



*Illustrations similar*

# AIRPORT FIRE FIGHTING AND RESCUE VEHICLE

## TECHNICAL SPECIFICATION – **FALCON 6**

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## 1 . S U M M A R Y

### A – CHASSIS

Configuration	:	6x6
Cabin	:	Aerodynamic
Air Conditioning	:	Available
Crew	:	1 + 3
Steering	:	Power Steering, Centre Left
Engine Power	:	566 kW @ 1800 RPM 770 Metric Hp @ 1800 RPM
Max. Torque	:	3183 Nm @ 1500 RPM
Transmission	:	Automatic
Braking System	:	Disc Brake Anti – Lock Braking System (ABS) + EBS
Suspension	:	Coil spring
Load variant	:	13Tx13Tx13T (39T)
Tyres	:	16.00 R 20

### B – PERFORMANCE

Acceleration	:	0–80 km in 35 sec
Top Speed	:	≥ 115 Km/Hr.
Approach Angle	:	30 degrees
Departure Angle	:	30 degrees

Turning diameter (from wall to wall)	:	less than 3x vehicle length
Inter-axle clearance	:	12°
Under-axle clearance at differential housing bowl:		350 mm
Diagonal opposite wheel motion	:	360 mm
Overall Length	:	Approx. 12,000 mm
Overall Width	:	Approx. 3,140 mm w/o mirror (Over mirror 3,450 mm)
Overall Height	:	Approx. 4,000 mm

**Service Brake:**

a) Stopping distance	:	33 – 0 Km/Hr. less than 12 m 64 – 0 Km/Hr. less than 49 m
b) Grade holding on fully loaded vehicle	:	Ascending 50% Descending 50%

**Emergency Brake:**

Stopping distance from 0-64 km/h	:	within 88 m
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**Parking Brake:**

Grade holding on fully loaded vehicle	:	Ascending 20% Descending 20%
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**Side slope Stability:**

Degree	:	30°
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**Evasive Maneuver test:**

NATO doc AVTP 03-16W	:	attain 40 km/hr. (25mph) speeding in the evasive maneuver test
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**J Turn test 90 degree:**

46m radius turn	:	attain 48 km/hr. (30 mph) speeding
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**C – FIRE FIGHTING SYSTEM**

Water Tank	:	9,000 Litres
Foam Tank	:	1,150 Litres
Water Pump	:	8,000 LPM at 10 Bar
Foam Proportioning System	:	Automatic Around – The – Pump (0 – 10%)

Roof Monitor	:	Air Aspirated Remote Controlled 5,000/2,500 LPM (Dual flow)
Bumper Turret	:	Non – Aspirated Remote Controlled, up to 2900 LPM
Water/Foam Hose Reel	:	1.25” x 30 m (100’)—Electric & Manual Rewind
Side Deliveries	:	4 Nos. – 2.5” (2 on each side)
Under Truck Nozzles	:	7 Nos. (3+2+2)
DCP System	:	250 kg / 550 lbs
Body Mounting	:	Flexible by Rubber Blocks
Finish	:	As per customer requirement

## 2. INTRODUCTION

The NAFFCO Aircraft Rescue and Fire Fighting Vehicle is designed to current and anticipated requirements of major hub international airports based on the performance criteria of NFPA 414 and ICAO standards.

This vehicle is designed to operate in tropical zones at high temperatures and in a salt laden, high humidity atmosphere.

It is also designed to provide ease of operation, safety, reliability and accessibility for repair and maintenance.

This vehicle is designed and built according to NAFFCO procedures fulfilling the Standards of AS 9100 & ISO 9001



The vehicle is based on a 6x6 purpose built chassis having a high performance rear mounted diesel engine, fully automatic transmission. It is designed to pump water or water/foam solution on the move. The crew cab is designed in a modern style to allow crew safety and ease of operation.

The vehicle carries 9,000 litres of water, 1,150 litres of foam and 250 kg (550lbs) of dry chemical powder.



**Fire-fighting equipment includes the following:**

- Centrifugal Fire Pump, with “Pump & Roll” operation
- Remote Controlled Roof Monitor, Air Aspirated
- Remote Controlled Bumper Turret Non Air Aspirated
- Side mounted Water/Foam Hose Reel
- Side fitted Water/Foam hand line outlets (left/right)
- Under truck protection nozzles
- Dry chemical powder system

The vehicle is designed with a modular concept and takes into consideration easy access for routine maintenance.

### **3 . C H A S S I S**

The chassis has been designed and certified in the NFPA 414 for ARFF vehicles to have a very good elasticity of torsion allowing to work on uneven grounds without causing any load concentration on suspensions, axles and on the chassis itself.

#### **3.1 FRAME**

The frame is made in special heavy steel with high yielding limit consisting of Two (2) Longitudinal beams reinforced together by Cross Members. All Structural Fasteners used in the frame will be of high-grade bolts & vibration resistant nuts. The Chassis is designed to have a very good elasticity of torsion. 2 traction eyes front and rear side at the longitudinal beams of the frame designed for the GVW of the vehicle

#### **HEAVY DUTY FRONT/REAR BUMPER**

Heavy Duty stainless steel front/rear bumpers will be provided and bolted directly to the chassis frame rails. This will provide protection in off road conditions.

