkr Position Dual 3.1A USB Sw Pnl
O	1303-011	<b>STEP TRIM</b>	Step Trim Grip Strut Lwr TPlt Mid
O	1379-003	<b>UNDER CAB ACCESS DOOR</b>	Under Cab Access Door Rear Step LH Painted
S	1102-013	<b>INTERIOR DOOR TRIM</b>	Interior Door Trim Painted
S	1323-001	<b>DOOR TRIM CUSTOMER NAMEPLATE</b>	Door Trim Customer Nameplate
S	1105-001	<b>CAB DOOR TRIM REFLECTIVE</b>	Cab Dr Trim Reflective Vert Stripe/6" Chevron w/Logo
S	1308-001	<b>INTERIOR GRAB HANDLE "A" PILLAR</b>	Interior Grab Handle 'A' Pillar 11" Molded
S	1332-008	<b>INTERIOR GRAB HANDLE FRONT DOOR</b>	Interior Grab Handle Frt Door Horiz 9"
O	1345-002	<b>INTERIOR GRAB HANDLE REAR DOOR</b>	Int Grab Handle Rr Dr Alum Window Span 30" Black Powder Coat
O	1319-019	<b>ADDITIONAL INTERIOR GRAB HANDLE REAR DOOR</b>	Addl Cab Int Grab Hndl Rr Dr Diag 30" Grab Bar
O	1347-028	<b>INTERIOR REAR WALL COMPARTMENT</b>	Int Rr Wall Cmpt L/R Outer OEM Installed APS Provisional Clear Area
O	1301-001	<b>INTERIOR SOFT TRIM COLOR</b>	Interior Soft Trim Color Black
O	1337-004	<b>INTERIOR TRIM SUNVISOR</b>	Interior Trim Sunvisor Vinyl Black
S	1304-001	<b>INTERIOR FLOOR MAT COLOR</b>	Interior Floor Mat Color Gray
O	1335-018	<b>CAB PAINT INTERIOR DOOR TRIM</b>	Cab Paint Int Dr Trim Multi-tone Onyx Black
O	1371-021	<b>HEADER TRIM INTERIOR PAINT</b>	Header Trim Interior Paint Multi-tone Onyx Black
O	1370-023	<b>TRIM CENTER DASH INTERIOR PAINT</b>	Trim Center Dash Interior Paint Multi-tone Onyx Black
O	1378-022	<b>TRIM LEFT HAND DASH INTERIOR PAINT</b>	Trim LH Dash Interior Paint Multi-tone Onyx Black
O	1373-022	<b>TRIM RIGHT HAND DASH INTERIOR PAINT</b>	Trim RH Dash Interior Paint Multi-tone Onyx Black
S	1344-002	<b>DASH PANEL GROUP</b>	Dash Pnl Group 3-Pnl
O	1312-037	<b>SWITCHES CENTER PANEL</b>	Switches Ctr Pnl 3 Upr LH
O	1313-003	<b>SWITCHES LEFT PANEL</b>	Switches Left Pnl 3 (1+2) Headlight/Dimmer/Wiper
S	1314-001	<b>SWITCHES RIGHT PANEL</b>	Switches Right Pnl 0

## CAB SEATS

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S	1225-007	<b>SEAT BELT WARNING</b>	Seat Belt Warn Vista Display w/VDR
O	1237-002	<b>SEAT MATERIAL</b>	Seat Material Vinyl
O	1243-003	<b>SEAT COLOR</b>	Seat Color Black/Red Seat Belts
S	1249-001	<b>SEAT BACK LOGO</b>	Seat Back Logo Spartan
O	1201-037	<b>SEAT DRIVER</b>	Seat Driver Bostrom Firefighter 2-Way Manual 500 Series ABTS
S	1213-025	<b>SEAT BACK DRIVER</b>	Seat Back Driver Non-SCBA ABTS

S	1219-001	<b>SEAT MOUNTING DRIVER</b>	Seat Mounting Driver
S	8102-103	<b>OCCUPANT PROTECTION DRIVER</b>	Occupant Protection Driver Advanced Protection System
S	1202-037	<b>SEAT OFFICER</b>	Seat Officer Bostrom Firefighter Fixed 500 Series ABTS
O	1214-034	<b>SEAT BACK OFFICER</b>	Seat Back Officer SCBA IMMI SmartDock
O	1220-003	<b>SEAT MOUNTING OFFICER</b>	Seat Mounting Officer Rwd 2"
S	8103-103	<b>OCCUPANT PROTECTION OFFICER</b>	Occupant Protection Officer Advanced Protection System
O	1273-001	<b>SEAT BELT ORIENTATION CREW</b>	Seat Belt Orientation Crew Outboard Shoulder To Inboard Hip
O	1263-001	<b>SEAT REAR FACING OUTER LOCATION</b>	Seat RFO Location (2) R/L
O	1203-020	<b>SEAT CREW REAR FACING OUTER</b>	Seat Crew RFO Bostrom Firefighter Fixed 500 Series
O	1215-031	<b>SEAT BACK REAR FACING OUTER</b>	Seat Back RFO SCBA IMMI SmartDock
O	1221-009	<b>SEAT MOUNTING REAR FACING OUTER</b>	Seat Mounting RFO Rwd 2"
O	8104-103	<b>OCCUPANT PROTECTION RFO</b>	Occupant Protection RFO Advanced Protection System
O	1264-005	<b>SEAT REAR FACING CENTER LOCATION</b>	Seat RFC Location Ctr
O	1204-015	<b>SEAT CREW REAR FACING CENTER</b>	Seat Crew RFC Bostrom Firefighter 500 Series Fixed
O	1216-029	<b>SEAT BACK REAR FACING CENTER</b>	Seat Back RFC SCBA IMMI SmartDock
O	1222-002	<b>SEAT MOUNTING REAR FACING CENTER</b>	Seat Mounting Rear Facing Center
O	8105-102	<b>OCCUPANT PROTECTION RFC</b>	Occupant Protection RFC Advanced Protection System
O	1267-101	<b>SEAT FRAME REAR FACING CENTER</b>	Seat Frame Rear Facing Center Dual
O	1280-103	<b>SEAT FRAME REAR FACING CENTER STORAGE ACCESS</b>	Seat Frame Rear Facing Center Storage Access Solid Dr
O	1311-108	<b>CAB FRONT UNDERSEAT STORAGE ACCESS DOOR</b>	Cab Frt Undrst Strg Acc Dr Vented
O	1355-023	<b>SEAT COMPARTMENT DOOR FINISH</b>	Seat Compartment Door Finish Multi-tone Onyx Black

## **CAB EXTERIOR**

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S	1511-100	<b>WINDSHIELD WIPER SYSTEM</b>	Windshield Wiper System
S	1534-002	<b>ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR</b>	Electronic Windshield Fluid Level Indicator
O	1103-004	<b>CAB DOOR HARDWARE</b>	Cab Door Hardware Chrome w/Scuff Plate
S	1111-001	<b>DOOR LOCKS</b>	Door Locks Manual
O	1115-002	<b>DOOR LOCK LH REAR CAB COMPARTMENT</b>	Door Lock LH Rear Cab Compartment Manual
O	1116-002	<b>DOOR LOCK RH REAR CAB COMPARTMENT</b>	Door Lock RH Rear Cab Compartment Manual
O	1503-003	<b>GRAB HANDLES</b>	Grab Handles SS 18" w/Scuff Plate
O	1527-002	<b>AUXILIARY GRAB HANDLE</b>	Aux Grab Handle 7" SS Cab Face Ctr
O	1504-016	<b>REARVIEW MIRRORS</b>	Mirror Aerodynamic Retractable 613315 Rmt Htd Ltd
O	1529-003	<b>REARVIEW MIRROR HEAT SWITCH</b>	Rearview Mirror Heat Sw MUX
O	1506-002	<b>TRIM LOWER SIDE</b>	Trim Lower Side SS 10"H
O	1513-010	<b>CAB FENDER</b>	Cab Fender Alum Wide
O	1514-002	<b>MUD FLAPS FRONT</b>	Mud Flaps Frt
O	1526-025	<b>CAB EXTERIOR FRONT &amp; SIDE EMBLEMS</b>	Cab Ext Frt & Side Emblems Spartan w/APS Shiploose

## START / CHARGING SYSTEMS

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S	5109-001	<b>IGNITION</b>	Ign Mstr Sw w/Keyless Start
S	5101-020	<b>BATTERY</b>	Batt (3) Group 31 Harris
S	5106-001	<b>BATTERY TRAY</b>	Batt Tray LH Steel
S	5107-002	<b>BATTERY BOX COVER</b>	Batt Box Cover LH Steel w/Black Handle
S	5102-001	<b>BATTERY CABLE</b>	Batt Cables
S	5108-002	<b>BATTERY JUMPER STUD</b>	Batt Jumper Stud Frt LH Lwr Step
S	5104-001	<b>ALTERNATOR</b>	Alternator Leece-Neville 270A
S	5105-001	<b>STARTER MOTOR</b>	Starter Motor Delco

## LINE VOLTAGE ELECTRICAL POWER DISTRIBUTION

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O	5202-004	<b>BATTERY CONDITIONER</b>	Batt Cond Kussmaul 1200 LH RFO Seat Position
O	5203-002	<b>BATTERY CONDITIONER DISPLAY</b>	Batt Cond Display LH Mid Glass
O	3314-006	<b>AUXILIARY AIR COMPRESSOR</b>	Aux Air Cmp Kussmaul Auto Pump 120V Bhd Off Seat Mnt Horiz
O	5204-055	<b>ELECTRICAL INLET</b>	Elec Inlet 120V 20A Auto Eject
O	5209-002	<b>ELECTRICAL INLET LOCATION</b>	Elec Inlet Location LH Cab Side Mid
O	5210-005	<b>ELECTRICAL INLET CONNECTION</b>	Elec Inlet Conn to Batt Conditioner & Air Pump
O	5206-002	<b>ELECTRICAL INLET COLOR</b>	Elec Inlet Color Yellow

