SPECIFICATION

ROSENBAUER AIR CRASH TENDER
PANTHER 8x8, FLF 14500 Design 2005

(Coupling System BS)

similar to drawing no. A06047-A

ROSENBAUER INTERNATIONAL AG reserves the right of alterations and modifications due to technical progress and/or improvements. ROSENBAUER INTERNATIONAL AG cannot be held responsible for changes in the chassis programmes of the chassis manufacturers.

Optional features, if selected, influence the weight of the vehicle.

Drawings and photographs may show optional equipment available at extra charge and may exclude standard equipment.

BASIC DATA

CHASSIS:	Type:	MAN SX 40.1000
	Engine:	735 kW (1000 hp) at 2300 rpm
	Drive:	8 x 8
	Gearbox:	Automatic, model Allison
CAB:	Seating arrangement: 1 + 3 2 doors	
PUMP:	Type:	N100, centrifugal pump
WATER TANK:	Capacity:	13000 l
FOAM COMPOUND TANK:	Capacity:	1600 l
ROOF MONITOR:	Type:	RM 60 E
BUMPER MONITOR:	Type:	RM 15 E
DRY POWDER UNIT:	Capacity:	225 kg Monnex

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1. GENERAL DESCRIPTION

This ROSENBAUER Air Crash Tender is primarily designed for rapid and active combatting of aircraft fires and to facilitate evacuation of occupants.

All components of this vehicle result from first-class products that have been continuously developed and improved, making the vehicle absolutely reliable under any circumstances.

All-wheel drive, differential lock in all axles, inter axle locks and single tyres ensure together with the NATO approved coil spring suspension that the vehicle is very well suited for cross-country operations.

This vehicle has been engineered and will be fabricated and tested in accordance with the German (DIN), Austrian (ÖNORM) and internal Rosenbauer/MAN standards and specifications.

This vehicle has been designed to meet the ICAO recommendations in respect of all performance criteria.

1.1 General design approach

a) The selection and matching of drivetrain components, as well as maximum usage of lightweight material consistent with design requirements to provide a high horsepower to weight ratio for maximum acceleration are the basic design criteria, with the result to reach the scene of an emergency on or in the vicinity of an airport with rapidity and high mobility.

Top speed:	up to 138 km/h
Acceleration from 0 - 80 km/h:	within 25 sec. (at an operational weight of approx. 39,5 t)

b) To gain rapid fire control and permit rescuing passengers, high agent discharge rates are instantly available at the monitors, hand lines and at the self protection system.

Special design consideration is given to safety, ease and simplicity of operation of fire fighting controls, maximum visibility from the cab and maximum articulation of the monitor.

Roof monitor discharge:	Up to 9000 l/min., dual output design
Monitor articulation:	horizontal 270 º vertical -15 º to +70 º

c) Off-road mobility is achieved due to correct selection of axle and tyre configuration and suspension with progressively acting coil springs and double acting hydraulic shock absorbers incorporating adequate ground clearance.

Vehicle drive:	8 x 8
Tyres:	8, size: 16.00 R 20, single
Ground clearance:	front approx. 464 mm rear approx. 421 mm

d) The vehicle is suited to operate in a variety of climatic situations including desert, tropical, salt sea and arctic environments.

e) This ROSENBAUER product provides for ease of maintenance by designing for maximum accessibility, the use of a minimum of parts requiring maintenance and the avoidance of components which require special tools for service or repair.

f) Safety and comfort of crew during standby and travel modes and during emergency fire fighting operations, was one of the main design considerations.

g) The horsepower and torque of engines are selected to satisfy the power requirements of the water pump and the vehicle drivetrain during all mobility operations and all operations requiring the simultaneous application of driving and discharging.

The selection and arrangement of the components of the required fire-fighting systems satisfy the requirements of rated capacity discharge of water or a water and foam concentrated solution during operations either independent of or in conjunction with vehicle motion.

This ROSENBAUER design provides for maximum safety, offers fastest discharge, eliminates operational errors and protects the vehicle components.