## 3.2 ENGINE

SCANIA DC16 092A, V8 cylinder IN-LINE. Diesel engine, water-cooled, rearward

Exhaust emission : Tier 4F, with exhaust after-treatment and SCR-System  
Displacement : 16.4 liter  
Max. Output : up to 566 kW (770 hp) @ 1800 rpm  
Max. Torque : up to 3183 Nm @ 1500 rpm

Direct injection, turbo charged with diagnostic plug for connection with the SCANIA diagnostic system.

Load-proof for firefighting use (-30°C up to +50° C)

Engine brake via throttle valve in exhaust line

Engine “High-Idle Switch”

CAN-BUS interface for body manufacturer via J1939 protocol.



### 3.2.1 COOLING /RADIATOR

Water cooling unit, thermostatically controlled, mounted rear side  
Electric filling level control of the expansion tank

Maximum load-proof for firefighting use (-25°C up to +50° C) for minimum 2 hours permanent firefighting pump operation.

The cooling system is protected against soiling under extreme conditions.

### 3.2.2 AIR CLEANER

Dry air filter with exchangeable cartridge and dirt indication

### 3.2.2 EXHAUST

Rear side mounted, with one high grade rust resistant exhaust silencer  
Exhaust collection pipe vertically led up over the superstructure with elbow on the tail pipe.

### 3.2.4 FUEL TANK

300 Liter (in aluminum) with lockable cap and drain at bottom  
Ad-blue tank provided

## 3.3 ELECTRICAL SYSTEM

Voltage 24 V, IP65  
Lead-Batteries: 2 x 12 V / 180 Ah, (maintenance free)  
Alternator: 1 x 150 A / 24 V and 1 x 100 A / 24 V

## 3.4 TRANSMISSION

Brand: Twin-Disc/USA  
Model: TD61-1179 Series

6 - Speed automatic gearbox switchable under load with torque converter and integrated power divider.

Full time all-wheel drive with differential lock. 30-70 biasing differentials available for 6x6 vehicles.

High capacity PTO clutch with ability to shift at any engine speed.

State of the art TDEC-501 electronic control system.

Increased firefighting efficiency: the twin disc transmission system permits faster shifts, rapid acceleration and precise control of vehicle speed to meet ground requirements and varying tractive conditions. The vehicle gets to location faster and starts pumping sooner to fight life-threatening fires quickly.

Ease of use: advanced electronic control system tailored for ARFF vehicles integrates the control of drive mode, PTO engagement, pump and roll mode and frees the vehicle operator to concentrate on the primary mission. Simple operation reduces training requirements.

Reduced downtime: durable heavy-duty components, combined with electronic controls which prevent

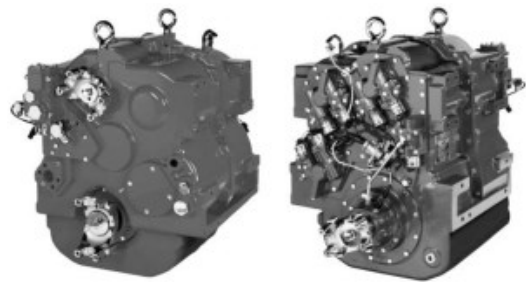


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overspeed, shift shocks and reduce the effects of operator's error, result in increased machine availability and less wear and tear on other machine components.

Extended service life: the 1179 transmission system utilizes the same components used in heavy-duty off-highway units. This assures long life in ARFF vehicle operation.

Integrated system components: torque converter with integral power dividing, drop box-type transmission and advanced electronic controls are all designed to work together as a system rather than a collection of parts

**Gear ratios:**

- |         |              |
|---------|--------------|
| 1. 6.03 | 4. 1.70      |
| 2. 3.95 | 5. 1.12      |
| 3. 2.61 | 6. 0.74      |
| R. 6.70 | Overall 8.18 |

### 3.5 AXLES

**Front Axle:** Steerable with differential lock

**Rear Axle:** With longitudinal and lateral diff. lock

**Rear axle:** With differential lock

### 3.6 SUSPENSIONS

The chassis stability is enhanced by the use of progressive coil suspension system, double bumpers and stabilizers to provide excellent on- and off-runway mobility, enhanced comfort as well as cornering and roll stability.

**Front:**

Progressive coil spring suspension with double-bumpers and stabilizer to guarantee superior off-road capabilities.

**Rear:**

Progressive coil spring suspension with double-bumpers and stabilizer on the rear axle to guarantee superior off-road capabilities.