## LIGHTING

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S	5301-100	<b>HEADLIGHTS</b>	Headlights 4 Headlamps Halogen
O	5303-026	<b>FRONT TURN SIGNALS</b>	Frt Turn Signals Whelen M6 LED Above Frt Warn
O	5337-002	<b>HEADLIGHT LOCATION</b>	Headlights Above Frt Warn Lts
S	5336-003	<b>SIDE TURN/MARKER LIGHTS</b>	Side Turn/Marker Lts LED
O	5348-003	<b>REAR CAB WALL TURN SIGNALS</b>	Rear Cab Wall Turn Signals Whelen M6 LED 18" High
S	5302-003	<b>MARKER &amp; ICC LIGHTS</b>	Marker & ICC Lts Face Mnt LED
O	5350-087	<b>HEADLIGHT AND MARKER LIGHT ACTIVATION</b>	Hdlt & Mrkr Lt Actv Hdlt Eng On/Mom Rkr Sw Override
S	5308-010	<b>GROUND LIGHTS</b>	Ground Lts LED Resp Side Dr & Vista
S	5309-003	<b>LOWER CAB STEP LIGHTS</b>	Lwr Cab Step Lts LED
S	5382-002	<b>INTERMEDIATE STEP LIGHTS</b>	Intermediate Step Lts LED
O	5319-010	<b>UNDER BUMPER LIGHTS</b>	Under Bmpr Lts 4" LED Prk Brk
S	5312-003	<b>ENGINE COMPARTMENT LIGHT</b>	Engine Cmpt Work Lt LED (1)
O	5403-062	<b>LIGHTBAR PROVISION</b>	Lightbar Prov Wire & Lwr Mnt Spartan Supply
O	5450-359	<b>CAB FRONT LIGHTBAR</b>	Cab Frt Ltbar Whelen Freedom F4N72QLED 6R2C6B Layout 1
O	5426-003	<b>LIGHTBAR SWITCH</b>	Lightbar Sw Vista
O	5317-196	<b>FRONT SCENE LIGHTS</b>	Frt Scene Lts Whelen Pioneer 12V LED PFH2
O	5335-003	<b>FRONT SCENE LIGHTS ACTIVATION</b>	Frt Scene Lts Actv Vista
O	5329-003	<b>FRONT SCENE LIGHT LOCATION</b>	Frt Scene Lt Loc Ctr Brow Pos
O	5306-060	<b>SIDE SCENE LIGHTS</b>	Side Scene Lts Whelen M9 Series 12V LED
O	5318-023	<b>SIDE SCENE LIGHT LOCATION</b>	Side Scene Lt Loc Upper Mid Fwd 24" Roof Position
O	5316-008	<b>SIDE SCENE ACTIVATION</b>	Side Scene Actv Indv Vista Buttons & Resp Side Doors
S	5305-157	<b>INTERIOR OVERHEAD LIGHTS</b>	Interior Overhead Lts Weldon LED w/Front Map Lts/MUX Actv
O	5324-130	<b>AUXILIARY DOME LIGHT MID CREW</b>	Aux Dome Lt Mid Crew (2) Blue Rr Dr/Toggle Sw Actv

- O 5325-167 **AUXILIARY DOME LIGHT REAR CREW** Aux Dome Lt Rr Crew PPHE (4) Whelen Red/Clear LED 6" Round,Clr Rr Dr Actv
- O 5310-004 **MAP LIGHTS** Map Lt Federal Signal RH Dash

## OPTICAL WARNING DEVICES

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- S 5406-076 **DO NOT MOVE APPARATUS LIGHT** Do Not Move App Lt Flashing Red Whelen Ion LED w/Alarm
- S 5422-002 **MASTER WARNING SWITCH** Mstr Warn Sw MUX
- S 5409-002 **HEADLIGHT FLASHER** Headlight Flasher Alternating
- S 5425-003 **HEADLIGHT FLASHER SWITCH** Headlight Flasher Sw MUX
- O 5401-032 **INBOARD FRONT WARNING LIGHTS** Inboard Frt Warn Lts Whelen M6 LED Chrm Bezel
- O 5413-021 **INBOARD FRONT WARNING LIGHTS COLOR** Inboard Frt Warn Lts Color Red LH/Blue RH w/Clr Lens
- O 5414-027 **OUTBOARD FRONT WARNING LIGHTS** Outboard Frt Warn Lts Whelen M6 LED PinWheel Variable Pattern Chrm Bezel
- O 5415-018 **OUTBOARD FRONT WARNING LIGHTS COLOR** Outboard Frt Warn Lts Color Red LH/Blue RH w/Clr Lens
- O 5423-004 **FRONT WARNING SWITCH** Frt Warn Sw On w/Mstr Warn Sw
- O 5404-027 **INTERSECTION WARNING LIGHTS** Intersection Warn Lts Whelen M6 Super LED
- O 5419-028 **INTERSECTION WARNING LIGHTS COLOR** Int Warn Lts Color Red LH/Blue RH w/Clr Lens
- O 5420-010 **INTERSECTION WARNING LIGHTS LOCATION** Intersection Warn Lts Location Bumper Prewire & Shiploose
- O 5402-029 **SIDE WARNING LIGHTS** Side Warn Lts Whelen M6 Super LED
- O 5418-031 **SIDE WARNING LIGHTS COLOR** Side Warn Lts Color Red LH/Blue RH w/Clr Lens
- O 5412-002 **SIDE WARNING LIGHTS LOCATION** Side Warn Lts Location Lwr Mid
- O 5424-004 **SIDE AND INTERSECTION WARNING SWITCH** Side & Intersection Warn Sw On w/Mstr Warn
- O 5405-071 **TRAFFIC CONTROL** Traffic Ctrl Tomar 3065 Emitter Rf Mnt LH Sd Mstr Warn Ctrl
- O 5407-003 **INTERIOR DOOR OPEN WARNING LIGHTS** Int Dr Open Warn Lts Red Truck-Lite 4" LED Flsh

## AUDIBLE WARNING DEVICES

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- O 5510-006 **SIREN CONTROL HEAD** Siren Ctrl Head Whelen 295HFSA7
- O 5514-005 **HORN BUTTON SELECTOR SWITCH** Horn Btn Sel Sw Elec Horn/Air Horn MUX
- O 5512-018 **AIR HORN ACTIVATION** Air Horn Actv Strg Whl/L/R Lanyard
- S 5505-002 **BACK-UP ALARM** Back-Up Alarm Ecco 575

## INSTRUMENTATION

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- S 5601-041 **INSTRUMENTATION** Instrumentation Standard
- O 5624-004 **BACKLIGHTING COLOR** Backlighting Color Blue

## COMMUNICATIONS SYSTEMS

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- O 5701-056 **RADIO** Radio Jensen WB/AM/FM/CD/iPod/Sat Ovrhd LH
- O 5707-002 **AM/FM ANTENNA** AM/FM Antenna LH Fwd Cab Roof
- O 5706-036 **CAMERA** Cam Rr Box/RH Teardrop on Vista
- O 5703-022 **COMMUNICATION ANTENNA** Comm Ant Base RH Fwd Cab Rf w/Antenex VHF Ant Spartan Sply

O	5708-002	<b>COMMUNICATION ANTENNA CABLE ROUTING</b>	Comm Ant Cable Routing Under RH Frt Seat
S	5020-001	<b>PANEL LAYOUT</b>	Panel Layout

## **ADDITIONAL EQUIPMENT**

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S	8814-002	<b>CAB EXTERIOR PROTECTION</b>	Cab Exterior Protection Front
S	8806-001	<b>FIRE EXTINGUISHER</b>	Fire Extinguisher Shiploose
S	8810-001	<b>DOOR KEYS</b>	Door Keys for Manual Locks (4)
S	8811-003	<b>DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION</b>	Diagnostic Software Occupant Protection Advanced Protection System

## **SALES ADMIN**

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S	8003-155	<b>WARRANTY</b>	Warranty Cab and Chassis 2019 (2) Year
S	8030-006	<b>CHASSIS OPERATION MANUAL</b>	Chassis Operation Manual Digital Copy (2)
S	8031-024	<b>ENGINE &amp; TRANSMISSION OPERATION MANUAL</b>	Eng & Trans Operation Man Eng Hard Copy/Trans Digital/Eng Owner Digital
S	8805-007	<b>CAB/CHASSIS AS BUILT WIRING DIAGRAMS</b>	Cab/Chassis As Built Wiring Diagrams Digital Copy (2)
S	8039-001	<b>SALES TERMS</b>	Sales Terms

## **ENGINEERING**

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O	9005-002	<b>DRIVELINE LAYOUT CONFIRMATION</b>	Driveline Layout Confirmation Required
O	2124-002	<b>EFCM/REAR CROSSMEMBERS</b>	End of Frame Cross Member

# *Specification*

0100-011

## **MODEL**

The chassis shall be a Metro Star model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

8011-019

## **MODEL YEAR**

The chassis shall have a vehicle identification number that reflects a 2019 model year.

8001-001

## **COUNTRY OF SERVICE**

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. Spartan Chassis is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

8017-001

## **CAB AND CHASSIS LABELING LANGUAGE**

The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in English.

8006-009

## **APPARATUS TYPE**

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 750 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

8008-001

## **VEHICLE TYPE**

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

8008A-000

### **VEHICLE ANGLE OF APPROACH PACKAGE**

The angle of approach of the apparatus shall be a minimum of 8.00 degrees.

NFPA1901 Angle of Approach definition:

“To determine the angle of approach, place a thin steel strip against the front of the tires where they touch the ground or stretch a tight string from one front tire to the other at the front where they touch the ground. Determine the lowest point (component or equipment) on the vehicle forward of the front tire that would make the smallest angle of approach. Hang a plumb bob from the lowest point and mark the point on the ground where the point of the plumb bob touches. Measure the vertical distance from the ground to the point where the plumb bob was hung (distance  $V$ ). Measure the horizontal distance from the plumb bob point to the steel strip or string running from front tire to front tire (distance  $H$ ). Divide the vertical distance by the horizontal distance. The ratio of  $V/H$  is the tangent of the angle of approach. If the ratio is known, the angle of approach can be determined from a table of trigonometric functions of angles or from a math calculator. The standard requires a minimum angle of approach of 8.00 degrees: since the tangent of 8.00 degrees is 0.1405, if  $V$  divided by  $H$  is 0.1405 or larger, the angle of approach is 8.00 degrees or greater.”

0104-001

### **AXLE CONFIGURATION**

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

0101-004

### **GROSS AXLE WEIGHT RATINGS FRONT**

The front gross axle weight rating (GAWR) of the chassis shall be 21,500 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

0102-004

### **GROSS AXLE WEIGHT RATINGS REAR**

The rear gross axle weight rating (GAWR) of the chassis shall be 27,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

8010-101

### **PUMP PROVISION**



The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location. Chassis driveline pump provisions shall include an interlock feature for automatic setting of the park brake when the vehicle is shifted into pump mode while the transmission is in neutral. When the conditions are met the driver side parking brake valve shall activate. Once shifted to road mode the condition for electric automatic brake engagement is no longer present and the driver's parking brake control valve shall function normally.

8009-004

#### **WATER & FOAM TANK CAPACITY**

The chassis shall include a carrying capacity of up to 750 gallons (2839 liters). The water and/or foam tank(s) shall be supplied and installed by the apparatus manufacturer.

1000-024

#### **CAB STYLE**

The cab shall be a custom, fully enclosed, LFD model with a 24.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to ten (10) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 144.60 inches with 67.50 inches from the centerline of the front of the axle to the back of the cab.



The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner and a rear floor to headliner height of 79.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 65.38 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 71.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 32.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.75 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 12.80 inches.

8101-105

### **OCCUPANT PROTECTION**

The vehicle shall include the Advanced Protection System™ (APS) which shall secure belted occupants and increase the survivable space within the cab. The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The system components shall include:

- Driver steering wheel airbag
- Driver dual knee air bags (patent pending) with energy management mounting (patent pending) and officer knee airbag.
- Large driver, officer, and crew area side curtain airbags

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around the occupants, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries
- Heavy truck Restraints Control Module (RCM) - receives inputs from the outboard sensors, selectively deploys APS systems, and records sensory inputs immediately before and during a detected qualifying event
- Integrated outboard crash sensors mounted at the perimeter of the vehicle - detects a qualifying front or side impact event and monitors and communicates vehicle status and real time diagnostics of all critical subsystems to the RCM
- Fault-indicating Supplemental Restraint System (SRS) light on the driver's instrument panel

Frontal impact protection shall be provided by the outboard sensors and the RCM. In a qualifying front impact event the outboard sensors provide inputs to the RCM. The RCM activates the steering wheel airbag, driver side dual knee airbags (patent pending), officer side knee airbag, and advanced seat belts for each occupant in the cab.