2. CHASSIS AND ENGINE

Make:	MAN SX
Model:	40.1000 / 8x8
Engine:	
Location:	Rear mounted
Make:	MAN
Model:	D2842 LF10 Euro 3 EDC
Method of operation:	intercooled 4-stroke Diesel engine, with direct injection and turbocharger
Bore/stroke:	128 mm/142 mm
Arrangement of cylinders:	in V-form
Number of cylinders:	12
Piston displacement:	21920 ccm
Max. output:	735 kW (1000 hp) at 2300 rpm acc. to DIN 70020
Max. torque:	3500 Nm at 1400 rpm to 1900 rpm acc. to DIN 70020
Combustion air intake system:	The high efficiency, multi stage cyclonic dry filter elements are mounted in the engine compartment, restrictor indicator is located in the side service box.
Exhaust system:	The exhaust and the silencer system is located on the left hand side behind the first front axle, the end tube is directing upwards, end of exhaust closed with gravity flap to avoid foreign matter entering exhaust during standstill of engine.
Fuel tank:	Capacity 2 x 180 litres. Adequate drain plugs are provided. Tank can be filled by means of 25 l cans using the integrated extendable funnel. Fuel tank material: stainless steel
Cooling system:	High performance cooling system for tropical conditions is provided by water forced circulation by pump. The blower-fan will be driven by a hydraulic motor, the speed will be automatically controlled by a special thermostate depending on the ambient temperature.

Air-inlet will be on top of the vehicle to prevent any dirt accumulation. Drain cocks at the lowest points of engine and radiator are provided.
The entire cooling block is located approximately 2050 mm above ground, therefore dirt accummulation from mud etc. is avoided and the wadeability improved.

Electric system:

Voltage:	24 Volt
Alternators:	2 units, each 28 Volt, 110 A
Batteries:	Number 2, voltage and capacity: 12 V, 175 Ah
Starter:	24 V/6,5 kW

Transmission:

Type: Fully automatic transmission with torque convertor and retarder, with mechanical emergency actuation

Make/Model: Allison, model 6610

Number of gears: 6 forward, 1 reverse

Ratios and speeds:

1	4,0	32 km/h
2	2,68	42 km/h
3	2,01	62 km/h
4	1,35	85 km/h
5	1,00	115 km/h
5	0,67	138 km/h
R	5,15	20 km/h

Transfer box: MAN transfer gearbox, model VG 252 P22 All-wheel drive, pneumatically actuated longitudinal differential lock, actuation from driver's panel.

Wheel drive: 8 x 8

Wheelbase: 1930 - 3570 - 1500 mm

Steering: The steering, model ZF 8099, is of a fully integral power assisted type. Central L/H side driving position (approx. 345 mm from the centre line on the L/H side).

Chassis frame: Torsion-free ladder construction with welded crossmembers.

Front axles:	
Make/model:	1. front axle: MAN, VA7-1050 2. front axle: MAN, VAD7-1050
Type:	The axles are of the rigid type with reduction gearing via planetary gears at the hubs. A driver operated pneumatically operated differential lock is provided.
Load rating:	1000 kg per axle
Rear axles:	
Make/model:	1. rear axle: MAN, HD7-13120 2. rear axle: MAN, H7-13120
Type:	The rear axles are of the rigid type with reduction gearing via planetary gears at the hubs. A driver operated pneumatically operated differential lock is provided.
Load rating:	11500 kg per axle
Suspension:	Front and rear: coil springs, shock absorbers. The suspension system is strong enough to drive at high speed over improved road surfaces and at moderate speed over cross country. Double acting, hydraulic shock absorbers are provided on front and rear axles giving adequate wheel motion and reducing the unsprung masses. The design of the axles and the suspension system will provide for a diagonally opposite vertical wheel motion of at least 350 mm relative to the surface on which the vehicle is standing without raising any other wheel off the ground, causing interference between parts or undue distortion of bodywork, pipes etc. and allowing all doors, controls etc. to operate satisfactorily. Front and rear axles are furnished with special stopping devices for bottoming to prevent any damage to the axle.
Tyres (front and rear):	Single tyres Dimension: 16.00 R 20
Rims:	10.00-20, Steel

Braking system:

Service brake:	Dual-circuit high capacity pneumatic brake system with automatic brake pressure regulator. A fast build-up system is provided to permit release of spring brakes within shortest time. The service brake system is capable of stopping the fully loaded and manned vehicle within 12,2 m from a speed of 32 km/h or within 48,8 m from a speed of 64 km/h on a dry level concrete pavement. The system is also capable of holding the fully loaded and manned vehicle on a 50 % slope.
Parking brake:	Spring loaded and air controlled, acting on the rear wheels with emergency release device. The parking brake system is capable of keeping the fully laden vehicle from rolling on a 20 % grade. An emergency stop with the parking brake system is possible within 88 m from a speed of 64 km/h.
Engine brake:	Electro-pneumatically operated engine brake by means of butterfly valve in the exhaust system and retarder actuated and controlled from the service brake pedal.
Miscellaneous:	The brake system is equipped with the following: - Air dryer unit extracting moisture - Tyre inflation connection with filling hose 10 m long - Drain valves of reservoirs - Audible and acoustic warning systems for low pressure - ABS anti-lock system for all wheels
Charging connections:	One quick-release coupling is provided at the rear to enable the reservoirs to be charged from an external source of compressed air.

Compressed air system:	Make:	Knorr/Wabco
	Type:	2 cylinder compressor, driven from vehicle's drive engine
	Capacity:	540 l/min., working pressure 8,3 bar

Air compressor: An electrically driven air compressor will be mounted on the rear of the vehicle. When connected to external power (230 V/50 Hz) the brake system will be kept at operating pressure automatically. The external power receptacle is combined with the one for the battery charger.

Accessories delivered with the chassis:

Hydraulic vehicle jack and wheel changing tools.
Spare wheel and tyre will be delivered loose with the vehicle.

3. DRIVER'S AND CREW'S CAB

Type: Forward control type, Rosenbauer "MAXVIEW" cabin in aluminium-cab welded design with alu/GRP panels for a crew of 3 (1 driver plus 2 firemen).

Design: The driver's cab is a rigid safety cell, offers well-tuned suspension and ensures comfortable accommodation to the crew fully attired in protective clothing. Modern design offers excellent allround vision.
The cab is adequately insulated against noise, vibration and extreme temperatures.

Lettering: In English language, where pictographs or ISO-symbols (for ease of understanding) do not serve the purpose.

Doors: Two large swing-forward type doors, electrically operated, with sliding windows, for rapid entry and exit of crew-members.
Open doors will be automatically closed at a driving speed of ≥ 5 km/h

Windows: Excellent allround visibility is ensured by the "MAXVIEW" panorama windscreen, roof and side windows. The windscreen and the other windows are of clear safety laminate glass.

If the roof monitor is actuated, the windshield wipers will be engaged automatically and are in operation as long as the monitor is in operation.

The cabin is designed that a driver having an eye height of 800 mm will be able to see the ground min. 600 cm ahead and will have a minimum range of vision 60 º above horizontal without leaving or rising in his seat. The horizontal vision is 220 °.

Mirrors: Two large rear view mirrors, electrically adjustable, are provided, one on each side of the cab.

Seating: For 3 crew members. Fully adjustable suspended driver's seat with integrated S.C.B.A. bracket, centrally L/H side mounted (345 mm from the centre line). One seat with integrated S.C.B.A. bracket on the L/H side, one seat with integrated S.C.B.A. bracket on the R/H side. All seats fitted with two-point automatic roller-type seat belts.

Instrument console: Instrument panel, centrally located in front of driving seat and containing all necessary information and warning gauges and lamps. Function switches are of the push-button or rocker design. The gauges are illuminated for night use. Ergonomic design considerations have ensured that vital automotive functions are central to the driver.

<u>Instruments:</u>

Engine:
- Revolution counter
- Engine hour meter
- Oil pressure gauge
- Coolant temperature gauge
- Pilot light low oil pressure
- Pilot light low coolant level
- Speedometer, km/h and mph

Axles:
- Switches/pilot lights for differential locks

Brake system:
- Air pressure gauge circuit I
- Air pressure gauge circuit II
- Pilot light parking brake
- Pilot light/buzzer low air pressure

Electrical system:
- Masterswitch battery

Engine accessories:
- Pilot light battery charging

Fueltank:
- Fuel level gauge

Fire fighting panel:

Located to the right of the instrument console, there is a control panel for the fire fighting operations. Lettering with symbols and in English language.