### 3.7 WHEELS AND TYRES

Single tyre front axle - 16.00 R 20  
Single tyre rear axle - 16.00 R 20  
Spare tyre , Rims – 1 set (loose)

### 3.8 BRAKES

Dual circuit brake system with ABS (anti-lock system) and EBS (Electronic brake system), complied with the requirements of ECE R13

Compressed-air disk brakes effective on front axle and rear axles.  
Spring loaded parking brake effective on both rear axles.  
Retardation min. 2 m/sec<sup>2</sup> at 30 km/h

**Service brake performance:** 32 km/h – 0 in less than 12 m  
64 km/h – 0 in less than 49 m  
Holding capacity > 50% slope

#### **Parking brake and Emergency**

**Brake performance:** 64 km/h – 0 in less than 88 m  
Holding capacity > 20% slope

### 3.9 STEERING

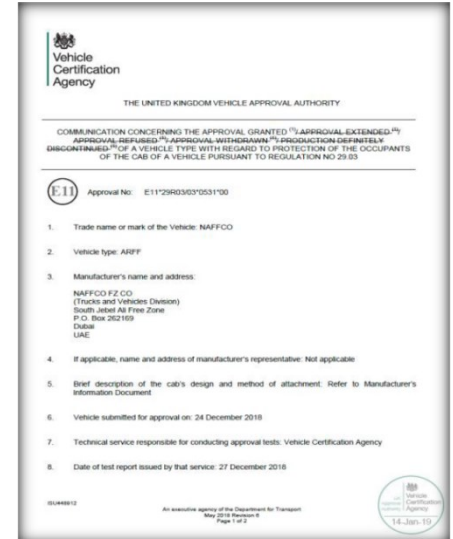
Power steering gear  
Centre left hand steering position  
Dual circuit with emergency steering pump

## 4. CREW CAB

### CAB TYPE

- CERTIFIED AS PER ECER 29.03 BY PHYSICAL TEST.
- TWO DOOR STYLE
- **LIGHT WEIGHT, GRP WITH ALUMINIUM ROLL CAGE INTEGRATED IN GRP.**
- SINGLE PIECE WINDSHIELD, HIGH VISIBILITY
- INTERIOR VOLUME 8 CUBIC METERS

The cab is fully enclosed, lightweight and will be guaranteed for corrosion for fifteen years and will be capable of comfortably accommodating of **one driver and three (3) fire fighter in full fire-fighting turnout gear**. The cab will be constructed from materials of adequate strength to ensure a high degree of safety for the crew under all operating conditions, including excess heat exposure and vehicle rollover accidents



### 4.1 CAB CONSTRUCTION

Aerodynamic GRP external shape and integrated aluminium roll cage in accordance with all applicable safety requirements will provide a high strength, self-contained module, ensuring maximum crew protection in the event of external impact.

All cabin interior panels made from ABS. To ensure superior insulating properties and low noise levels within the cab, the roof and vertical walls will be fully insulated with heat/noise suppressing materials to ensure the noise level within the cab does not exceed 85 dBA during normal operational conditions.



The cab floor will be covered with heavy duty, rubber matting, which will provide a durable non-slip, noise suppressing, easy clean surface. Trim will be provided to prevent damage to the matting edges.

## MECHANICAL CONTROLS

- Engine speed – foot
- Brake – foot
- Brake – hand
- Gear selector – hand
- Steering wheel

## 4.2 CAB ACCESS

Access to cabin is provided through the Two (2) forward-hinged cab doors; doors are full glass exterior equipped with vertical electric operated sliding windows and door handles. A wide door opening of approximately 90°, and an opening height of approx. 1900 mm (75”), including antiskid entry steps, will assist in the safe entry and egress of crew member.

The cabin access steps are automated deployed when door opens and automatically stored while vehicle drives to ensure the 30-degree approach angle

## 4.3 DRIVING CONSOLE

The console is designed to reflect the clean modern lines of the interior and is positioned offset, forward of the driver.

In the digital TFT display all driving information's and indicators for the chassis are provided effectively and can be clearly seen by the driver.

The switches are illuminated and a complete warning system with indicator symbols/lights and audible alarms will be provided.

Gauges:

- Speedometer, electronic with trip odometer
- Tachometer, electronic with engine hour meter
- Pump hour meter
- Engine oil pressure gauge in Bar
- Transmission oil temperature
- Air pressure gauges in Bar
- Coolant temperature

- Fuel level / Ad Blue Level
- Voltmeter

**Warning indicators:**

- High coolant temperature, warning light and alarm
- Low pressure brake-air-supply, warning light and alarm
- Low engine oil pressure, warning light and alarm
- Low coolant level, warning light and alarm
- Alternator not charging light
- Low fuel level
- Stop engine and check engine
- Differential locks (front locked, rear locked, inter axle locked)
- Turn signals, left/right
- Hazard, 4-way flasher
- Headlight on & main beam light
- Parking brake engaged

Specialist diagnostic tool to permit analysis of engine and transmission management system not necessary.

Fault diagnostic to enable optimum engine & transmission performance via TFT dashboard display in the cab

## 4.4 FIREFIGHTING CONSOLE

Featuring a dedicated TFT display, the console is located in front – right of the driver, accessible from driver as well as officer seats.

*Language support available in several languages, English being default*

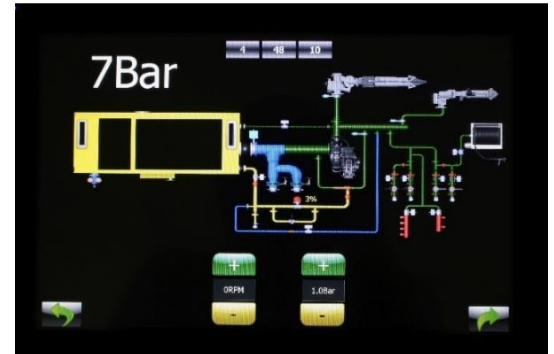
The access to the commands can be done simply by touching the screen, however a backup is provided by means of rocker switches for the main controls.