Rollover, side impact, and ejection mitigation shall be provided by the outboard sensors and the RCM. In qualifying rollover or side impact events the outboard sensors provide inputs to the RCM. The RCM activates the side curtain airbags and advanced seat belts for each occupant in the cab. The RCM measures roll angle, lateral acceleration, and roll rate to determine if a rollover event or side impact event is imminent or occurring.

In the event of a qualifying offset or other non-frontal impact, the RCM shall determine and intelligently deploy the front impact protection system, the side impact protection system, or both front and side impact protection systems based on the inputs received from the outboard crash sensors.

1501-002

### **CAB FRONT FASCIA**

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

1518-025

### **FRONT GRILLE**

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

1551-002

### **CAB UNDERCOAT**

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

1552-002

### **CAB SIDE DRIP RAIL**

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

1521-002

### **CAB PAINT EXTERIOR**

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper followed by sealing the seams with SEM brand seam sealer.

The cab shall then be painted the specific color designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene. The paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

1533-001

### **CAB PAINT MANUFACTURER**

The cab shall be painted with PPG Industries paint.

1522-800

### **CAB PAINT PRIMARY/LOWER COLOR**

The primary/lower paint color shall be PPG FBCH 926234 red.

1523-550

**CAB PAINT SECONDARY/UPPER COLOR**

The secondary/upper paint color shall be PPG FBCH 929925 white.

1524-002

**CAB PAINT EXTERIOR BREAKLINE**

The upper and lower paint shall meet at a breakline on the cab which shall be located approximately 1.00 inch below the door windows on each side of the cab. The breakline shall curve down at the front cab corners to approximately 5.00 inches below the windshields on the front of the cab.

1515-002

**CAB PAINT PINSTRIPE**

A 0.50 inch wide gold reflective tape with black borders shall be applied on the break line between the two different colored surfaces.

8013-042

**CAB PAINT WARRANTY**

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

1334-039

**CAB PAINT INTERIOR**

The visible interior cab structure surfaces shall be painted with a multi-tone onyx black texture finish.

1005-001

**CAB ENTRY DOORS**

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

1101-101

**CAB ENTRY DOOR TYPE**

All cab entry doors shall be full length in design to fully enclose the lower cab steps. Entry doors shall include Pollak mechanical plunger style switches for electrical component activation.

1322-002

**CAB INSULATION**

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

1001-004

**REAR CAB ROOF MODIFICATION**

The standard cab roof and rear wall shall be modified. The upper rear portion of the cab shall include a full width X 23.00 inches deep X 31.25 inches high cover which extends from the 24.00 inch raised roof out away from the cab to house the top mount pump panel. The extension shall be constructed of Marine Grade 5052-H32, 0.09 inch thick aluminum.

1540-101

**LH EXTERIOR REAR COMPARTMENT**

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

5313-002

**LEFT HAND EXTERIOR REAR COMPARTMENT LIGHTING**

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the left side of the cab. The strip light shall be 10.00 inches long and shall include three (3) bright white Gen3 LEDs.

1548-015

**LH EXTERIOR COMPARTMENT INTERIOR FINISH**

The interior of the left hand exterior compartment shall have a multi-tone onyx black texture finish.

1541-101

**RH EXTERIOR REAR COMPARTMENT**

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 21.19 inches high. The compartment size shall be 11.34 inches wide X 21.19 inches high X 21.19 inches deep. The compartment shall have a 10.63 inch wide, 32.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

5345-002

### **RIGHT HAND EXTERIOR REAR COMPARTMENT LIGHTING**

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 10.00 inches long and shall include three (3) bright white Gen3 LEDs.

1549-015

### **RH EXTERIOR COMPARTMENT INTERIOR FINISH**

The interior of the right hand exterior compartment shall have a multi-tone onyx black texture finish.

1007-002

### **PUMP PANEL CUTOUT**

The rear wall of the cab shall include a cut out which allows for the pump panel of the apparatus body to protrude into the cab providing an enclosed operation area within the cab. The cutout shall be 70.00 inches wide and 25.50 inches tall from the bottom of the pump panel hood extension.

9001-006

### **CAB TEST INFORMATION**

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

5000-018

### **ELECTRICAL SYSTEM**

The chassis shall include a single starting electrical system which shall include a 12 volt direct current multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit

minimum high temperature flame retardant loom. All nodes and sealed Deutsch connectors shall be waterproof.

5006-002

### **APPARATUS WIRING PROVISION**

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

5005-212

### **MULTIPLEX DISPLAY**

The multiplex electrical system shall include three (3) Weldon Vista IV displays which shall be located one (1) in the left hand side of the dash in the switch panel and one (1) in the right hand side of the dash in the switch panel. The third panel mount style display screen shall be shipped loose for customer installation. The Vista IV displays shall feature full color LCD display screens which include a message bar displaying the time of day and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be eight (8) push button virtual controls, four (4) on each side of the display for the on-board diagnostics. The display screens shall be video ready for back-up cameras, thermal cameras, and DVD.

The Vista IV displays shall offer varying fonts and background colors. The displays shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

5046-048

### **MULTIPLEX DISPLAY SPECIAL LAYOUT**

The Vista display and control screen shall be configured specifically to include a momentary button labeled HOT. This momentary button shall set the HVAC mode to defrost, set the temp to max heat, and turn the front fans to high. The momentary button shall be located on the home screen.

To change the temperature, fan speed, or mode including off the user must go to the HVAC menu.

5004-002

### **LOAD MANAGEMENT SYSTEM**

The apparatus load management shall be performed by the included multiplex system. The multiplex system shall also feature the priority of sequences and shall shed electrical loads based on the priority list specifically programmed.

5622-003

### **DATA RECORDING SYSTEM**

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

5031-010

#### **ACCESSORY POWER**

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud.

An OEM body connections bracket shall be installed on the chassis near the left hand battery box. The bracket shall include one (1) set each of 200 amp master power switched and 300 amp battery direct fused power and ground studs.

5030-009

#### **AUXILIARY ACCESSORY POWER**

An auxiliary set of power and ground studs shall be provided and installed behind the officer seat and shall be wired to a 40 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 40 amp battery direct load.

5032-019

#### **ADDITIONAL ACCESSORY POWER**

An additional set of power and ground studs shall be provided and installed behind the officer's seat. The power and ground studs shall be circuit protected with a 40 amp breaker. The studs shall be 0.38 inch diameter and be capable of carrying up to a 40 amp battery master switched load.



5011-001

**EXTERIOR ELECTRICAL TERMINAL COATING**

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

1701-156

**ENGINE**

The chassis engine shall be a Cummins L9 engine. The L9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 380 horse power at 2000 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1150 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.

The L9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2017 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CK-4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

1329-001

**CAB ENGINE TUNNEL**

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

1731-002

**DIESEL PARTICULATE FILTER CONTROLS**

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

1718-002

**ENGINE PROGRAMMING HIGH IDLE SPEED**

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

1719-005

## **ENGINE HIGH IDLE CONTROL**

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indicator on the Vista display and control screen for the high idle speed control.

1710-001

## **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

The engine shall include programming which will govern the top speed of the vehicle.

1713-005

## **AUXILIARY ENGINE BRAKE**

The engine shall utilize a variable geometry turbo (VGT). The VGT auxiliary engine brake shall be an integral part of the turbo and shall offer a variable rate of exhaust flow, which when activated shall slow the engine and in turn slow the vehicle.

The VGT shall actuate the vehicle's brake lights when engaged as an auxiliary brake. A cutout relay shall be installed to disable the VGT when in pump mode or when an ABS event occurs. The VGT engine brake shall activate at a 0% accelerator throttle position when in operation mode.

1708-002

## **AUXILIARY ENGINE BRAKE CONTROL**

An engine variable geometry turbo brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The variable geometry turbo brake control shall be controlled through an on/off rocker switch.

1720-003

## **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

1715-001

**FLUID FILLS**

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

1735-001

**ENGINE DRAIN PLUG**

The engine shall include an original equipment manufacturer installed oil drain plug.

8002-001

**ENGINE WARRANTY**

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

1706-011

**REMOTE THROTTLE CONTROL**

A Fire Research In Control 400 pressure sensor governor shall be provided for the electronic engine. It shall include a remote mountable control head.

The In Control shall regulate the pump pressure and monitor all essential engine parameters.

LED readouts shall display RPM, PSI, pump discharge and intake pressure, engine oil pressure, engine temperature, transmission temperature and battery voltage. An audible alarm out put shall also be part of the system.

The rpm increase and decrease will be controlled by control knob on the face of the In Control 400.

1707-130

**REMOTE THROTTLE HARNESS**

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Fire Research In Control 300/400 pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set. The harness shall be designed for a top mount pump panel.

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate “Pump Engaged” and “OK to Pump” indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

1721-001

### **ENGINE PROGRAMMING REMOTE THROTTLE**

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

1727-001

### **ENGINE PROGRAMMING IDLE SPEED**

The engine low idle speed will be programmed at 700 rpm.

2704-002

### **ENGINE FAN DRIVE**

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.

2701-019

### **ENGINE COOLING SYSTEM**

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer fan with a three (3) piece fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and rearward oriented sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel "constant torque" style clamps meeting the engine manufacturer's requirements.

The radiator and charge air cooler shall be removable through the bottom of the chassis.

2711-005

### **ENGINE COOLING SYSTEM PROTECTION**

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame components.

2708-001

### **ENGINE COOLANT**

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

2707-002

### **ENGINE COOLANT FILTER**

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

2706-003

## **ELECTRONIC COOLANT LEVEL INDICATOR**

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

2705-004

## **ENGINE PUMP HEAT EXCHANGER**

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

The engine pump heat exchanger shall include a pre-plumbed 38.00 feet long hose loop from the engine supply to the engine return port. The loop shall be .38 inches outer diameter black nylon tube using 90.00 degree push-to-connect fittings at the exchanger. The loop shall extend back and be tied up on the frame behind the cab for easy access to cut and connect the lines during pump installation.

2709-004

## **COOLANT HOSES**

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

2710-002

## **ENGINE COOLANT OVERFLOW BOTTLE**

A remote engine coolant overflow bottle shall be provided in the case of over filling the coolant system. The overflow bottle shall capture the expansion fluid or overflow rather than allow the fluid to drain on the ground. The overflow bottle provided on the cooling system shall only be a catch bottle and shall not return excess coolant back into the surge tank.

2801-009

## **ENGINE AIR INTAKE**

The engine air intake system shall include an ember separator air intake filter which shall be located behind the right hand side headlamp. This filter ember separator shall be designed to protect the downstream air filter from embers, using a combination of unique flat and crimped metal screens packaged in a corrosion resistant heavy duty galvanized steel frame. This multilayered screen shall be design traps embers and allows them to burn out before passing through the pack.