This panel comprises:

1. Alarm switch including pilot lamp for rotating beacons and electronic siren on/off
2. Switch for airtraffic warning beacon
3. Pilot lamp for open doors (shown on display)
4. Main actuating push button:
   Operates the following as one function for ease and rapidity in bringing the fire fighting system to the operational state.
   - Start of pump engine with pilot lamp
   - Water tank suction valve open with pilot lamp
   - Priming pump starts working with pilot lamp
   - foam suction valve ready to open with pilot lamp
5. Foam concentrate selector switch 3 % and 6 %
6. Switch for underbody protection with pilot lamp
7. Selector switch automatic/manual operation
8. Water tank level gauge (shown on display)
9. Foam tank level gauge (shown on display)
10. Normal pressure manometer (shown on display)
11. Switches for L/H and R/H side foam lines with valve indicator light

Controls for monitors:

1. Pistol shape joy-stick for roof monitor RM 60 E with switches for:
   - Start: - Monitor moves automatically into attack position given by the control handle
   - Stop: - Monitor moves automatically into transport position
   - Monitor line valve open, full output
   - 50 % flow rate adjustment (with flap)
   - Deflector adjustment for dispersed stream

2. Joy-stick for bumper monitor RM 15 E with switches for
   - start/stop
   - water/foam solution discharge
   - full jet/spray jet/flat stream adjustment
   - switches for oszillating operation

Emergency control: In the event the electric or pneumatic installation should fail, all valves can be actuated manually (at each individual valve) in order to secure operation of the aircrash tender under all circumstances (override system).

Control box: A separate control box, holding all controls and switches for the Public Address System, is dashboard mounted within easy reach of the driver or co-drivers. This control box also holds controls and switches for adjusting the electronic siren just to the required signal and for simultaneous operation with the Public Address System.

Hatch: A quick opening roof hatch will be provided at the rear right side of the cabin roof to enable easy access to the roof, also manual emergency monitor operation will be possible, standing onto a step in the hatch opening.

Equipment:
- Heating and ventilating unit
- Double wipers and windscreen washing unit
- Two sun visors

Air condition: The unit provides adequate cooling capacity for the tropical climate. The cooling system compressor will be driven by the vehicle engine.

Intercommu-nication: Between cabin and monitor stand, consisting of 2 headsets with micro-phone, headphones and quick release jack and sockets.

Further equipment:
* Hooks for hanging of protection clothes
* Glove box for (6) pairs
* Space for hand lamp
* Space for VHF/AM UHF/FM Radio
* Slot for crash map etc.
* 2 Quartz clocks (GMT + local time)

4. SUPERSTRUCTURE IN GENERAL

Make: ROSENBAUER

Construction: The structure is made of aluminium in combination with formed parts made of polyester composite material. The self supporting body is fastened elastically on the chassis frame by means of conical bearings.

Design: The bodywork is designed in such a way as to allow maximum accessibility to all areas to be serviced and inspected. Provision is made for all major vehicle components to be removed in an easy way.

For this purpose, lifting eyes are provided wherever feasible. This ensures that removal and replacement do not entail unacceptable downtime.

Working deck: The tank roof is covered with a special coating, which is extremely slip resistant.

Access: A rear access ladder, integrated in the superstructure, on the L/H vehicle side. Comes with light alloy step protection. Hand grips where necessary. Additional access through the hatch in the cab.

Side storage lockers: The space below the tank module has been designed as storage lockers. There are two, each one on the R/H and L/H side of the vehicle. The lateral design of the lockers will allow maximum storage capacity and fast removal of accessories delivered with the vehicle.
Closure by means of water and dust-tight swing top doors (one door on each side).

Illumination: When opening a door, an automatic switch ensures immediate illumination of the respective locker with indication on the control panel.

Interior equipment: Brackets for the equipment which will be delivered with the vehicle. (Exact scope of equipment, which can be stored in the vehicle, will be determined in case of order.)

Bumper: Heavy duty front bumper, made of steel

Towing eyes: Two recovery/towing eyes are fitted at front and rear of the chassis.

Ladder: Brackets for storing a 2 part extension ladder will be provided on the roof.