The flow diagram of the system can be accessed on same screen, and possibility of direct interaction is provided.

*Illustrations similar*

The flow is dynamically represented and the conditions of the valves can be controlled also by touching the screen on the particular outlet:

- Pump start (in stationary mode)
- Roof turret
- Bumper Monitor
- Hose reel
- Ground nozzles



**A backup function is provided for main operations by means of switches in case of TFT screen fault.**

## 4.5 VISIBILITY

A single piece windshield will be provided. The deep side windows and cab door glass will provide superior visibility and will be tinted, shatterproof safety glass, free from imperfections and will have a minimum viewing area to exceed FAA requirements. An appropriate interior transparent sun visor and or a sunshade will be installed for reduction of sun glare into the cab area as necessary.



## 4.6 WINDSHIELD WIPERS AND WASHER

Dual, electric operated, synchronised radial type windshield wipers will be provided. Wipers will have "HI/LO" operating speeds.

Wiper arms are designed and manufactured to present a pleasing smoothness of profile and stylish appearance that complements the front of the vehicle. A windshield deluge system separate from the windshield wiper system, will be included to cool the windshield and to provide operator visibility during periods of high radiant heat, fire-fighting operations. It will be designed to flood the windshield with clear water when activated. Clear water will be discharged under sufficient pressure and in a pattern that ensures the driver/operator's field of vision can be kept clear of foam solution where used in conjunction with the windshield wiper.

## 4.7 CAB MIRRORS

Large heated and motorised, true image rear view mirrors are mounted on each side of the cab, forward of the cab doors. Each mirror will be individually remote controlled from the driver's position. The mirror heating elements will be controlled by a single dash mounted switch. Blind spot mirrors are provided as part of rear view mirrors assembly.

## 4.8 LIGHTING - CAB INTERIOR

The interior illumination is done using RGBW LED strips allowing the driver to select the light mode from the TFT screen in the driver console. A strip LED light will be provided in each side opening, cab door step well. These lights will activate with the respective door switch.

## 4.9 CREW'S SEATS

Adjustable driver seat and three individual SCBA jump seats, one for co-driver and two at back of the driver (complying NFPA 1901) will be provided. The Seats include features as quick release mechanism for SCBA and a flip up seat in order to maximize the space for firemen movements inside cabin. The seats will be upholstered with heavy-duty material or equivalent.



## 4.10 CLIMATE CONTROL

A climate-control system will be provided for total cab environmental comfort. This system will provide heat, cooling and defrost capabilities to various areas in the cab. Appropriate louvers and ductwork will be provided to direct heating and air conditioning to all cab areas.

## 5. BODY WORK

The superstructure is designed in modules and style to complement the modern lines of the crew cab, with complete external faces done from moulded GRP panels. Detachable panels are provided within each module where access to chassis components is required for maintenance or inspection purposes. The superstructure comprises the following:



**Total capacity of compartments exceeds 1,500 Litter / sides**

### 5.1 SIDE FRONT LOCKER (COMPARTMENT 1)

Two large volume lockers are provided behind the cabin, one on each side for housing equipment and other accessories with suitable access panels for maintenance purposes. These two lockers are closed by aluminium roller shutters.

Able to support minimum 100kg of tools / equipment

### 5.2 LOW LEVEL LOCKERS (COMPARTMENT 2)

Two low level lockers one of each side are located below the water/foam tank assembly and between the front and rear axles. The lockers are closed by aluminium roller shutter fitted with necessary mounting brackets for keeping the different accessories provided with the vehicle.

Able to support minimum 100kg of tools / equipment.

## 5.3 SHUTTERS

The shutters are fitted with weatherproof seals all round. The shutters are fitted with built-in LED strip lights on the sides to fully illuminate the lockers. Warning indication for shutter open is available in driver console.

## 5.4 ENGINE COMPARTMENT (COMPARTMENT 3)

The rear engine cover is a single module made of corrosion resistant tubes covered with GRP enclosing the engine, batteries, fuel tank etc. and can be opened upwards for access to the engine, transmission and radiator by means of 2 side mounted upward lifting doors.  
Able to support minimum 100kg of tools / equipment

## 5.5 ROOF ACCESS

A retractable ladder located at the rear of the vehicle. The ladder with non-slip treads incorporates a lower section of the fold down type for easy access. Height of the bottom step to the ground is approximately 450 mm.

## 5.6 HAND GRAB/RAILS

Hand/grab rails are positioned where necessary to ensure ease and safety of crew members.

## 5.7 MOUNTING BRACKETS

Brackets are provided as required to ensure the secure stowage of equipment either in the cab or lockers.

## 5.8 MISCELLANEOUS

Tank fill connections, diesel fuel access etc. are located within the body line to maintain clean body lines.

All wiring and tubing is securely clipped and located within protected areas, if they pass through panels, adequate protection is given to prevent chafing.