The engine air intake system shall also include a stainless steel air cleaner mounted to the frame and located beneath the cab on the right side of the vehicle. The air cleaner shall utilize a replaceable filter element designed to prevent dust and debris from being ingested into the engine. The air cleaner housing

and connections in the air intake system shall be designed to mitigate water intrusion into the system during severe weather conditions.

The air intake system shall also include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

2802-003

### **AIR INTAKE PROTECTION**

A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame components.

2901-068

### **ENGINE EXHAUST SYSTEM**

The exhaust system shall include an end-in end-out horizontally mounted single module after treatment device, downpipe from the charge air cooled turbo. The single module shall include four temperature sensors, diesel particulate filter (DPF), urea dosing module (UL2), and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be mixed and injected into the system through the between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The single module after treatment through the end of the tailpipe shall be connected with zero leak clamps. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system after treatment module shall be mounted below the frame in the inboard position.

2907-003

### **DIESEL EXHAUST FLUID TANK**

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

2902-030

## **ENGINE EXHAUST ACCESSORIES**

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

The tail pipe shall have a drop in it to allow additional clearance from the body.

2906-002

## **ENGINE EXHAUST WRAP**

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

1801-015

## **TRANSMISSION**

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be:

1st	3.49:1
2nd	1.86:1
3rd	1.41:1
4th	1.00:1
5th	0.75:1
6th	0.65:1 (if applicable)
Rev	5.03:1

1806-002

## **TRANSMISSION MODE PROGRAMMING**

The transmission, upon start-up, will select the fifth speed operation without the need to press the mode button.

1811-004

## **TRANSMISSION FEATURE PROGRAMMING**

The Allison Gen V-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the



park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

<u>Function ID</u>	<u>Description</u>	<u>Wire assignment</u>
Inputs		
C	PTO Request	142
J	Fire Truck Pump Mode (4th Lockup)	122 / 123
Outputs		
C	Range Indicator	145 (4th)
G	PTO Enable Output	130
	Signal Return	103

1815-002

### **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

1807-005

### **TRANSMISSION SHIFT SELECTOR**

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

1814-002

### **TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE**

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

1808-007

### **TRANSMISSION COOLING SYSTEM**

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

1817-001

**TRANSMISSION DRAIN PLUG**

The transmission shall include an original equipment manufacturer installed magnetic transmission fluid drain plug.

8005-001

**TRANSMISSION WARRANTY**

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.

2004-004

**LH PTO**

A PTO shall be installed on the transmission by the OEM.

2001-108

**LH PTO MODEL**

A ten (10) bolt Chelsea model 280-GSFJP-B8RK heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides an intermittent and continuous torque rating of 265 lb. ft.

2010-004

**RH PTO**

A PTO shall be installed on the transmission by the OEM.

2008-078

**RH PTO MODEL**

A ten (10) bolt Chelsea model 280-GDFJP-B5RK heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides an intermittent and continuous torque rating of 390 lb. ft.

2005-009

**PTO LOCATION**

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.

3001-001

**DRIVELINE**

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

3005-022

**MIDSHIP PUMP / GEARBOX**

A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid-ship split shaft pump as specified by the apparatus manufacturer. Holes shall be provided as specified by the OEM for mounting a Darley brand pump.

See PDF for specific hole pattern.

3008-085

**MIDSHIP PUMP / GEARBOX MODEL**

The midship pump/gearbox provisions shall be for a Waterous CSUC20 pump.

3048-007

**MIDSHIP PUMP GEARBOX DROP**

The Waterous pump gearbox shall have a “C” (medium length) drop length.

3009-007

**MIDSHIP PUMP RATIO**

The ratio for the midship pump shall be 2.27:1.

3010-1125

**MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE**

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 112.50 inches.

5013-014

**PUMP SHIFT CONTROLS**

One (1) air pump shift control panel shall be mounted in the lower left section of the center dash panel. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided

and located so it can be read from the driver's position per NFPA **16.10.1.3**. The road mode shall be selected when the control lever is in the up position and pump mode shall be selected when the control lever is in the down position.

The control lever center position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

3049-003

### **PUMP SHIFT CONTROL PLUMBING**

Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points with threaded 0.25 inch NPT fittings on the solenoid for attaching the customer installed pump. The air supply shall be pressure protected from service brake system.

3109-059

### **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS1098 fuel filter/water separator with a thermostatically controlled integral heater as a primary filter. The fuel filter shall have a drain valve.

An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

A secondary fuel filter shall be included as approved by the engine manufacturer.

3111-001

### **FUEL LINES**

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

3104-013

### **FUEL SHUTOFF VALVE**

There shall be two (2) fuel shutoff valves which shall be installed, one (1) in the fuel draw line at the primary fuel filter and one (1) in the fuel outlet line at the primary fuel filter to allow the fuel filters to be changed without loss of fuel to the fuel pump.

3103-008

### **ELECTRIC FUEL PRIMER**

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

3101-101

### **FUEL TANK**

The fuel tank shall have a capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length.

The baffled tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with "U" straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

3130-001

### **FUEL TANK MATERIAL AND FINISH**

The fuel tank shall be constructed of 12 gauge aluminized steel. The exterior of the tank shall be powder coated black and then painted to match the frame components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 Method B, results to be 5B minimum. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H-2H. The direct impact resistance test per ASTM D2794, results to be 5B minimum.

Any proposals offering painted fuel tanks with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

3131-001

### **FUEL TANK STRAP MATERIAL**

The fuel tank straps shall be constructed of ASTM A-36 steel. The fuel tank straps shall be powder coated black and then painted to match the frame components if possible.

3102-010

### **FUEL TANK FILL PORT**

The fuel tank fill ports shall be in-line with the left and right side fill ports located in the rearward position of the fuel tank.

3115-002

### **FUEL TANK DRAIN PLUG**

A 0.5 inch NPT magnetic drain plug shall be centered in the bottom of the fuel tank.

2401-004

**FRONT AXLE**

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 21,500 pounds FAWR.

2405-002

**FRONT WHEEL BEARING LUBRICATION**

The front axle wheel bearings shall be lubricated with synthetic oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

2502-002

**FRONT SHOCK ABSORBERS**

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or “road sensing” designed shocks shall not be considered.

2501-016

**FRONT SUSPENSION**

The front suspension shall include a ten (10) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

2601-006

## **STEERING COLUMN/ WHEEL**

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a 2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

2609-002

## **ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

2603-011

## **POWER STEERING PUMP**

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type. The power steering system shall include an oil to air passive cooler.

2606-009

## **FRONT AXLE CRAMP ANGLE**

The chassis shall have a front axle cramp angle of 48-degrees to the left and 44-degrees to the right.

2610-003

## **POWER STEERING GEAR**

The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

2608-001

## **CHASSIS ALIGNMENT**

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

3401-003

## **REAR AXLE**

The rear axle shall be a Meritor model RS-25-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.63 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

3403-002

#### **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with synthetic oil.

3411-002

#### **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with synthetic oil.

3407-010

#### **REAR AXLE DIFFERENTIAL CONTROL**

A driver controlled differential lock shall be installed on the rear axle. This feature shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH. The differential lock shall be controlled by a virtual button on the Vista display and control screen. The Vista display shall also indicate when positive engagement of the differential control has occurred.

3408-008

#### **VEHICLE TOP SPEED**

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

3501-001

#### **REAR SUSPENSION**

The single rear axle shall feature a Reyco 79KB suspension which shall offer a vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

A helper spring shall be provided in addition to the standard spring pack to help prevent vehicle sway during aggressive cornering.

The rear suspension capacity shall be rated at 21,000 to 33,000 pounds.

3503-002



## **REAR SHOCK ABSORBERS**

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the rear suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or “road sensing” designed shocks shall not be considered.

3601-061

## **FRONT TIRE**

The front tires shall be Michelin 425/65R22.5 “L” tubeless radial XFE regional tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a nominal speed rating of 65 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum load capacity shall be 24,396 pounds per axle with a maximum speed of 65 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum speed capacity shall be 22,800 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

3602-012

## **REAR TIRE**

The rear tires shall be Michelin 12R-22.5 16PR "H" tubeless radial XDN2 all-weather tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a nominal speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum load capacity shall be 29,020 pounds per axle with a maximum speed of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Michelin Intermittent Service Rating maximum speed capacity shall match the nominal speed rating.

The Michelin Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

3413-513

### **REAR AXLE RATIO**

The rear axle ratio shall be 5.13:1.

3614-030

### **TIRE PRESSURE INDICATOR**

There shall be electronic chrome LED valve caps shipped loose for installation by the OEM which shall illuminate with a red LED when tire pressure drops 8psi provided. The valve caps are self-calibrating and set to the pressure of the tire upon installation.

3701-033

### **FRONT WHEEL**

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

3703-029

### **REAR WHEEL**

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 LvL One™ aluminum wheels with a polished outer surface. The inner rear wheels shall be Accuride hub piloted, 22.50 inch X 8.25 inch steel wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

3710-059

### **WHEEL PAINT**

Each of the steel wheels shall be pretreated in a zinc phosphate bath, coated with a cathode electro deposited white primer base coat (E-Coat). The E-Coat shall exceed 336 hours under industry standard ASTM salt spray testing.

The wheels then shall be powder coated in white all to be completed by the wheel supplier. The powder coat shall exceed 1,200 hours under industry standard ASTM salt spray testing.

3702-002

### **WHEEL TRIM**

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons shipped loose with the chassis for installation by the apparatus builder. The baby moons shall have cutouts for oil seal viewing when applicable.

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.

3725-003

### **WHEEL GUARDS**

The rear dual wheels shall include a plastic isolator approximately 0.04” installed between the inner and outer wheel hub to help prevent corrosion caused by metal to metal contact. There shall also be a plastic isolator between the axle hub and the wheels on both front and rear axles.

3205-014

### **BRAKE SYSTEM**

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide a service brake application in the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

A virtual style switch shall be provided and properly labeled “mud/snow”. When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

The Electronic Stability Control (ESC) unit is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicle’s motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicle’s lateral acceleration. The Controller Area Network (CAN) bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

3206-003

### **FRONT BRAKES**

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

3207-005

### **REAR BRAKES**

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type. The brakes shall feature a cast iron shoe.

3208-001

### **PARK BRAKE**

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

3204-035

### **PARK BRAKE CONTROL**

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake.

The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver. The control shall include a protective guard which shall prevent accidental activation of the parking brake and still allow proper actuation of the control.

3214-001

### **REAR BRAKE SLACK ADJUSTERS**

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual

adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

3202-005

### **AIR DRYER**

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.

3215-004

### **FRONT BRAKE CHAMBERS**

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

3210-015

### **REAR BRAKE CHAMBERS**

The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 36 brake chamber has a 36.00 square inch effective area.

3320-001

### **AIR COMPRESSOR**

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

3339-004

### **AIR GOVERNOR**

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket on the left frame rail behind the battery box.

3305-001

### **AUXILIARY AIR RESERVOIR**

One (1) auxiliary air reservoir with a 1200 cubic inch capacity shall be installed on the chassis to act as an additional reserve supply to the air system for air horn, air tool, or other non-service brake use. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

3303-010

### **MOISTURE EJECTORS**

Heated, automatic moisture ejectors with a manual drain provision shall be installed on all reservoirs of the air supply system. The manual drain provision shall include an actuation pull cable coiled and tied at each drain valve. The supplied cables when extended shall be sufficient in length to allow each drain to be activated from the side of the apparatus.