5. WATER TANK

Capacity: 13000 litres usable

Design: The water tank is mounted completely torsion free on the chassis with flexible rubber-steel elements and is therefore suitable for roughest cross-country operation.

Construction: It is made of polypropylene, 10 to 14 mm thick, and therefore absolutely corrosion-proof.

Fittings: The design of the tank includes:

- Manhole with quick action cover release and excess pressure safety device - suitable for rapid gravity filling from an overhead tank position
- Overflow system with pressure and vacuum release
- Tank drain valve at lowest point
- Electric tank level indicator "Fludometer", with external content indicator lights
- Dismountable baffle plates, mounted in the tank's interior, to prevent a rolling motion of the contents
- Anti-swirl plates prevent a funnel formation during suction operation
- 2 hydrant filler inlets, on the L/H side, with 2 ½ " coupling and blank cap, and equipped with a butterfly type valve. Complete with non-return valve and strainer.
- 1 hydrant filler inlet on the R/H side, with Storz A coupling and blank cap, and equipped with a butterfly type valve. Complete with non-return valve and strainer.
  This inlet is equipped with an automatic tank level regulating system for direct water supply directly from the hydrant into the water tank, allowing continuous operation from tank without overflowing. Takes the surges out of high pressure inlets, prevents wasting water and fits perfect for "around the pump" foam proportioning systems.

6. FOAM COMPOUND TANK

Capacity: 1600 l usable
Note: The foam tank capacity allows for two charges of water to one foam when operating at 6 % selection.

Location: The tank is mounted separately between cabin and pump compartment.

Design: The foam compound tank is suitable for transport and storage of all known brands of synthetic and protein based foam compounds.

Construction: It is made of polypropylene, 10 to 14 mm thick, and therefore absolutely corrosion-proof.

Equipment:
- Manhole with quick action cover release and excess pressure safety device. Quick fill-up of tank by burst-pin for plastic container possible.
- Overflow system with pressure and vacuum release
- Electric tank level indicator "Fludometer"
- One tank filler inlet on the L/H side, with 2 ½ " coupling and blank cap and equipped with a ball type valve.

7. PUMP DRIVE AND PUMP

Pump drive:

Separate diesel engine for pump operation. It can be engaged during any mode of vehicle movement or standstill.

Make: DEUTZ diesel engine
Model BF06M1015CP, 6 cylinder V-engine
Output: 314 kW (427 hp) at 1900 rpm
Diesel tank: engine is fuelled from vehicle's diesel tanks

Water pump: ROSENBAUER N100

Type: Centrifugal pump with spiral casing

Material: Pump housing and impellers made of corrosion resistant light alloy
Pump shaft made of stainless steel (acc. to DIN 1.4122).

Number of stages: Single stage

Drive: Permanently connected to pump engine

Output: Designed rated output capacity up to 10000 l/min. (please refer to enclosed pump performance diagram N100)
up to 9000 l/min. at 10 bar (at water tank suction operation)

Location: Midships

Connections:
- Suction line to the tank, comes with butterfly valve
- One normal pressure outlet to the roof monitor RM 60 E
- One normal pressure outlet to the bumper monitor RM 15 E
- Two normal pressure outlets to the restricted foam side lines
- One normal pressure outlet to the unrestricted water delivery outlet
- One normal pressure outlet to the underground protection nozzles
- One connection to the foam compound pipe system for rinsing purposes

Thermal relief valve: A thermal relief valve (60 ºC) is installed in line-up discharging to atmosphere to prevent overheating of pump when pumping against closed discharge.

Priming Device:

Type: Double piston priming pump KAP 600
Actuation: Automatic, engagement by pneumatic forced belt drive
Suction height: Up to 9.0 m, therefore shortest priming time

Side Control Panel: Not fitted, all operation will be done from the cabin

Piping: Water pipework is made of stainless steel, foam concentrate pipework is made of foam concentrate resistant material (as polypro-pylene, stainless steel or brass).

Lettering: All labels and plates are in English language, where pictographs or ISO-symbols (for ease of understanding) do not serve the purpose.

Couplings: All couplings are as per BS 336 : 1989, made of light alloy. Blank caps will be fitted with ropes to prevent loss.