All removable access panels are fitted with quick release fastener.

## 6. WATER & FOAM SYSTEM

The system comprises the following:

- Water pump, Power Divider driven
- Automatic Foam proportioning system (around-the-pump)
- Joystick controlled air aspirated roof turret
- Joystick controlled front bumper turret (non-aspirated)
- Side mounted water/foam hose reel
- Right side Outlets
- Left side Outlets
- Under truck protection nozzles (7 Nos.)

The above components are suitable for use with all current foam concentrates including AFFF and FFFP. The frame work is flexibly mounted to minimise stresses in the frame and noise/vibration from the transmission entering the cab when the fire pump is in operation.

### 6.1 WATER PUMP

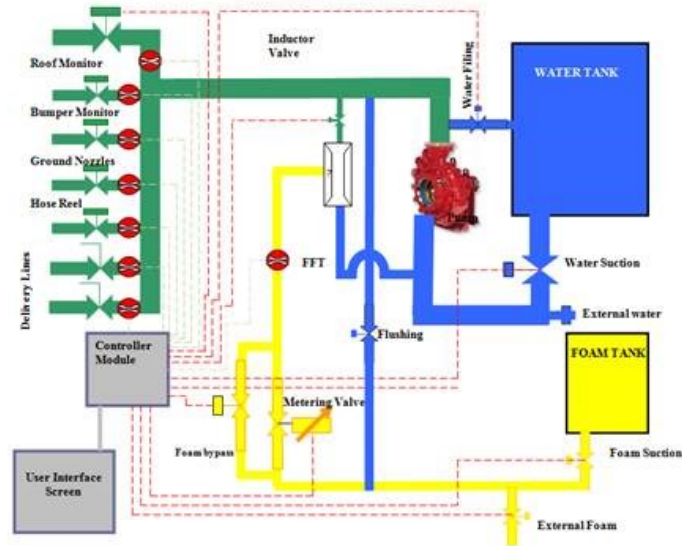
Brand	:	Shield/UK
Drive	:	By Power Divider
Type	:	Centrifugal Pump, Single Stage, Normal Pressure
Material	:	Gun metal
Rated Capacity	:	Up to 8,000 lpm at 10 bar
Priming system	:	Automatic Priming



Can be operated during pump and roll mode  
Allows discharge of extinguishing agent while vehicle operation.

The connecting ends (couplings) of a fire truck to fire hoses will meet the following requirements ГOCT P 53279-2009 (Russia) Bogdanov type.

## 6.2 FOAM PROPORTIONING SYSTEM



Manufacturer	:	NAFFCO (U.A.E)
Model	:	NAFFS-AATP
		Electronic controlled proportioning for flows up to 10 000 lpm.
Mixing ratio	:	Programmable foam ratios between 0-10%. 3%, 6% standard.
Certifications	:	UL classified as per NFPA 1901, clause 20.10 for 3% and 6%.

This around-the-pump foam proportioning system will automatically maintain selected foam percent mixture regardless of discharge water flow fluctuations. Around-the-pump proportioning system operates with an inductor installed between the water pump discharge and suction. A small flow of water from the pump discharge passes through the inductor and creates a vacuum that draws foam concentrate into the inductor and ejects it into the intake side of the pump.

The NAFFS-AATP is PLC controlled and easy to use. The controls can be available on both cabin and pump control panels. Easy to use touch screen interface as well as backup through rocker switches and manual metering valve can be provided. Therefore, in case of malfunction of flow meters or in case of flow under the system capability, NAFFS-AATP automatic features can be overridden in two modes. First backup mode overrides the automatic system features and allows the control of the metering valve position directly and second backup mode will bypass completely the electrical metering valve allowing the manual setting through manual bypass valve similar with the manual Around the Pump Systems. Designed to be used with class B foam.

### 6.3 ROOF MONITOR

<b>Brand</b>	:	Elkhart Brass USA
<b>Model</b>	:	Cobra
<b>Type</b>	:	Air Aspirated/dual flow
<b>Controls</b>	:	Main: Remote Control (joystick) Backup: Manually controlled from cabin roof
<b>Flow Rate</b>	:	5000 / 2500 LPM
<b>Rotation</b>	:	Horizontal rotation up to 350° Vertical travel from +90° & -15°
<b>Power</b>	:	24 V
<b>Location</b>	:	Over the Cabin Roof, front side
<b>Standards</b>	:	NFPA 414 and FAA
<b>Throw Range</b>	:	85m



### 6.4 BUMPER TURRET

<b>Brand</b>	:	Shield / UK
<b>Control</b>	:	Joystick Operated Remote Control (Which can be operated either by driver or co-driver through a selector switch)
<b>Flow rate</b>	:	Selectable to 950-1525-2100-2900 LPM
<b>Material</b>	:	Made Of durable alloy
<b>Rotation</b>	:	180° horizontal travel



135° vertical travel +90° to - 45°

**Location** : Fitted on the front bumper

**Throw range** : 46 m (still condition)

## 6.5 HOSE REEL

One (1) quick attack hose reel mounted in a lateral compartment with quick access and deployment capability.