3307-001

### **AIR SUPPLY LINES**

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

3309-033

### **AIR INLET CONNECTION**

An air connection for the shoreline air inlet shall be supplied.

3349-002

### **AIR INLET LOCATION**

The air inlet shall be installed in the left hand side lower front step in the forward position.

3326-002

### **AIR INLET/ OUTLET FITTING TYPE**

The air connector supplied shall be a 0.25 inch size Tru-Flate Interchange style manual connection which is compatible with Milton 'T' style, Myers 0.25 inch Automotive style and Parker 0.25 inch 10 Series connectors.

3334-002

### **AIR TANK SPACERS**

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 1.50 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

3338-002

**REAR AIR TANK MOUNTING**

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

2103-2065

**WHEELBASE**

The chassis wheelbase shall be 206.50 inches.

2106-0530

**REAR OVERHANG**

The chassis rear overhang shall be 53.00 inches.

2101-002

**FRAME**

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

Proposals calculating the frame strength using the "box method" shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

8007-024

### **FRAME WARRANTY**

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.

2111-124

### **MISCELLANEOUS FRAME OPTIONS**

The frame shall include hole patterns which shall be specific to Crimson Vibratorque style body mounting. There shall be nine (9) mounting locations forward of the centerline of rear axle, and seven (7) mounting locations rearward of the centerline of rear axle, and one (1) mounting location centered over the centerline of rear axle.

See PDF for OEM specified pattern.

2118-004

### **REAR TOW DEVICE**

The frame rails shall contain (6) holes per frame in a pattern specified by the OEM for mounting Spartan ERV tow eyes at the rear of the frame at a location defined by the OEM.

2110-201

### **FRAME PAINT**

The frame rails shall be hot dip galvanized prior to assembly and attachment of any components. The components that shall be galvanized shall include:

- Main frame "C" channel or channels

The frame parts which are not galvanized shall be powder coated prior to any attachment of components. Parts which shall be powder coated shall include but are not limited to:

- Steering gear bracket



- Front splayed rails and fish plates
- Bumper extensions
- Cross members
- Cross member gussets
- Fuel tank mounting brackets
- Fuel tank straps (unless material/finish is specified in 3130 subcat)
- Air tanks (unless color coded tanks are specified in 3205 subcat)
- Air tank mounting brackets
- Exhaust mounting brackets
- Air cleaner skid plate
- Radiator skid plate
- Battery supports, battery trays and battery covers

Other non-galvanized under carriage components which are received from the suppliers with coatings already applied shall include but are not limited to:

- Suspension components
- Front and rear axles

All powder coatings, primers and paint used on the non-galvanized components shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-cured pencil hardness of H-2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

2105-002

**REAR MUD FLAP**

The unit shall be equipped with a temporary wooden fender and mud flap assembly for transport to the body manufacturer.

2201-001

**FRONT BUMPER**

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

2202-001

**FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended approximately 6.00 inches ahead of the cab.

5501-029

**AIR HORN**

The chassis shall include two (2) Buell brand air horns, one (1) shall measure 12.00 inches long and one (1) shall measure 15.00 inches long, both with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish.

2216-017

### **AIR HORN LOCATION**

The air horns shall be shipped loose for the body manufacturer to install in the bumper. Mounting brackets for the horns shall also be shipped loose for body manufacturer use. The body manufacturer shall cut all holes in the bumper as required for the horn installation.

2232-002

### **AIR HORN RESERVOIR**

One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

5504-068

### **ELECTRONIC SIREN SPEAKER**

There shall be two (2) Whelen Engineering Inc. model SP123BMC, 100 watt cast aluminum speakers provided. Each speaker shall measure 7.25 inches tall X 9.25 inches wide X 5.25 inches deep. Each speaker shall include a chrome grille.

2217-013

### **ELECTRONIC SIREN SPEAKER LOCATION**

The two (2) electronic siren speakers shall be shipped loose for the body manufacturer to install in the face of the bumper. The body manufacturer shall cut all holes required for the installation.

2301-001

### **CAB TILT SYSTEM**

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly, painted safety yellow shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

2303-002

### **CAB TILT LIMIT SWITCH**

A cab tilt limit switch shall be installed. The switch will effectively limit the travel of the cab when being tilted. The final adjustment of the switch shall be performed by the apparatus manufacturer to prevent damage to the cab or any bumper mounted option mounted in the cab tilt arc.

2305-001

### **CAB TILT CONTROL RECEPTACLE**

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

2306-002

### **CAB TILT LOCK DOWN INDICATOR**

The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

In addition to the alert message an audible alarm shall sound when the cab is unlocked and ajar with the parking brake released.

1401-009

### **CAB WINDSHIELD**

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self locking window rubber.

1402-002

**GLASS FRONT DOOR**

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished using electric actuation. The left and right front door windows shall be controlled using a switch on each respective side inner door panel. The driver's door shall include a switch for each powered door window in the cab.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

1407-001

**GLASS TINT FRONT DOOR**

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1419-008

**GLASS REAR DOOR RH**

The rear right hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the inner door panel and on the driver's control panel.

1430-001

**GLASS TINT REAR DOOR RIGHT HAND**

The window located in the right hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1412-008

**GLASS REAR DOOR LH**

The rear left hand side crew door shall include a window which is 27.00 inches in width X 26.00 inches in height. The window shall be a powered type and shall be controlled by a switch on the inner door panel and on the driver's control panel.

1431-001

### **GLASS TINT REAR DOOR LEFT HAND**

The window located in the left hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1410-003

### **GLASS SIDE MID RH**

The cab shall include a window on the right side behind the front and ahead of the crew door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

1432-001

### **GLASS TINT SIDE MID RIGHT HAND**

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1409-003

### **GLASS SIDE MID LH**

The cab shall include a window on the left side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

1433-001

### **GLASS TINT SIDE MID LEFT HAND**

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1405-004

### **GLASS REAR WALL OUTER UPPER**

The rear wall of the cab on the left and right sides shall include a window which shall measure 16.00 inches in width X 16.00 inches in height. These windows shall be fixed within this space and shall be square in shape. The windows shall be mounted using black self locking window rubber.

1436-001

### **GLASS TINT REAR WALL OUTER UPPER**

The windows located in the rear wall of the cab on the left and right outer upper corners shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1413-006

**GLASS UPPER SIDE FRONT**

The raised roof on the left and right sides of the cab shall include a triangular shaped window which shall be 12.00 inches wide X 11.00 inches high. These windows shall be fixed within this space. These windows shall be mounted to the cab using black self-locking window rubber.

1437-001

**GLASS TINT UPPER SIDE FRONT**

The windows located in the upper section on the left and right side towards the front of the cab shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1415-002

**GLASS UPPER SIDE MID**

The middle section of the raised roof on the left and right sides of the cab shall include a window which shall measure 16.00 inches wide X 14.00 inches high. These windows shall be fixed within this space. These windows shall be mounted using black self-locking window rubber.

1438-001

**GLASS TINT UPPER SIDE MID**

The windows located in the upper section on each side in the middle of the cab shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1417-002

**GLASS UPPER SIDE REAR DOOR**

Windows shall be provided in the upper portion of each rear door of the raised roof cab. Each window shall measure 27.00 inches wide X 14.00 inches high and be installed above the lower door window. The windows shall be rectangular in shape and fixed within this space. The windows shall be mounted using black self-locking window rubber.

1439-001

**GLASS TINT UPPER SIDE REAR DOOR**

The window located in the upper section of the rear crew doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1421-002

**GLASS UPPER SIDE REAR**

The upper portion on the left and right sides towards the rear of the cab shall include a window which is 8.00 inches wide X 14.00 inches high. These windows shall be fixed within this space. The windows shall be oblong in shape and be mounted using black self-locking window rubber.

1440-001

**GLASS TINT UPPER SIDE REAR**

The window located in the upper section on the side of the cab towards the rear shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1427-002

**GLASS UPPER SIDE REAR PPHE**

The left and right sides of the pump panel hood extension shall include a 16.00 inch wide X 16.00 inch tall window. These windows shall be fixed within this space. The windows shall be square and be mounted using black self-locking window rubber.

1441-001

**GLASS TINT UPPER SIDE REAR PUMP PANEL HOOD EXTENSION**

The windows located on the left and right sides of the pump panel hood extension shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1423-002

**GLASS REAR WALL CENTER**

The center rear wall of the cab shall include a window which is 41.00 inches in width X 16.00 inches in height. This window shall be fixed and be of a rectangular shape. The window shall be mounted using black self locking window rubber.

1442-001

**GLASS TINT REAR WALL CENTER**

The window located in center of the rear wall shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1403-004

**GLASS UPPER FRONT**

The front face of the raised roof slope of the cab shall include two (2) windows which shall be 6.00 inches wide X 11.00 inches high. These windows shall be fixed type and shall be rectangular in shape. The windows shall be mounted using black self-locking window rubber.

1443-001

**GLASS TINT UPPER FRONT**

The windows located on the forward face of the raised roof of the cab on the left and right sides shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1424-002

**GLASS REAR WALL OUTER LOWER**

The lower portion of the rear wall on the left and right sides of the cab shall include a window which is 5.00 inches wide X 30.00 inches high. These windows shall be fixed within this space. The windows shall be oblong in shape and be mounted using black self locking window rubber.

1444-001

**GLASS TINT REAR WALL OUTER LOWER**

The windows located in the lower portion of the rear wall on the left and right sides of the cab shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1428-002

**GLASS REAR WALL EXTENSION LOOKDOWN**

The cab shall include two (2) 5.00 inch wide X 17.00 inch long windows mounted horizontally on the underside of the pump panel hood extension, one each side. These windows shall be fixed within this space. The windows shall be mounted with black self-locking window rubber.

1445-001

**GLASS TINT REAR WALL HORIZONTAL**

The windows located on the underside of the rear pump panel hood extension on the left and right side of the pump panel cutout shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

1614-204

**CLIMATE CONTROL**

A ceiling mounted combination defroster and cabin heating and air conditioning system shall be located above the engine tunnel area. The system covers and plenums shall be of severe duty design made of aluminum which shall be coated with a customer specified interior paint. The design of the system's covers shall provide quick access to washable air intake filters as well as easy access to other serviceable items.

Six (6) adjustable louvers shall provide comfort for the front seat occupants and ten (10) adjustable louvers shall provide comfort for the rear crew occupants. The plenum shall be shortened to terminate in the mid crew area on cabs with 10.00 inch raised roofs and greater. This shortened plenum shall allow for the customer to utilize the upper rear center wall for compartmentation, equipment, or apparatus operations.



Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122° F (+/- 3° F) to 80° F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.

The system shall also provide heater pull up performance which meets or exceeds the performance requirements of SAE J1612 as well as defrost performance that meets or exceeds the performance requirements of SAE J381.

A gravity drain system shall be provided that is capable of evacuating condensate from the vehicle while on a slope of up to a 13% grade in any direction.

The air conditioning system plumbing shall be a mixture of custom bent zinc coated steel fittings and Aeroquip flexible hose with Aeroquip EZ-Clip fittings.