8. FOAM PROPORTIONING SYSTEM FOAMATIC (Model RVME 600)

Model: ROSENBAUER RVME 600 MID

Design: The foam proportioning system RVME 600 MID is an electronic controlled around the pump foam proportioning system. The proportioning rate is adjusted at 1, 3, 6 and 8%. The electronic flow meter is directly on the pressure outlet of the pump and sends the flow rate to a computer. The computer controls depending on flow- and proportioning rate the opening angle of the dosing valve. The housing of the flow meter and the dosing valves are made of corrosion resistant material. The paddle wheel of the flow meter is made of resistant plastic.

The foam proportioning system "RVME 600" is suitable for protein based foam compounds, as well as for synthetic foam compound and AFFF.

The automatic foam proportioning is done with low pressure loss and operates within the pump output range of 200 l and 9000 l/min. as well as at the pump pressure between 5 bar and maximum pump pressure.
Our standard rates are 3 % and 6 %.

Connections:
- One valved suction line to the foam compound tank
- One valved external suction and flushing line, with Storz C, fixed and blind coupling in brass, for suction operation from external supply.

9. ROOF MONITOR

Make: ROSENBAUER

Model: RM 60 E (electronic)

Type: For water and foam operation, with air-aspirating foam barrel, suitable for all foams, complete with deflector.

Material: Corrosion resistant light alloy

Location: On the cabin's roof

Actuation: Remote-controlled from inside the cabin, by a single hand "slave type" pistol shape joy-stick, which will always indicate the direction of the monitor barrel. Manual operation by handwheels from the cabin's roof is possible.

Monitor housing
- water tank level gauge
- foam compound tank level gauge
- normal pressure manometer
- actuation water/foam operation switch
- flow rate adjustment switch
- deflector adjustment switch
- throttle hand lever (engine speed), separately mounted

Output: Dual discharge: 6000 l/min. at 10 bar (100 %) or
3000 l/min. at 10 bar (50 %), for economic use of agent

Operation ranges: At windless conditions and 10 bar outlet pressure:
Water or foam straight stream - throw range:
approx. 90 m at 6000 l/min.
approx. 65 m at 3000 l/min.

Rotation: 270 ° total (135 ° in each direction)

Elevation: -15 ° to +70 °

Depression: From zero to maximum minus 15 °. Due to the shape of the cab and the contours of the working deck, the depression angle may be smaller when measured over the rotating beacons, ladder fixtures etc. The monitor movements are automatically controlled in such a way, that vehicle mounted obstacles like rotating beacons, ladder fixtures etc. will not be hit by the monitor barrel.

Searchlights: In order to facilitate night operations, two halogen 70 W searchlights are fitted on the monitor.

10. BUMPER MONITOR

Make: ROSENBAUER

Model: RM 15 E, with oszillation mode

Type: For water and AFFF operation, with non-aspirating nozzle

Material: Corrosion resistant light alloy

Location: On the front bumper

Actuation: Remote-controlled from inside the cabin, by a joy-stick

Range: At windless conditions and 10 bar outlet pressure:
Water or foam straight stream - throw range: approx. 50 m

Output: 1500 l/min. at 10 bar

Rotation: max. 180 º (+/- 90 °)

Elevation: -30 ° to +70 º

11. FOAM SIDE LINES

Two foam side line delivery outlets will be provided, one on each side of the vehicle's side lockers. The outlet valves will be fitted with 2 ½ " BS instantaneous female couplings. The delivery will be operated pneumatically from the cab and will be fitted with manual override valves.

Each delivery outlet is prepared for rapid connection of the following items:

1 Foam Making Branchpipe model "FB 10/10"
Short version. Maximum flow rate 455 l/min. at 7 bar. Average foam expansion: 10x. Throw range: approx. 21 m. With spray jet nozzle and 2,5 " BS male instantaneous coupling, complete with shutt-off valve. Made of light alloy.
Weight: 5 kg.
Order No. D01068

1 Fire Hose "Professional"
All synthetic hose, encased in a blend of high tensile PVC/nitrile rubber, forming a unified lining and cover. Corresponds to BS 6391:1983 for type 3 hose, and certified as to DIN 14811. Test pressure 25 bar, burst pressure 50 bar. Each hose 30 m long, diameter 45 mm, complete with 2,5 " BS instantaneous couplings made of light alloy.
Order No. D00919

Items will be fitted in suitable brackets for rapid removal. Hose and branchpipe will be taken out from the accessories as mentioned in list BLUAE-05037A dated 2005-08-25.