Electric as well as manual drive to rewind the semi-rigid rubber hose will be provided and incorporated in the hose drum in order to save space.

The hose reel delivery has unregulated pressure.

**Hose Size** : 32 mm (1.25")

**Hose Length** : 30 m (100')

**Output** : Adjustable nozzle up to 230 lpm

**Jet Pattern** : Nozzle capable of full jet and wide angle fog.

## 6.6 SIDE HANDLINES

Four (4) sides line connections, two (2) each side, are provided in the lower between axle lockers.

- Two (2) 2.5-inch (65 mm) pressure restricted discharge connections (one on each side) electro pneumatically operated

- Two (2) 2.5-inch (65 mm) pressure unrestricted discharge connections (one on each side) manually operated

## 6.7 UNDERTRUCK PROTECTION NOZZLES

Under truck protection nozzles, directional spray type, are located in broad of each wheel and below the engine and are controlled by a pneumatically operated valve from the driver's console and can be operated independently or simultaneously with the monitor discharge while the vehicle is stationary or moving.



## 6.8 PIPE WORK

All pipe work is manufactured from stainless steel (SS316 L). All valves are made out of stainless steel 316L.

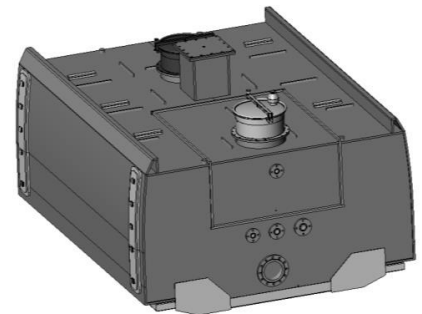
All pipes are designed to enable valves and components to be removed with the minimum of disturbance to other components and pipe work.

## 7. WATER & FOAM TANK

The water and foam tank (integrated) is located between the front storage lockers and the rear engine cover.

The tank outlets will be arranged to permit use of varies of percentages of the rated capacity with the vehicle positioned on:

Condition (Position)	Percentage (usable capacity)
20% Side Slope	Min. 90%
30% Ascending grade	85%
30% Descending grade	85%



### 7.1 WATER TANK

Capacity: 9,000 litres geometric

### 7.2 FOAM TANK

Capacity: 1,150 litres (usable)

### 7.3 CONSTRUCTION

The water and foam tank is made of Polypropylene [PP] material to minimise any corrosion which may be caused by using brackish water. The tank is fully baffled transversely and longitudinally to minimise liquid surge when the vehicle is moving. Large area apertures are included in the baffles to provide free access to all areas of the tank interior for cleaning and inspection purposes.

## 7.4 MOUNTING

The tank cradle is flexibly mounted on the main chassis frame through heavy duty steel / rubber mounting blocks which will ensure flexible movement of tank during on/off driving and hence protect the tank from any torsion stresses.

## 7.5 TANK FILLINGS

Access to both the water and foam tank interior is provided by 500mm SS 316 manholes located on the top each complete with a hinged fill/inspection lid with locking mechanism.

Each tank is vented to atmosphere through a baffled overflow to prevent possible damage to the tanks when filling or discharging at maximum output. The overspill design restricts any media while the vehicle is moving, any losses that may occur are discharged clear of the chassis components.

Tank Fill	Water	2 Connections each side (total 4 connections)
	Foam	1 Connection right hand side

Each tank is provided with drain pipe with manually operated shut off valve.

## 7.6 FOAM TANK FILL/DRAIN

A coupling complete with a manually operated valve and dust cap with chain are provided at the right hand side low level locker, for foam take external filling. Tank drain with brass ball valve provided at side bottom.

For tank fill two pumps are provided.

## 7.7 FLUSHING

After firefighting operations involving the use of foam concentrates the system can be cleaned of all traces of foam concentrate by including clean water downstream of the tank isolating valve and discharging through all delivery outlets until the water flow is clear.

## 7.8 PNEUMATIC SERVICES PANEL

This panel is located within the firefighting pump module and contains all the pneumatic systems components including filters, air driers, lubrications etc. but excluding valve actuators and control switches.

All superstructure pneumatic piping is nylon type and colour for easy identification and located in protected areas.

## 7.9 EMERGENCY

In the event of the electric or pneumatic installation failure, control of all the valves are to be actuated manually in order to ensure operation of the air crash tender under all circumstances (override system)

## 8. PUMP CONTROL PANEL

For control of the stationary pumping operations, the unit is provided with Two (2) TFT HMI (Human Machine Interface) located at RHS and LHS of vehicle immediately behind crew cabin.

Based on operation demand, the system can control either the pump speed or the pump pressure. In pressure mode, the speed will automatically adjust to maintain the set pressure of the system, regardless of the flow variations.

### Gauges and controls:

- Intake pressure
- Discharge pressure
- Engine coolant temperature
- Engine oil pressure
- Pneumatic system pressure
- Tanks levels
- Increase decrease pressure
- Increase decrease speed
- Foam percentage settings
- Stationary pumping ON
- Tank water suction
- Tank filling
- Flushing
- Hose reel delivery
- DCP controls



## 9. DRY CHEMICAL POWDER SYSTEM

### 9.1 DESIGN AND TECHNICAL DATA

The system is suitably located with access and controls at the side of Truck. Access for refilling or checking the powder container is provided by hinged panels within the roof of the module.

