SPECIAL WATER AND FOAM FIRE EXTINGUISHING VEHICLE 4,000 LITERS

(image for information purposes only)

The special vehicle is intended for firefighting, extrication and rescue operations in urban, rural and difficult-to-access areas, with an emphasis on rapid movement, short-term deployment of the intervention device and the use of water with high extinguishing efficiency.

The special vehicle can work independently (using water from its own tank or from other sources) or in cooperation with other similar or different special vehicles, but designed to work with water and foam.

The special vehicle corresponds to an intense operating regime, with immediate movement upon intervention, with frequent accelerations and decelerations, including on roads with very steep ramps and slopes, regardless of the season.

0 00 Main components

100 Chassis **MAN TGM 18.320 4x4 BB CH**

150 Double cab, **MAN** 2+4 members

200 Water tank 4,000 ± 10%, material, **GRP**

200 Foam tank 400 ± 10%, material, **GRP**

300 Superstructure, equipment compartments, **ROMPRIM (skeleton, sheet metal cladding , MCD blinds made of anodized aluminum)**

400 Centrifugal fire pump, **ZIEGLER FPN 10-3.000-2HH**

Foam proportioning system , **ZIEGLER PHJ100**

500 **MALECO** high pressure hose reels

POK KALIPYGE water/foam discharge cannon

700 **ZIEGLER Z-Control** control system

10 Vehicle parameters

Dimensions:

- total length: 8,500 ± 100 mm mm
- width : 2,550 m
- height : 3,400 mm

Engine power :	320 HP
Angle of attack:	25°
Clearance angle:	25°
Ground clearance:	326 mm.
Vehicle category:	N3 SG
Maximum speed:	100 km/h
Maximum ramp:	30%

The water tank, the foam tank, the pumping unit and the other equipment that equips the superstructure are located in such a way as to ensure a balanced distribution of masses on the chassis.

20 Inscription / painting:

The special vehicle will be inscribed on the sides and front with the inscription "FIREMEN", as well as with the logos of the "Inspectorate for Emergency Situations" and the "112" logo.
The color of the special vehicle will be red , RAL 3000 shade , except for the aluminum blinds in the accessory compartments. The special vehicle will be equipped with reflective

plates and strips;

(image for information purposes only)

1 00 Chassis

(image for information purposes only)

- Engine, 320 HP, pollution level: will be in accordance with EU regulations in force at the date of delivery, currently Euro 6.
- Fuel: diesel.
- 150-liter fuel tank and 27-liter AdBlue tank , positioned so as not to affect off-road capability. They are protected against damage when driving off-road or unpaved roads by metal shields on the sides and underneath.
- Electric preheating system for engine coolant, with connection for external 220 V power source.
- Towing hitches:
    - For the rear: trailer coupling to the end cross member, ROCKINGER type 400 G 150A.
    - For the front: coupling jaw, center, integrated into the bumper / front cross member, with threaded bolt.
- The towbar and front coupling jaw are sized for the technically permissible maximum mass of the vehicle.

- Traction control system (ASR)
- 4x4 drive, G103 transfer case with interaxle lock , with road and off-road gears, neutral position . Electronic traction management system (VSM), electronic.
- Differential lock front and rear axles
- PowerMatic 08.13 OD automatic gearbox , 8 speeds.
- Front axle suspension with stabilizer bar and telescopic shock absorbers, designed for driving on asphalt, unpaved roads and rough terrain.
- M+S tires, mounted on steel rims (including spare wheel):
- Spare wheel, according to the configuration when equipping the rear axle with tires. Mounting on the roof of the superstructure, without affecting the passing capacity of the Special Vehicle.
- The special vehicle is equipped with twin wheels on the rear axle.
- Steering system: power assisted
- Electronic braking system (EBS)
- Braking system servo
- Anti-lock braking system (ABS), off -road , with additional terrain logic and hill descent assist
- EVBec additional deceleration system , exhaust engine brake, adjustable, 2 stages
- EasyStart hill start assist system .
- Anti-lock braking system (ABS), off -road , with additional terrain logic and hill descent assist
- Trailer socket for anti-lock braking system (ABS).
- Drum brake system on the front and rear axles.
- The electrical installation is equipped with sockets for connection to external consumers.
- 2 sockets in the central cabin, one 12 V and one 24 V
- Electrical system voltage: 24 V
- Two batteries, 12 V, 150 Ah, standard (SLI), maintenance-free.
- Lighting and signaling system with front headlights, front fog lights and rear fog lights. All headlights and lamps of the special vehicle protected against accidental impacts with a metal grille
- The special vehicle will be equipped with flexible rubber arm clearance lamps at the rear.