The overhead heater/defroster plumbing shall include an electronic flow control valve that re-directs hot coolant away from the evaporator, via a bypass loop, as the temperature control is moved toward the cold position.

Any component which needs to be accessed to perform system troubleshooting shall be accessible by one person using basic hand tools. Regularly serviced items shall be replaceable by one person using basic hand tools.

***\*\*Spartan Motors Inc. recommends that the overall climate system performance be based off third-party testing in accordance to Society of Automotive Engineering standards as a complete system.***

***Individual component level BTU ratings is not an accurate indicator of the performance capability of the completed system. System individual component BTU ratings:***

- Air conditioning evaporator total BTU/HR: 82,000
- Air conditioning condenser total BTU/HR: 59,000
- Heater coil total BTU/HR: 98,000

***Performance data specified is based on testing performed by an independent third-party test facility using a medium four-door 10” Raised roof Gladiator chassis equipped with an ISL engine.***

1632-002

### **CLIMATE CONTROL DRAIN**

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

1617-108

### **CLIMATE CONTROL ACTIVATION**

The heating, defrosting and air conditioning controls shall be located on the Vista display and control screen.

1620-019

**HVAC OVERHEAD COVER PAINT**

The overhead HVAC cover shall be painted with a multi-tone onyx black texture finish.

1606-003

**AUXILIARY CLIMATE CONTROL FRONT UNDERSEAT**

Two (2) 13,500 BTU heaters shall be provided and installed in the face of the seat riser storage area for the left and right front seats, one (1) each side. The fan controls shall be located on the Vista display and control screen(s).

The auxiliary heater system hoses shall be silicone with stainless steel constant torque clamps approved for use with silicone hose. The auxiliary heater system shall include one (1) seasonal shut-off valve. The valve shall be supplied at the front of the right hand corner of the cab. The cab must be tilted to access the shut-off valve.

1603-003

**A/C CONDENSER LOCATION**

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

1601-013

**A/C COMPRESSOR**

The air-conditioning compressor shall be a belt driven, engine mounted compressor. The compressor shall be compatible with R134-a refrigerant.

***\*\*Spartan Motors Inc. recommends that the overall climate system performance be based off third-party testing in accordance to Society of Automotive Engineering standards as a complete system.***

***Individual component level ratings are not an accurate indicator of the performance capability of the completed system.***

Freon Compressor displacement: 19.1 cubic inches per revolution.

1609-002

**CAB CIRCULATION FANS REAR**

The cab shall include two (2) individually switched all metal construction 6.00 inch fans which shall be installed in the upper rear cab corners as far outboard as possible. The multi purpose fans can be used to increase air circulation or help defog windows.

1530-001

**UNDER CAB INSULATION**

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

1327-002

### **INTERIOR TRIM FLOOR**

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

The floor shall have an overlay of 3003-H22 aluminum embossed tread plate. The tread plate shall be held down with screws and aluminum trim molding.

1302-001

### **INTERIOR TRIM**

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

1306-006

### **HEADER TRIM**

The cab interior shall feature header trim over the driver and officer dash constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum.

1305-015

### **TRIM CENTER DASH**

The main center dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical

access cover for ventilation. The center dash electrical access cover shall include a gas cylinder stay which shall hold the cover open during maintenance.

1339-102

### **TRIM LH DASH**

The left hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate for a perfect fit around the instrument panel. For increased occupant protection the extreme duty left hand dash utilizes patent pending break away technology to reduce rigidity in the event of a frontal crash. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

1321-004

### **TRIM RH DASH**

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.

1307-002

### **ENGINE TUNNEL TRIM**

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

5040-064

### **POWER POINT DASH MOUNT**

The cab shall include two (2) 12 volt cigarette lighter type receptacles in the cab dash to provide a power source for 12 volt electrical equipment. The receptacles shall be wired battery direct.

The cab shall also include one (1) Dual universal serial bus (USB) charging receptacle in the cab dash rocker switch cutout to provide a power source for USB chargeable electrical equipment. The USB receptacle shall include one (1) USB port capable of a 5 Volt-1 amp output and one (1) USB port capable of a 5 Volt-2.1 amp output. The receptacles shall be wired battery direct and include a backlit legend.

1303-011

### **STEP TRIM**

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5052 H32 aluminum Grip Strut® grating with angled outer corners. The grating shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for

rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed in 0.08 inch thick 3003-H22 embossed aluminum tread plate.

1379-003

#### **UNDER CAB ACCESS DOOR**

The cab shall include an aluminum access door in the left crew step riser painted to match the cab interior paint with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

1102-013

#### **INTERIOR DOOR TRIM**

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

1323-001

#### **DOOR TRIM CUSTOMER NAMEPLATE**

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

1105-001

#### **CAB DOOR TRIM REFLECTIVE**

The interior of each door shall include high visibility reflective tape. A white reflective tape shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

1308-001

#### **INTERIOR GRAB HANDLE "A" PILLAR**

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

1332-008

#### **INTERIOR GRAB HANDLE FRONT DOOR**

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

1345-002

## **INTERIOR GRAB HANDLE REAR DOOR**

A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

1319-019

## **ADDITIONAL INTERIOR GRAB HANDLE REAR DOOR**

Each rear door shall include one (1) additional grab handle. The handle shall be a 30.00 inch long one-piece cast aluminum grab handle. Each handle shall be mounted diagonally on the interior door trim panels. Each handle shall be textured and feature a black powder coat finish and shall assist personnel entering and exiting the cab.

1347-028

## **INTERIOR REAR WALL COMPARTMENT**

The cab shall include an interior clear area provision for the side curtain crew airbag mounting to account for a compartment located on the left and right side at the rear wall to be installed by the body builder. The clear area shall extend from behind the standard rear door locations to the rear wall. The provision allows appropriate airbag selection for clear airbag deployment and adequate protection and ejection mitigation.

1301-001

## **INTERIOR SOFT TRIM COLOR**

The cab interior soft trim surfaces shall be black in color.

1337-004

## **INTERIOR TRIM SUNVISOR**

The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield. Each sun visor shall be constructed of Masonite and covered with padded black vinyl trim.

1304-001

## **INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be gray in color.

1335-018

## **CAB PAINT INTERIOR DOOR TRIM**

The inner door panel surfaces shall be painted with multi-tone onyx black texture finish.

1371-021

## **HEADER TRIM INTERIOR PAINT**

The metal surfaces in the header area shall be coated with multi-tone onyx black texture finish.

1370-023

## **TRIM CENTER DASH INTERIOR PAINT**

The entire center dash shall be coated with multi-tone onyx black texture finish. Any accessory pods attached to the dash shall also be painted this color.

1378-022

## **TRIM LH DASH INTERIOR PAINT**

The left hand dash shall be painted with a multi-tone onyx black texture finish.

1373-022

## **TRIM RIGHT HAND DASH INTERIOR PAINT**

The right hand dash shall be painted with multi-tone onyx black texture finish.

1344-002

## **DASH PANEL GROUP**

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

1312-037

## **SWITCHES CENTER PANEL**

The center dash panel shall include three (3) rocker switch positions in a single row configuration in the upper left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

1313-003

## **SWITCHES LEFT PANEL**

The left dash panel shall include three (3) switches. There shall be one (1) headlight switch over one (1) windshield wiper/washer control switch and one (1) instrument lamp dimmer switch on the left hand portion of the panel. All switches shall have backlighting provided.

1314-001

## **SWITCHES RIGHT PANEL**

The right dash panel shall include no rocker switches or legends.

1225-007

## **SEAT BELT WARNING**

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s), an indicator light in the instrument panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also activate when any seat is occupied, the corresponding seat belt was fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

1237-002

## **SEAT MATERIAL**

The seats shall be covered with a 45.00 ounce vinyl material. This material shall be semi-resistant to UV rays and from being saturated or contaminated by fluids.

1243-003

## **SEAT COLOR**

All seats supplied with the chassis shall be black in color. All seats shall include red seat belts.

1249-001

## **SEAT BACK LOGO**

The seat back shall include the "Spartan" logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

1201-037

## **SEAT DRIVER**

The driver's seat shall be an H.O. Bostrom 500 Series Firefighter Sierra model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.



The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00.

This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

1213-025

### **SEAT BACK DRIVER**

The driver's seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

1219-001

### **SEAT MOUNTING DRIVER**

The driver's seat shall be installed in an ergonomic position in relation to the cab dash.

8102-103

### **OCCUPANT PROTECTION DRIVER**

The driver's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The driver's seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the driver, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the driver's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the driver in a qualifying event by covering the window and the upper portion of the door.
- Dual knee airbags (patent pending) with energy management mounting (patent pending) - protects the driver's lower body from dangerous surface contact injuries, acceleration injuries, and from intrusion as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

Steering wheel airbag - protects the driver's head, neck, and upper torso from contact injuries, acceleration injuries, and contact points with intrusive surfaces as a result of a collision.

1202-037

**SEAT OFFICER**

The officer's seat shall be a H.O. Bostrom 500 Series Sierra seat model. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

1214-034

**SEAT BACK OFFICER**

The officer's seat back shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

1220-003

**SEAT MOUNTING OFFICER**

The officer's seat shall offer a special mounting position which is 2.00 inches rearward of the standard location offering increased leg room for the occupant.

8103-103

### **OCCUPANT PROTECTION OFFICER**

The officer's position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The officer's seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the officer, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the officer's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the officer in a qualifying event by covering the window and the upper portion of the door.

Knee airbags - protects the officer's lower body from dangerous surface contact injuries, acceleration injuries, and from contact points with intrusive surfaces as a result of a collision as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

1273-001

### **SEAT BELT ORIENTATION CREW**

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

1263-001

### **SEAT REAR FACING OUTER LOCATION**

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

1203-020

### **SEAT CREW REAR FACING OUTER**

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom 500 Series Firefighter model seat. The seat shall feature a tapered and padded seat, and cushion. The seat shall be mounted in a fixed position.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the

seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

1215-031

#### **SEAT BACK REAR FACING OUTER**

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

1221-009

#### **SEAT MOUNTING REAR FACING OUTER**

The rear facing outer seats shall offer special mounting positions which shall be 2.00 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.

8104-103

#### **OCCUPANT PROTECTION RFO**

The rear facing outer seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal

impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each rear facing outer seating position APS shall include:

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - protects each occupant's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to each seating position with an airbag custom designed for each cab configuration.

1264-005

### **SEAT REAR FACING CENTER LOCATION**

The crew area shall include one (1) rear facing crew seat located directly behind the engine tunnel in the center of the cab.

1204-015

### **SEAT CREW REAR FACING CENTER**

The crew area shall include a seat in the rear facing center position which shall be a H.O. Bostrom 500 Series Firefighter model seat. The seat shall feature a tapered and padded seat back and cushion.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant. The ABTS feature shall also include the RiteHite™ shoulder adjustment feature to provide enhanced comfort and safety by allowing customized seat belt fit.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

1216-029

## **SEAT BACK REAR FACING CENTER**

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

1222-002

## **SEAT MOUNTING REAR FACING CENTER**

The rear facing center seat shall be mounted facing the rear of the cab.