The system comprises one 250 kg (550 lbs). Powder container linked with expelling gas installation and cylinder, control panel and one reeled rubber hose line installed at the left side.

The container is designed and manufactured for a maximum operating pressure of 14 bar (200 psi) from high grade steel coated internally for maximum protection.

The container is equipped with a large diameter filling port and a device to ensure maximum fluidisation of the powder, expelling gas supply line, safety valve etc.

The pressurising system ensures that the powder is thoroughly mixed with the expellant via a mixing device and ensures that no powder can enter the gas system. Provision is made for the purging of the system after use without loss of the remaining powder in the container.

The expelling gas installation is connected to the container through a valve and pressure regulator arrangement.

The control panel is integrated in pump TFT HMI. It provides quick access to tank pressurization, outlets deliveries as well as flushing. The level of the expellant gas is as well displayed on the screen.

Dry chemical powder storage	:	250 kg. (Empty)
Operating pressure	:	12 bar (175psi)
Expellant gas	:	Nitrogen

### 9.2 DRY CHEMICAL POWDER DISCHARGE

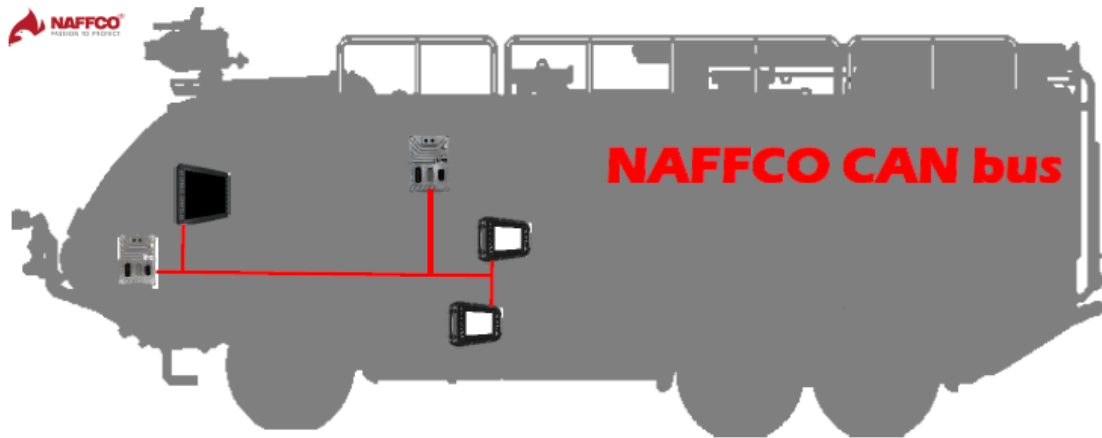
One hose reel will be mounted on one side of the vehicle. The reel will accommodate a fire hose and will be designed for fast deployment connected to a pistol grip dry chemical powder nozzle.

Hose length	:	30 m (100')
Hose diameter	:	25mm
Agent	:	AFFF compatible dry
chemical power	:	
Output	:	between 2.5-4.5 kg/sec

Throw range : Around min 7.5m (24'), no wind  
 Operation : Electrical rewind with manual back-up system

## 10. ELECTRICAL SYSTEM

All electrical system related to fire-fighting is controlled by PLC system, which will bring the following advantages over the classic systems:



### 10.1 Programmable Automotive logical controller:

Rugged design to withstand vibrations, temperature, humidity, and noise

Giving the vehicle flexibility, personalization, greater input output performance and space-saving solutions

Designed to make the operation easier and to reduce the operator mistakes by interlock system built in the program.

Designed with ease of maintenance and troubleshooting as a major function.

Using two controllers to reduce the wiring by using CAN- bus system

Fault detection circuits and built in diagnostic menus, incorporated in each major component, can tell whether the component is working properly.

Operating temperature: -40 °C to +85 °C

IP67

Comply with (Off-highway) Electromagnetic compatibility (EMC), EN ISO 13766-1:2008, and E11 Electromagnetic compatibility (EMC) for vehicles, UNECE-R10.05



## 10.2 Touch Control panels:

12" Robust HMI/programmable display specifically designed for mobile applications

Resolution 1280x800 pixels

With coloured display, the HMI shows realistic graphics that enables the operator to quickly control the onsite operations.

Fanless cooling

Operating temperature -20 to 70 degrees Celsius

Sealing IP67 (NEMA 6)

CPU iMx6 quad processor RAM 2 GB

Internal memory 16GB free for application

Comply with Electromagnetic compatibility (EMC) noise immunity, EN61000-6-2, and E11, UN/ECE-R10.05, Vibration & resonance search EN60068-2-6



Provided languages: English / or any additional language based on the end user choice

**Specifications are subject to change according to manufacturer continuous product development.**

## 10.3 Touch Control panels:

7" Robust HMI/programmable display specifically designed for mobile applications

Resolution 1280x800 pixels

With coloured display, the HMI shows realistic graphics that enables the operator to quickly control the onsite operations.