1 50 Driver/crew cabin:

- Left-hand drive cab, multifunction steering wheel, with adjustable height and tilt.
- Metal cab, MAN DN model, advanced double (narrow, extra long, normal height),

closed, one-piece, with suspension and anti-corrosion protection.

- Hydraulic cabin folding device, manual operation .
- Equipped with 4 doors and 1+5 seats (all seats are equipped with seat belts according to legal provisions).
- The floor in the crew compartment is covered with ribbed aluminum sheet, with an increased level of slip protection and easy to clean.
- Comfort driver's seat with air suspension, 2- way adjustment .
- Crew seats - **FASP model** (excluding the driver's seat) are specially designed for breathing apparatus intended for firefighters (equipped with a backrest, folding seat and headrest, which embed the breathing apparatus and which allow easy unlocking by operating a handle)
- Windshield sunshade, interior, foldable.
- Mirror package, exterior mirrors, electrically adjustable, heated, front mirror, right-hand side mirror, mechanically adjustable, heated.
- front windows , manual rear windows
- system , automatic air conditioning , Climatronic .
- Additional cabin heating, with a power of 4 Kw , using diesel fuel, directly from the tank of the special vehicle.
- The cabin is factory painted – Fire Red RAL 3000.
- Camera-type device that activates automatically when reversing with integrated rear parking sensors .
- Traffic camera type device with microSD recording .

1 60 Acoustic and optical warning system

- Light bar certified according to Regulation C R65, **SPARK-L , 1890 mm** long , located on the ceiling at the front of the cabin, with blue and white LED strobe lamp modules , protected against accidental impacts with a stainless steel grille
- **EXPERT-100** acoustic signal generator , 24 Vdc , with 5 tones, power 150W.
- Control box / remote control for the ARMAS EXPERT 100 acoustic -optical warning system with remote control mounted on the dashboard.
- Reverse warning light , acoustically activated in reverse gear

1 70 Communications equipment

- TETRA radio communications equipment **Motorola MXM600 (1 pc)**
- **Motorola MXP600** portable radio communications equipment (6 pcs)

2 00 Water/foam tank:

- Water tank:

Capacity: **4,000 ± 10%** liters.

Material: **GRP**

Equipped with overflow, inspection cover (to ensure access for a person inside) and drain valve, equipped with wave breaker and shock absorption system during transport.

- Sparkling water tank:

Capacity: **200 ± 10% liters** .

Material: **GRP** ,

The foam tank is separate from the water tank and has an inspection cover and a wave breaker .

3 00 Superstructure:

- Monoblock superstructure made of a solid system of anodized aluminum profiles .
- mounting brackets , shelves, drawers, and sliding panels on which the accessories are positioned are made of durable aluminum panels with anti-corrosion protection.
- The roof is clad with corrugated aluminum sheet and can withstand a minimum weight of 300 kg, not including the equipment placed on it. It is reinforced so that it does not allow buckling under the weight of the servitors.
- Access to the roof of the special vehicle is via a ladder that can withstand a weight of at least 150 kg, made of anodized aluminum , located on the left rear side of the special vehicle, foldable towards the upper part of the special vehicle, equipped with a locking system in the folded position .

(images for information purposes only)

- All compartments are closed with blinds, MCD model (France), made of anodized aluminum , dust- and water-tight.
- The compartment lighting is automatically activated by magnetic switches when the blinds open or close and is LED type .
- The equipment compartments are equipped with hinged access hatches, 300 kg

capacity, and have orange LED lamps installed on the sides , with flashing light to allow them to be highlighted in the open position .

- Fire extinguishing equipment is conveniently and safely located on sliding racks and drawers in compartments, on the roof and in the driver's cab.
- Access to water and foam tanks is ensured for their repair or cleaning
- Shelves are secured with countersunk head screws to avoid personnel injury and equipment damage. No assemblies using clamps or self-tapping screws are used .
- The space in the accessories and equipment compartment provides storage for 3 type B hoses, in braid, in special holders, located near a type B water outlet, which allows quick connection to the pumping system. Heavy accessories and aggregates are positioned in the lower part of the special vehicle, and lighter accessories in the upper part of it.
- The accessories arranged inside are located in such a way as to ensure access from the ground without the need for personnel to climb inside the superstructure.
- The discharge hoses each have an individual location and are secured with textile straps with Velcro fastening ("hedgehog"), labeled for each type of hose.
- The suction tubes and other equipment stored on the roof of the superstructure are secured by placing them in a closed box, with a key system (made of aluminum and illuminated on the inside using LED technology, activated when they are opened) which ensures protection against damage and movement during movement.
- sliding panels , metal storage boxes, etc. in the superstructure are constructed with rounded edges. Drawers, sliding panels , are secured against accidental opening and are sized to support at least twice the weight of the accessories they contain.
- All equipment and accessories that are not fixed in/on drawers, to the floor, doors or side walls, are arranged in compartments, in boxes made of durable plastic, with lids and handles for handling. On the lid of the boxes you will find a list of the material goods contained.