12. UNRESTRICTED WATER DELIVERY OUTLET

One unrestricted water delivery outlet, to provide pump pressure governed flow for aircraft interior fires, shall be provided on the L/H side of the vehicle. Fitted with manual valve and 2 ½ " BS instantaneous female coupling with blank cap. The delivery outlet shall be operated manually.

13. UNDERBODY PROTECTION

Design: The system is designed to control ground fires, caused by run-out aviation fuel etc. and to protect the undercarriage of the vehicle.

Location: 3 nozzles in front of the 1. axle (horizontal type)
2 nozzles in front of the 2. axle
2 nozzles between 3. and 4. axle

Output: Each nozzle has an output of approx. 70 l/min.

Throw range: 2 to 3 m semi-circular or circular

Control system: Remote-controlled from driver's cab.

14. DRY POWDER UNIT

Model: PLA 250

Location: midships

Design: One dry powder container holding 225 kg of **Monnex** dry chemical powder.

Working pressure: The dry chemical powder container is laid out for an operational pressure of 12 - 13 bar and all safety valves are set to blow off at 14 bar.

Standards: The dry chemical powder container is made in accordance with the prevailing German standards for design and manufacturing of pressure vessels "AD-Merkblätter B 0, 1, 3 and W 1". All materials used are as per DIN standards.
The manufacturing process is under supervision of the German TÜV (State Technical Supervision Agency) and a copy of the test certificates will be delivered with the powder unit.

Lettering: All labels and plates are in English and Arabic language, where pictographs or ISO-symbols (for ease of understanding) do not serve the purpose.

Controls:
- 1 valve for pressurizing the powder container
- 1 lever for powder discharge hose
- 1 control for flushing discharge hose and powder container
- 1 pressure gauge for powder container
- 1 pressure gauge for nitrogen cylinder

Inert gas: One 25 litres capacity nitrogen cylinder, filled at a pressure of 200 bar, serves as propellant for the dry chemical powder. The filling pressure is related to a temperature of 15 °C. Testing pressure of the cylinder is 300 bar.
The nitrogen used is 99,9 % pure, with a maximum steam content of 30 ppm. The cylinder is clearly marked with the word "N I T R O G E N".
Pressurizing time of container: Within 12 - 15 seconds.

Painting: Fire red RAL 3000 for powder container, lines and valves.

Spare cylinder: One filled nitrogen spare cylinder will be delivered loose with the vehicle.

Hose: One collapsible, electrical conductive powder hose, 30 m long, 25 mm internal diameter, is stored in the front of the vehicle. The end of the hose is fitted with a trigger operated powder nozzle.
Output: 2,5 kg/sec.
Throw range: approx. 8 m at still air

Quick activation system: Fitted on the dashboard in the driver's cab there is a control with pilot lamp for pressurizing the dry powder container so that the pressurizing can take place during the approach to the scene of the fire. In this way, precious time can be saved and the powder unit can be used immediately upon arrival.

15. ELECTRICAL EQUIPMENT

Road lighting: In compliance with national highway codes, comprising:
2 front and 2 rear direction lights with amber lens
2 headlights (halogen) and 2 high beam headlights (Xenon)
2 additional fog lights
2 additional airfield long range lights (Xenon)
2 combination stop and taillights (red lens)
2 back-up lights (clear lens)

Illumination: Lighting system for the interior of the cab, pump room and storage lockers.

Warning equipment: Each 1 flashing light is integrated in the L/H and R/H roof/side blue cover
Each 1 flashing light is integrated in the L/H and R/H side blue cover at rear superstructure
Audible reverse alarm.
1 electronic "wail-yelp" siren with control panel (model Federal, PA 300) and integrated Public Address System, with built-in front panel micro-phone.

Battery switch: A battery main switch for cutting all power from the battery is provided.