8105-102

## **OCCUPANT PROTECTION RFC**

The rear facing center seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each rear facing center seating position APS shall include:

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to crew seating with an airbag custom designed for each cab configuration.

1267-101

## **SEAT FRAME REAR FACING CENTER**

The rear facing center seating shall include a seat frame which is located and installed behind the engine tunnel. The seat frame shall measure 40.75 inches wide X 12.00 inches high X 15.88 inches deep. The seat frame shall be constructed of 0.19 inch thick Marine Grade 5052-H32 smooth aluminum plate. The seat box shall be painted with the same color as the remaining interior.

1280-103

**SEAT FRAME REAR FACING CENTER STORAGE ACCESS**

The rear facing center seat frame shall include a storage access opening which shall measure 32.00 inches wide X 8.75 inches high to allow access within the seat frame for storage. A solid access door which shall measure 34.00 inches wide X 11.12 inches high shall be provided at the opening.

1311-108

**CAB FRONT UNDERSEAT STORAGE ACCESS**

The left and right under seat storage areas shall have a vented aluminum hinged door with non-locking latch.

1355-023

**SEAT COMPARTMENT DOOR FINISH**

All underseat storage compartment access doors shall have a multi-tone onyx black texture finish.

1511-100

**WINDSHIELD WIPER SYSTEM**

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers; each shall be affixed to a radial arm. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

1534-002

**ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

1103-004

**CAB DOOR HARDWARE**

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a chrome plated finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.

1111-001

### **DOOR LOCKS**

Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

1115-002

### **DOOR LOCK LH REAR CAB COMPARTMENT**

The left hand side rear compartment shall feature a manual door lock.

1116-002

### **DOOR LOCK RH REAR CAB COMPARTMENT**

The right hand side rear compartment shall feature a manual door lock.

1503-003

### **GRAB HANDLES**

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of SAE 304 stainless steel and be 1.25 inch diameter to enable easy grabbing with the gloved hand. Each assist handle shall include a stainless steel plate which saves the cab from scuffs through continued use of the handle.

1527-002

### **AUXILIARY GRAB HANDLE**

There shall be a 7.00 inch molded stainless steel grab handle with a bright finish attached to the front fascia of the cab in the center below the windshield. The handle installation shall include steel reinforcement behind the front cab fascia.

1504-016

### **REARVIEW MIRRORS**

Retrac Aerodynamic West Coast style dual vision mirror heads model 613315 shall be provided and installed each of the front cab doors.

The mirrors shall be mounted via 1.00 inch diameter tubular stainless steel arms to provide a rigid mounting to reduce vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an integral convex mirror in the mirror head below the flat glass to provide wider field of vision. The flat and convex



mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The flat and convex mirrors shall be heated for defrosting in severe cold weather conditions.

The mirror backs shall be constructed of vacuum formed chrome plated ABS plastic housings that are corrosion resistant and shall include an amber marker light. The mirrors shall be manufactured with the finest quality non-glare glass.

1529-003

#### **REARVIEW MIRROR HEAT SWITCH**

The heat for the rearview mirrors shall be controlled through a virtual button on the Vista display and control screen.

1506-002

#### **TRIM LOWER SIDE**

A stainless steel trim band, 10.00 inches high, with upper and lower black and chrome trim moldings, shall be installed on the lower exterior sides of the cab and doors. The trim shall be installed so that the top edge approximately 1.00 inch below the top of the front bumper, and shall be affixed without holes and fasteners.

1513-010

#### **CAB FENDER**

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 5.00 inches wide made of polished aluminum.

1514-002

#### **MUD FLAPS FRONT**

The front wheel wells shall have mud flaps installed on them.

1526-025

#### **CAB EXTERIOR FRONT & SIDE EMBLEMS**

The cab shall include three (3) Spartan emblems and two (2) Advanced Protection System shield emblems. The emblems shall be included in the cab shipped loose components for installation by the body builder.

5109-001

#### **IGNITION**

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the

steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the "ON" position.

The starter button shall only operate when both the master battery and ignition switches are in the "ON" position.

5101-020

### **BATTERY**

The single start electrical system shall include three (3) Harris BCI 31 925 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

5106-001

### **BATTERY TRAY**

The batteries shall be installed on a steel battery tray located on the left side of the chassis, securely bolted to the frame rails. The battery tray shall be coated with the same material as the frame.

The battery tray shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the tray to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

5107-002

### **BATTERY BOX COVER**

The battery box shall include a steel cover which protects the top of the batteries on the left hand side of the vehicle. The cover shall be coated the same as the frame and shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

5102-001

### **BATTERY CABLE**

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed at the ends with heat shrink and sealant.

5108-002

### **BATTERY JUMPER STUD**

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

5104-001

**ALTERNATOR**

The charging system shall include a 270 amp Leece Neville 12 volt alternator. The alternator shall include a self-excited integral regulator.

5105-001

**STARTER MOTOR**

The single start electrical system shall include a Delco brand starter motor.

5202-004

**BATTERY CONDITIONER**

A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.

5203-002

**BATTERY CONDITIONER DISPLAY**

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in the cab, viewable through the cab mid side window behind the left front door.

3314-006

**AUXILIARY AIR COMPRESSOR**

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

5204-055

**ELECTRICAL INLET**

A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.

**Amp Draw Reference List:**

*Kussmaul 1000 Charger - 3.5 Amps*

*Kussmaul 1200 Charger - 10 Amps*

*Kussmaul 35/10 Charger - 10 Amps*

*1000W Engine Heater - 8.33 Amps*

*1500W Engine Heater - 12.5 Amps*

*120V Air Compressor - 4.2 Amps*

5209-002

**ELECTRICAL INLET LOCATION**

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

5210-005

**ELECTRICAL INLET CONNECTION**

The electrical inlet shall be connected to the battery conditioner and the air pump.

5206-002

**ELECTRICAL INLET COLOR**

The electrical inlet connection shall include a yellow cover.

5301-100

**HEADLIGHTS**

The cab front shall include four (4) rectangular halogen headlamps with separate high and low beams mounted in bright chrome bezels.

5303-026

**FRONT TURN SIGNALS**

The front fascia shall include two (2) Whelen model M6 4.00 inch X 6.00 inch amber LED turn signals which shall be installed in a chrome housing above and outboard of the front warning and head lamps.

5337-002

**HEADLIGHT LOCATION**

The headlights shall be located on the front fascia of the cab directly above the front warning lights.

5336-003

**SIDE TURN/MARKER LIGHTS**

The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

5348-003

**REAR CAB WALL TURN SIGNALS**

The cab rear wall shall include two (2) Whelen model M6 4.00 inch X 6.00 inch programmable LED amber turn signals with a chrome flange, one (1) each side. The lights shall be installed so the bottom of the light is approximately 18.00 inches up from the bottom of the cab.

5302-003

**MARKER AND ICC LIGHTS**

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

5350-087

**HEADLIGHT AND MARKER LIGHT ACTIVATION**

The headlights and marker lights shall be activated when the engine is running and a headlight override switch on the dash. The rocker switch shall be a momentary type which when the top is pressed the headlights and marker lights shall activate and when the bottom is pressed the headlights and marker lights shall deactivate. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights.

5308-010

**GROUND LIGHTS**

Each door shall include an NFPA compliant LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the door on the respective cab side as well as through a virtual button on the Vista display and control screen.

5309-003

**LOWER CAB STEP LIGHTS**

The middle step located at each door shall include a recess mounted 4.00 inch round LED light which shall activate with the opening of the respective door.

5382-002

**INTERMEDIATE STEP LIGHTS**

The intermediate step well area at each door shall include an LED light within a chrome housing. The Egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with Entry step lighting.

5319-010

**UNDER BUMPER LIGHTS**

There shall be two (2) 4.00 inch round LED ground lights mounted under the bumper. The lights shall include a polycarbonate lens, a housing which is vibration welded, and LEDs which shall be shock mounted for extended life. The under bumper ground lighting shall be interlocked with the park brake.

5312-003

## **ENGINE COMPARTMENT LIGHT**

There shall be a LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

5403-062

## **LIGHTBAR PROVISION**

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by Spartan Chassis. The light bar installation shall include a lowered mounting that shall place the light bar just above the junction box and wiring to a control switch on the cab dash.

5450-359

## **CAB FRONT LIGHTBAR**

The lightbar provisions shall be for one (1) Whelen brand Freedom IV LED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72.00 inches in length. The lightbar shall feature six (6) red LED light modules, two (2) clear LED light modules and six (6) blue LED light modules. The clear lights shall be disabled with park brake engaged. The cable shall exit the lightbar on the right side of the cab.

5426-003

## **LIGHTBAR SWITCH**

The light bar shall be controlled by a virtual button on the Vista display and control screen. This button shall be clearly labeled for identification.

5317-196

## **FRONT SCENE LIGHTS**

The front of the cab shall include a Whelen Pioneer model PFH2 contour roof mount scene light installed on the brow of the cab.

Each 150 watt lamp head shall incorporate a 12 volt DC Super-LED flood light installed in a die-cast aluminum housing. Each lamp head shall use a collimator/metalized redux flood reflector assembly with Proclera™ silicone optics and a clear non-optic polycarbonate lens. The lens/reflector assembly shall utilize a liquid injected molded silicone gasket to be resistant to water, moisture, dust, and other environmental conditions. The PFH2 shall be vibration resistant. The Pioneer PC boards shall be conformal coated for additional protection. Each combination flood light lamp head shall draw 13.0 amps in spotlight mode and generate 17,750 lumens total. Each lamp head shall measure 4.25 inches in height X 14.00 inches in width. The lamp heads and brackets shall be powder coated white.

5335-003

## **FRONT SCENE LIGHTS ACTIVATION**

The front scene lighting shall be activated by a virtual button on the Vista display and control screen.

5329-003

### **FRONT SCENE LIGHT LOCATION**

There shall be one (1) scene light mounted center on the front brow of the cab.

5306-060

### **SIDE SCENE LIGHTS**

The cab shall include two (2) Whelen M9 LED scene lights, one (1) each side which shall be surface mounted. The Whelen lights shall provide directional lighting from twenty four (24) Super-LEDs and a clear gradient lens. The scene light shall have specialized TIR optics for ideal scene illumination.

5318-023

### **SIDE SCENE LIGHT LOCATION**

The scene lighting located on the left and right sides of the cab shall be mounted in the upper forward portion of the 24.00 inch raised roof of the cab between the front and rear crew doors.

5316-008

### **SIDE SCENE ACTIVATION**

The scene lights shall be activated by two (2) virtual buttons on the Vista display and control screen(s), one (1) for each light, and by opening the respective side cab doors.

5305-157

### **INTERIOR OVERHEAD LIGHTS**

The cab shall include a two-section, red and clear Weldon LED dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear portion of each lamp shall be activated by opening the respective door and via the multiplex display and both the red and clear portion can be activated by individual push lenses on each lamp.

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

5324-130

### **AUXILIARY DOME LIGHT MID CREW**

The cab shall include two (2) 7.00 inch auxiliary dome lights on the headliner in the middle of the crew area inboard of the outer seats. The lights shall include blue lenses. These lights shall be activated by the rear doors, by an individual toggle switch on the sill area of each mid side window, as well as by an individual switch located on the side of each light.