3 10 Optical signaling system installed on the superstructure

- On each side of the vehicle, recessed into the superstructure, a sequence of SANMAK SA7025-12 light modules/lamps, blue in color, using LED technology, "flash" type, are installed symmetrically over 50% of the total length of the superstructure.

3 20 Acoustic reversing warning device

- Acoustic reversing warning engaged in reverse gear

3 30 Lighting installation for work areas

- ***Perimeter lighting system***
  - Built into the vehicle's dimensions , it ensures increased visibility on all sides of the special vehicle in all work areas in the accessory and equipment compartments. The sides and rear of the special vehicle will have LED lamps , **SANMAK SA9118A** .
  - The lamps will be directed towards the ground at a 45 degree angle
  - The lamps will be placed on the upper part of the vehicle without exceeding the dimensions of the special vehicle .
  - They will be protected against accidental impacts with a stainless steel metal grille.
- lighting ***mast model*** **FIRECO CL.3420.NZ** with rotation and tilt unit **TT.38152_SEM**

3 40 Power supply:

- Power supply system for fire engines with cover, supply voltage 250 V. Socket with automatic disconnection when the vehicle is started.

- Protection class : IP55
- Contacts: IP IP+N+E
- Current: 20 A
- Voltage: 250 V
- Frequency: AC

- The special vehicle will have a Rettbox type external connector installed. Marechal , to make it possible to charge batteries and other equipment that requires charging while stationary (in the truck's garage) .
- Charging system contains an electronic charger controlled by a LEAB model microprocessor with automatic adapter for charging and preserving them during long periods of standstill
- The 230 V connector is a male type and is mounted on the side of the vehicle, on the driver's side. Two female connectors will also be supplied, each with an attached 10-meter cable.
- The 230 V circuit will be protected by grounding which will ensure a leakage current of maximum 30 mA. Next to the socket there will be a warning label with the inscription : "WARNING! CONNECT ONLY TO AN AUTHORIZED SOCKET"

4 00 Centrifugal fire pump

(title image informative)

Fire pump two- stage centrifuge gradually **FPN 10-3.000-2HH,** consisting of 2 pumps :

- low -pressure pump pressure , with **2 pressure stages** (**for** pressure low 0 ÷ 17 bar) and
- high pressure pump pressure , with **3 pressure stages** (**for** pressure high 30 ÷ 50 bar).

- switchable high- pressure pump
- Materials:
  - The castings (impeller, pump cover, pump housing) are made of seawater-resistant light metal alloy.
  - The pump shaft is made of corrosion-resistant steel.
  - drain taps are made of brass.
- Pump delivery performance:
  - 3,000 l/min @ 10 bar and 3 m suction height
  - 400 l/min @ 40 bar
  - Suction height : 7.5m
- Priming unit: by fully automatic double piston priming system **ZIEGLER - TROKOMAT – PLUS** .
- Priming time: 60 seconds
- Advantages:
  - The centrifugal fire pump and its components are very solid and extremely reliable. Insensitive to dirty water.
  - insensitive to frost, as the centrifugal fire pump can be emptied quickly and completely.
  - no foreign agents are required for the priming system.
- Drive: by the vehicle engine via a articulated shaft line from the gearbox power take-off

- Installation: behind the vehicle
- Control: all switching for pump operation is done from the control panel

4 10 Foam proportioning system

- Dosing unit **ZIEGLER PHJ100**
- Mixing ratio: **0-6%**
- Operating mode: fully automatic electronically controlled

4 20 Fire extinguishing piping system

- two 4” suction inlets with water filtration system, for natural water sources
- two type B inlets for water supply from pressurized water sources with impurity retention system , at the back , one on the left and one on the right side.
- The tank filling stops automatically when the water reaches the maximum level.
- two type B discharges arranged laterally, behind the special vehicle, one on the left side and one on the right side.
- two C-type outlets arranged on the side, behind the vehicle, one on the left and one on the right.
- All inlets and outlets are located inside the superstructure at the bottom. They do not exceed the lower level of the access hatches in the superstructure so as not to affect the vehicle's passage capacity.
- all inlets and outlets are protected against freezing during movement/stationary operation with aluminum covers
- manual depressurization systems are installed on type B and C exhaust pipes
- the vehicle will be equipped with 6 low-pressure water jetting guns, 2 type B and 4 type C,

4 30 Hot air heating system

- To prevent frost, a hot air heating system, **Eberspacher D2L 24 V 2.2 kW ,** is installed in the pumping unit compartment , which uses diesel fuel directly from the tank of the special vehicle.