Fan less cooling

Operating temperature: -30 to 85 degrees Celsius

Sealing IP67 (NEMA 6)

Powerful ARM Cortex A9 processor with 800 MHz clock speed

512 MB of DDR3 SDRAM and 2 GB of NAND mass storage

Comply with Electromagnetic compatibility (EMC) noise immunity, EN61000-6-2, and E11, UN/ECE-R10.05, Vibration & resonance search EN60068-2-6



Provided languages: English / or any additional language based on the end user choice

## 10.4 ROAD VEHICLE LIGHTING AND WARNING SYSTEM

- A set of traffic lights in compliance with European standard.
- 4 Amber side marker lights on each side
- Front head lights, consisting of 02 low beam lights and 02 high beam lights, day time running light.
- 2 front fog light
- 4 combinational stop/park lights/turn signal with hazard warning lights
- 2 reverse lights with audible warning when reverse is selected
- 2 rear fog lights
- rear registration number plate light
- 2 warning lights LED on the cabin roof
- 2 warning lights LED on the rear upper engine cowl
- Two blue flashing LED beacons mounted on top of the fire fighting vehicle.(Flashing beacons shall comply with the requirements of Annex 14 to the Convention on International Civil Aviation "Aerodromes" part 1 (blue colour (type C), intensity 40-400 cd, flashing speed 60-90 per minute).
- A yellow flashing LED flashing beacon mounted above the firefighting vehicle.(The flashing beacon shall comply with the requirements of Annex 14 to the Convention on International Civil Aviation "Aerodromes" part 1 (yellow colour (type C), intensity 40-400 cd, flashing speed 60-90 per minute).
- Vehicle battery charger with 220V connecting cable.
- All wires will be numbered and colour coded. Wiring will be grouped, assembled and designed for maximum electrical circuit loads.
- Electrical wiring will be secured and protected from temperature, petroleum products, lubricants and mechanical wear. Suitable circuit breakers shall be provided. Switch groups easily accessible.
- PA system PA 300 with 3 tone siren 200W with two speakers 100 each
- 2 locker lights in each compartment work with shutter activation automatic sensor
- 2 engine bay lighting, left and right, local control
- Tanks level indication 5 steps each side
- 6 side illumination lights LED (3 each side )
- 2 Rear illumination lights LED
- Reverse camera

## **11. PAINTING & FINISHING**

The vehicle will be finished painted as per customer requirements single colour. Red RAL 3000

## **12. MANUAL & STANDARD EQUIPMENT**

At the delivery the vehicle is equipped with the following documents in Romanian & English Language

- Operation manuals, Romanian & English Language
- Maintenance manuals, Romanian & English Language
- Spare parts listing
- Electrical Wiring diagram
- Piping and layout diagram

## **13. WARRANTY**

The complete vehicle is guaranteed against any defects arising from bad workmanship, design or materials for a period of 2 years from the date of delivery as per NAFFCO terms and Conditions.

## **14. ACCESSIBILITY**

For maintenance, periodic washing of body, chassis and engine; It should not be necessary to decouple any system or fire subsystem that inhibits partially or totally shutting down the machine, as it would affect the provision of the service and the category of the airport.

## **15. INSPECTION & TESTING**

The vehicle will be inspected and tested for operation including a physical tilt test in our factory before delivery.

## 16. COMMISSIONING AND SITE TRAINING

After delivery of the vehicle, a team of engineer / technicians will provide commissioning and training for the vehicle for a period of 3 working days.

## 17. NOTES

- NAFFCO reserves the right to introduce minor changes to improve operational and performance related aspects of the vehicle and if also necessary to supply equivalent equipment / components if they should become unavailable or obsolete.
- All Tanks will be shipped empty. Initial charge is not included in our offer.
- Pictures are presented for reference purpose only. Actual units may differ.

## 18. ACCESSORIES

SN	GENERIC DESCRIPTION	UPM	QTY
1	Suction hoses 5" approx. length 2,4 m	PCS	4
2	Suction strainer 5"	PCS	1
3	Fire hose 1.5" X 30 M	ROL	2
4	Fire hose 2.5"X 30 M	PCS	2
5	Foam Branch pipe 560 LPM@7 BAR	pcs	1
6	Medium Foam Making Branch Pipe 400LPM	PCS	2
7	Jet and Fog Pistol Grip Discharge Nozzle 115-475@ 7 BAR	PCS	2
8	Jet and Fog Pistol Grip Discharge Nozzle , Flow: 360 - 950 LPM @ 7 Bar	PCS	2
9	Universal Spanner	pcs	2
10	DCP Fire Extinguisher 6 KG	pcs	1
11	CO2 Fire Extinguisher 5 KG	pcs	1
12	Medical Kit	pcs	1

13	Warning Triangle	pcs	1
14	Fire Extinguisher SP-2	pcs	1
15	Car Jack 20 ton	pcs	1
16	Hose Gun for Inflating Tires	pcs	1
17	Wheel Arch	pcs	2
18	Tool Kit Bag	pcs	1
19	Ladder extendable approx.. 8 m	pcs	1
20	Dry Powder Chemical Purple k (COMPLY WITH ISO 7202)	KG	250