5325-167

### **AUXILIARY DOME LIGHT REAR CREW**

The cab shall include four (4) Whelen 60CREGCS 6.00 inch diameter red/clear round LED auxiliary dome lights on the headliner in the pump panel hood extension of the cab above the pump panel. The clear function of each light shall be activated by opening either of the rear doors. While both rear doors are closed, the individual red or clear function of each lamp can be activated dependently by switches on each lamp.

5310-004

### **MAP LIGHTS**

A Federal Signal gooseneck style map light shall be provided. The light shall have a clear lens with a sliding red filter, shall be 18.00 inches tall, and shall have a rheostat control switch on the base. The light shall be located on the right hand side of the dash.

5406-076

### **DO NOT MOVE APPARATUS LIGHT**

The front headliner of the cab shall include a flashing red Whelen Ion LED light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

5422-002

### **MASTER WARNING SWITCH**

A master switch shall be included, as a virtual button on the Vista display and control screen which shall be labeled "E Master" for identification. The button shall feature control over all devices wired through it. Any warning device switches left in the "ON" position when the master switch is activated shall automatically power up.

5409-002

### **HEADLIGHT FLASHER**

An alternating high beam headlight flashing system shall be installed into the high beam headlight circuit which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled "On Scene" when the park brake is applied.



5425-003

**HEADLIGHT FLASHER SWITCH**

The flashing headlights shall be activated through a virtual button on the Vista display and control screen.

5401-032

**INBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel

5413-021

**INBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the inboard positions shall be red on the left side and blue on the right side, both with clear lens.

5414-027

**OUTBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right outboard positions. The lights shall feature multiple flash patterns including steady burn. The lights shall be mounted to the front fascia of the cab within a chrome bezel. The lights shall be programmed to emit the "PinWheel Variable" non-flashing pattern.

5415-018

**OUTBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the outboard position shall be red on the left side and blue on the right side, both with clear lens.

5423-004

**FRONT WARNING SWITCH**

The front warning lights shall be controlled through the master warning switch.

5404-027

**INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Whelen M6 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn.

5419-028

**INTERSECTION WARNING LIGHTS COLOR**

The intersection warning light located on the left side shall be red in color and the intersection warning light located on the right side shall be blue in color. Both lights shall have clear lenses.

5420-010

**INTERSECTION WARNING LIGHTS LOCATION**

The intersection warning lights shall be pre-wired and shipped loose for installation by the OEM.

5402-029

**SIDE WARNING LIGHTS**

The cab sides shall include two (2) Whelen M6 Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

5418-031

**SIDE WARNING LIGHTS COLOR**

The warning light located on the left side of the cab shall be red in color and the warning light located on the right side of the cab shall be blue in color, each shall be provided with a clear lens.

5412-002

**SIDE WARNING LIGHTS LOCATION**

The warning lights on the side of the cab shall be mounted over the front wheel well directly over the center of the front axle.

5424-004

**SIDE AND INTERSECTION WARNING SWITCH**

The side warning lights shall be controlled through the master warning switch.

5405-071

**TRAFFIC CONTROL**

There shall be one Tomar model 3065-CHROME high priority traffic control optical emitter, mounted on the front left hand side of the cab roof. The emitter shall be activated by the master warn switch on the dash and shall be deactivated when the parking brake is applied.

5407-003

**INTERIOR DOOR OPEN WARNING LIGHTS**

The interior of each door shall include one (1) red 4.00 inch diameter Truck-Lite LED warning light located on the door panel. Each light shall activate with a flashing pattern when the door is in the open position to serve as a warning to oncoming traffic.

5510-006

### **SIREN CONTROL HEAD**

A Whelen 295HFSA7 electronic siren control head with remote dual amplifier shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

5514-005

### **HORN BUTTON SELECTOR SWITCH**

A virtual button on the Vista display and control screen shall be provided to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

5512-018

### **AIR HORN ACTIVATION**

The air horn activation shall be accomplished through the steering wheel button for the driver and by two (2) lanyard cables, one (1) on the left hand side accessible to the driver and one (1) on the right hand side accessible to the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

5505-002

### **BACK-UP ALARM**

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

5601-041

### **INSTRUMENTATION**

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

A twenty eight (28) icon lightbar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

One (1) three-movement gauge displaying vehicle speed, fuel level, and Diesel Exhaust Fluid (DEF) level. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H. The scale on the fuel and DEF level gauges shall read from empty to full as a fraction of full tank capacity. Red indicator lights in the gauge and an audible alarm shall indicate low fuel or low DEF at 1/8<sup>th</sup> tank level.

One (1) three-movement gauge displaying engine RPM, and primary and secondary air system pressures shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI) with a red line zone indicating critical levels of air pressure. Red indicator lights in the gauge and an audible alarm shall indicate low air pressure.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature shall be included. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds PSI with a red line zone indicating critical levels of oil pressure. A red indicator light in the gauge and audible alarm shall indicate low engine oil pressure. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (°F) with a red line zone indicating critical coolant temperatures. A red indicator light in the gauge and audible alarm shall indicate high coolant temperature. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red indicator light in the gauge and an audible alarm shall indicate high or low system voltage. The low voltage alarm shall indicate when the system voltage has dropped below 11.8 volts for more than 120 seconds in accordance with the requirements of NFPA 1901. The scale on the transmission temperature gauge shall read from 100 to 300 degrees °F with a red line zone indicating critical temperatures. A red indicator light in the gauge and an audible alarm shall indicate a high transmission temperature.

The light bar portion of the message center shall include twenty-eight (28) LED backlit indicators. The lightbar shall be split with fourteen (14) indicators on each side of the LCD message screen. The lightbar shall contain the following indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

### **RED INDICATORS**

Stop Engine - indicates critical engine fault

Air Filter Restricted - indicates excessive engine air intake restriction

Park Brake - indicates parking brake is set

Seat Belt - indicates a seat is occupied and corresponding seat belt remains unfastened

Low Coolant - indicates critically low engine coolant

Cab Tilt Lock - indicates the cab tilt system locks are not engaged.

### **AMBER INDICATORS**

Malfunction Indicator Lamp (MIL) - indicates an engine emission control system fault

Check Engine - indicates engine fault

Check Transmission - indicates transmission fault

Anti-Lock Brake System (ABS) - indicates anti-lock brake system fault

High exhaust system temperature – indicates elevated exhaust temperatures

Water in Fuel - indicates presence of water in fuel filter  
Wait to Start - indicates active engine air preheat cycle  
Windshield Washer Fluid – indicates washer fluid is low  
DPF restriction - indicates a restriction of the diesel particulate filter  
Regen Inhibit-indicates regeneration of the DPF has been inhibited by the operator  
Range Inhibit - indicates a transmission operation is prevented and requested shift request may not occur.  
SRS - indicates a problem in the supplemental restraint system  
Check Message - indicates a vehicle status or diagnostic message on the LCD display requiring attention.

### **GREEN INDICATORS**

Left and Right turn signal indicators  
ATC - indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system  
High Idle - indicates engine high idle is active.  
Cruise Control - indicates cruise control is enabled  
OK to Pump - indicates the pump is engaged and conditions have been met for pump operations  
Pump Engaged - indicates the pump transmission is currently in pump gear  
Auxiliary Brake - indicates secondary braking device is active

### **BLUE INDICATORS**

High Beam indicator

### **AUDIBLE ALARMS**

Air Filter Restriction  
Cab Tilt Lock  
Check Engine  
Check Transmission  
Open Door/Compartment  
High Coolant Temperature  
High or Low System Voltage  
High Transmission Temperature  
Low Air Pressure  
Low Coolant Level  
Low DEF Level  
Low Engine Oil Pressure  
Low Fuel  
Seatbelt Indicator  
Stop Engine  
Water in Fuel  
Extended Left/Right Turn Signal On  
ABS System Fault

5624-004

### **BACKLIGHTING COLOR**

The instrumentation gauges and the switch panel legends shall be backlit using blue LED backlighting.

5701-056

**RADIO**

A Jensen radio with weather band, AM/FM stereo receiver, compact disc (CD) player, and four (4) speakers shall be installed in the cab. The radio shall include rear RCA input pigtail connector, satellite radio capability, and a covered front auxiliary mini stereo input with iPod ready USB jack. The CD player shall be compatible with CD-R, CD-RW and MP3 format discs. The radio shall be installed in the left hand overhead position. The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab.

5707-002

**AM/FM ANTENNA**

A small antenna shall be located on the left hand side of the cab roof for AM/FM and weather band reception.

5706-036

**CAMERA**

An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) box shaped camera shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle and one (1) camera with a teardrop shaped chrome plated housing shall be mounted on the officer side of the cab below windshield ahead of the front door at approximately the same level as the cab door handle.

The cameras shall be wired to a single Weldon Vista display located on the driver's side dash. The rear camera shall activate when the transmission is placed in reverse and the right camera shall activate with the right side turn signal. Each camera shall also be activated by a button on the Vista display.

5703-022

**COMMUNICATION ANTENNA**

An antenna base shall be installed on the cab. The antenna base shall be an Antenex model MABVT8 and shall include 17.00 feet of RG58 A/U cable with no connector at the radio end of the cable. In addition to the antenna base, an Antenex TRABT 1420 Phantom VHF antenna shall be provided. The antenna base shall be mounted on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis. The antenna base and antenna shall be provided by Spartan.

5708-002

**COMMUNICATION ANTENNA CABLE ROUTING**

The antenna cable shall be routed from the antenna base mounted on the roof to the area behind and underneath the right hand front seat.

8814-002

### **CAB EXTERIOR PROTECTION**

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

8806-001

### **FIRE EXTINGUISHER**

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

8810-001

### **DOOR KEYS**

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

8811-003

### **DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION**

Diagnostic software for the Spartan Advanced Protection System shall be available for free download from the Spartan Chassis website to Spartan authorized OEMs, dealers and service centers, as well as the vehicle owner.

The software has been validated to be compatible with the following RP1210 interface adapters:

- Dearborn Group DPA4 Plus
- Noregon Systems JPRO® DLA+
- Cummins INLINE5
- Cummins INLINE6
- NexIQ™ USB-Link™

The software and adapter utilize the SAE J1939-13 heavy duty nine (9) pin connector which is located below the driver's side dash to the left of the steering column.

8003-155

### **WARRANTY**

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles,

whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

8030-006

**CHASSIS OPERATION MANUAL**

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

8031-024

**ENGINE AND TRANSMISSION OPERATION MANUALS**

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:

- (1) Hard copy of the Engine Operation and Maintenance manual with CD
- (1) Digital copy of the Transmission Operator's manual
- (1) Digital copy of the Engine Owner's manual

8805-007

**CAB/CHASSIS AS BUILT WIRING DIAGRAMS**

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

8039-001

**SALES TERMS**

The sale of the Spartan Chassis shall be governed by the terms contained on the Sales Terms – Acceptance of Purchase Order document, a copy of which is attached to this option.

9005-002

**DRIVELINE LAYOUT CONFIRMATION**

During the design phase of the chassis the Spartan Chassis driveline engineer shall submit the driveline layout to an OEM engineer to review the chassis design for any potential problems integrating the OEM body to the chassis. The OEM engineer shall provide approval to the driveline engineer prior to driveline bills of materials being released.