500 High pressure hose reels

(image for information purposes only)

- Two **MALECO model ML-25-60 drums** , one drum on each side of the truck
- On each drum there are 3 segments of high pressure hose, one 30 m and two 15 m
- The connection between the hose segments is made using small quick couplings.
- Two high-pressure water and foam solution discharge devices (discharge guns, adapted for high pressure, **LEADER TriggerFlow 150 Compact model)**
- The drums are driven electrically and manually.
- It will be equipped with a pneumatic system for draining water from the system, which will use air from the vehicle's braking system.

600 Water and foam discharge cannon

(pictures for information)

- Automated water and foam discharge cannon, **POK model Kalipyge** , located on the special vehicle, has both manual and electronic control (with a panel equipped with a joystick located inside the cabin, but also with a wireless remote control)
- It has the possibility of rotating horizontally 360º, and vertically from - 35º to +85º, along the entire rotation circumference.

- It is equipped with an electric, remote-controlled system for height adjustment of the working position.
- In the marching position, the cannon can be folded so that it fits within the dimensions of the special vehicle.
- The flow rate of the cannon is 4,000 liters/minute.

7 00 Control system :

- A main command and control panel, "classic" type (without display) , located at the rear of the special vehicle, in the pumping unit compartment.

(image for information purposes only)

- ***The following operational functions are provided:***

- starting and stopping the engine
- coupling and uncoupling the pumping unit to the chassis transmission.
- engine speed control .
- maintaining a constant speed .
- using the water/foam cannon on the emergency vehicle and its operation.

- ***The following parameters are displayed :***

- engine speed
- speed of the pumping unit
- working pressure of the pumping unit
- the depression required for priming fire extinguishing system
- water temperature in the pump unit
- water level in the tank

- the foaming agent level in the tank

➢ ***Signaling, both acoustically and visually, of the following warnings :***

- maximum water temperature in the pumping unit.
- the occurrence of the cavitation phenomenon .
- the occurrence of overpressure in the pumping unit
- failure of superstructure equipment to return to position (lighting mast, water/foam cannon, access hatches and blinds)

♦ A panel without touch-screen , located at the rear of the truck, in the pump unit compartment . Its display is automatically activated and deactivated when the pump compartment shutter is opened and closed .

➢ ***The following parameters are displayed on the screen:***

- pump working pressure
- water level in the tank
- the foaming agent level in the tank

➢ The command and control system allows the simultaneous use of all discharge lines

➢ The command and control system allows the water-foam mixture to be created and ensures a constant mixing ratio between 0% ÷ 6% with fractions/rates from 0.1% to 0.1%, regardless of the water flow and pressure, and allows the washing (cleaning) of the foam proportioning system and the discharge system.

➢ the command and control system consists only of valves with double manual and electric/pneumatic operation, with the exception of the valves on the discharge pipes B and C

➢ In the event that the pumping unit will not engage/disengage from the dedicated button(s) on the main control panel, its engagement/disengagement can be done from the cabin, by operating the power take-off engagement/disengagement command, as an emergency solution when the controls on the control panels no longer function.

➢ The working position is accessible to the attendant, which allows easy access to all controls on the pump panel, valves, etc., directly from ground level.

♦ A secondary command and control panel, with a non- touch-screen "display" , located in the cabin.

➢ ***The following operational functions are provided:***

- coupling and uncoupling the pumping unit to the chassis transmission
- engine speed control
- maintaining a constant speed
- using the water/foam cannon on the emergency vehicle and its operation.

➢ ***The following parameters are displayed***

- pump unit speed
- working pressure of the pumping unit
- water temperature in the pump unit
- water level in the tank
- the foaming agent level in the tank

➢ ***Signaling, both acoustically and visually, of the following warnings :***

- maximum water temperature in the pump unit
- appearance cavitation
- the occurrence of overpressure in the pumping unit
- failure of superstructure equipment to return to position (lighting mast, water/foam cannon, access hatches and blinds)