Radio system: One mobile VHF multi-channel radio, model ICOM A110 with speaker microphone, front mounted loudspeaker, headset, headset adapter, moun-ting bracket, internal electrical wiring and antenna.

Frequency range:	118 – 136,975 MHz
Pre-connected channels:	118,75 / 121,65 / 121,70 / 121,90 MHz (other frequencies please specify)

Two walkie-talkies, model ICOM IC-A3

Miscellaneous: One 230 V drive-away socket and plug is fitted in the rear of the vehicle for power supply of the following equipment:

- Drive engine cooling water preheating 230 V
- Pump engine cooling water preheating 230 V
- Automatic battery recharger 220 V, with overcharge protection
- Air compressor 230 V

Illumination system: Special 24 V lighting system for surrounding illumination consisting of 10 lamps (5 on each side) that will be fitted on the roof for increased safety during night operation.

FLIR-camera: A **F**orward **L**ooking **I**nfra**R**ed camera system (FLIR) will be fitted in/on the driver's cabin. This system consists of Raytheon's 4000B infrared camera (cold start to IR video image approx. 60 seconds, dector range up to 450 meters for a person) including joystick controlled pan/tilt function. Images will be shown on the vehicles main display (no separate monitor).

16. FINISH

Superstructure: Combined red RAL 3000 and grey colour

Frame: black RAL 9005

Bumpers: grey

Rims: silver

Rust Protection: Protection of the underpart and substructures with bitumen base protection coating.

Light alloy: anodized, unpainted

Tyre pressure lettering: above the wheels in bar

Logo: Logo according to customer's requirements.

17. DOCUMENTATION

Chassis: According to chassis manufacturer's delivery extent
2 Operation manuals - English language
2 Spare part catalogues - English language
2 Workshop manuals - English language
1 Service book
1 Data card
1 Type plate, GVW and chassis number

Superstructure/Pump:
2 Operation manuals - English language
2 Spare part catalogues - English language
2 Workshop manuals - English language
1 Type plate for the chassis, engine, superstructure in the cab
1 Type plate of actual weight
1 Type plate for pump
1 Guarantee certificate

18. CONDENSED TECHNICAL DATA

Engine output:	735 kW (1000 hp) at 2300 rpm acc. to DIN 70020
Max. torque:	3500 Nm at 1500 rpm acc. to DIN 70020
Acceleration from 0 - 80 km/h: (at GVW of 39,5 t)	within 25 seconds
Top speed:	approx. 138 km/h
Climbing ability:	up to 50 %

Wheelbase:	1930 - 3570 - 1500 mm
Track circle diameter:	approx. 26,5 m
Turning circle diameter:	approx. 28,5 m
Underaxle clearance:	front: 464 mm rear: 421 mm
Angle of approach:	approx. 30 °
Angle of departure:	approx. 30 °
Interaxle clearance:	approx. 30 °
Calculated tilt angle:	33 °
Overall length:	approx. 12070 mm
Overall width:	approx. 3000 mm
Overall height, unladen:	approx. 3650 mm
Permissible gross vehicle weight: Actual gross vehicle weight:	40000 kg approx. 39500 kg
Permissible front axles load: Actual front axle load:	20000 kg approx. 19000 kg
Permissible rear axles load: Actual rear axle load:	22000 kg approx. 20500 kg
Shipping weight:	approx. 22500 kg

Note: All dimensions and mass are approximate and may vary on manufacture.

19. ACCESSORIES

A full set of fire fighting accessories as per enclosed list no. BLUAE-05037 (RESCUE) dated 2005-08-25 will be delivered with the vehicle. All items will be securely mounted in/on heavy duty brackets, that will allow for fast removal.

20. TESTING

Each vehicle will be subjected to a severe control and testing program before delivery. These tests are laid down in the Rosenbauer Quality Control Program.

Vehicle: Typical tests for the automotive section are:

- Dimension check
- Weight measuring, fully loaded and empty
- Road test, including acceleration and top speed
- Brake test
- Turning diameter
- Electrical system, complete function test
- Tilt test

Fire fighting: Typical tests for the fire fighting section are:

- Pump test
- Tank capacities
- Fire fighting system tests, including monitor performance
- Proportioning system calibration check
- Foam quality test