

## CHASSIS

The medium rescue and fire-fighting vehicle is built on the chassis:

<b>Model</b>	MAN TGM 18.290
<b>Cabin</b>	1+1+4
<b>DMC</b>	18,600 kg
<b>Drive</b>	4x4 (attachable front drive)
<b>Transmission</b>	Automatic MAN PowerMatic 08.13 OD
<b>Engine</b>	213 kW (290 HP) / EURO V
<b>Torque</b>	1150Nm
<b>Engine capacity</b>	6871 cm3
<b>Suspension</b>	Front: reinforced, parabolic 2-leaf springs, shock absorbers on the front axle and stabilizer bar Rear: reinforced, parabolic 4-leaf springs, telescopic shock absorbers and stabilizer bar
<b>Blockages</b>	Differential locks: front axle / rear axle / interaxle lock
<b>Batteries</b>	2x175 Ah [reinforced]
<b>Braking system</b>	All drum brakes Electronic control of air production by APM Dehumidifier cartridge with increased durability Pneumatically controlled handbrake Retarder – exhaust brake
<b>Tires</b>	Twin tires on the rear axle, size 285/80 R22.5
<b>Stock</b>	Spare wheel without permanent mounting on the vehicle
<b>Other</b>	<ul style="list-style-type: none"> <li>• Ringfender mouth towing hitch RF40/G150D</li> <li>• Electric windows in front doors</li> <li>• Cruise control</li> <li>• Air conditioning</li> <li>• Mountain brake</li> <li>• Fog lights</li> <li>• The fuel tank is located outside the building</li> <li>• Modes 3 gearbox operating modes, including the Emergency driving mode</li> </ul>

## **CREW CAB**

The chassis is equipped with a single-module crew cabin designed for 5+1 people.



**Inside, as standard you can find:**

- Entrance steps lighting
- Air conditioning
- Sunroof
- Hands-free kit for your phone
- MP3 radio
- A transverse handle for holding on to the crew in the rear part of the cabin
- Rear seat with storage space for equipment
- Breathing Apparatus camera mount (4)\*
- Breathing Apparatus mask shelf for the crew
- 12V and 24V cigarette lighter socket
- Additional pneumatic signal

[\*] Breathing Apparatus camera mounts (4 pieces) are located in the back and equipped with two-point seat belts and a lifting headrest. The mount has a full backrest function when traveling without hearing aids.



There is a 4-inch control panel installed in the cabin, informing about the level of extinguishing agents in the tank (water + foam), the status of opening of compartments or platforms of the structure, connection to external power supply and extension of the lighting mast. In addition, it allows you to control the body lighting, the vehicle's main valve (electro-pneumatically controlled) and sprinklers divided into the front and rear of the vehicle.

As standard, the vehicle is equipped with a reversing camera with a 7-inch display in the driver's cabin, enabling efficient maneuvering of the fire truck.



Between the driver and the commander there is a table for chargers and radios equipped with an installation that protects against battery discharge, the so-called Acuguard. A pneumatic signal button is installed between the driver and the commander. The commander's station also has independent heating and lighting control via a flexible cable.

## **EQUIPMENT CONSTRUCTION**

**Type:** Modular development 2.0

**Intermediate frame:** This is an intermediate element between the chassis and the bodywork, with an openwork structure with flexible elements that reduce the stress between the chassis and the bodywork. It is responsible for the vehicle's ability to cross axles and move in difficult terrain or overcome obstacles in built-up areas, such as high curbs. The frame is made of structural steel protected against corrosion by galvanization.



The structure is made in a 3+3+1 compartment system, which ensures maximum equipment capacity, ensuring a depth of 600 mm in each compartment.



Self-supporting structure made of aluminum profiles ensuring high anti-corrosion of the structure. Placed flexibly on an intermediate frame that reduces the transfer of stresses generated by the chassis. The modularity of the structure involves a high degree of unification of development elements and repeatability thanks to the development framework made using numerically controlled machines. The sheathing is made of aluminum sheets, the inner sheathing is anodized and the outer sheathing is varnished. Sheathing sheets are connected to the frame using gluing and riveting technology. This solution ensures ease of repair and complete failure-free operation.



This design is a proven solution and is the result of joint work with the Faculty of Mechanical Engineering of the Military University of Technology and the Military Institute of Armor and Automotive Technology. The design has the best strength to weight ratio compared to any other technology on the market.



The roof of the building is made in the form of a working platform. Finished with anti-slip checker plate. The roof structure is adapted for the work of two firefighters. The designated communication path on the roof of the vehicle is flat and guarantees safe movement even after dark thanks to built-in lighting.



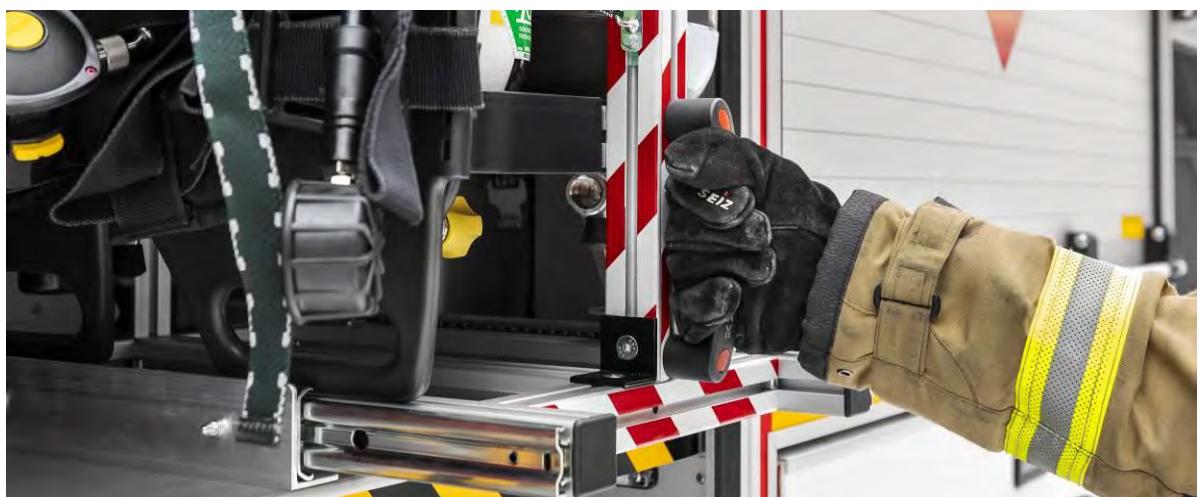
A solid ladder to access the roof, mounted on the rear wall. Additional handrails at the top of the ladder to facilitate climbing and an additional full step at the top. The ladder rungs are anti-slip.



Under each compartment there are tilting platforms, including two tiltable ones in the form of vehicle wheel arches. **The design of the steps ensures their load capacity of 280 kg**. Each step has additional LED warning lighting on the edge or a gelcoat finish.



All equipment and equipment compartments are closed with water- and dust-proof shutters. Blinds and compartments are equipped with key locks. The zipper is secured with a flap to prevent dirt from entering the zipper. One key fits all locks. Each blind is equipped with a closing aid strip. The opening of each compartment is signaled in the vehicle cabin.



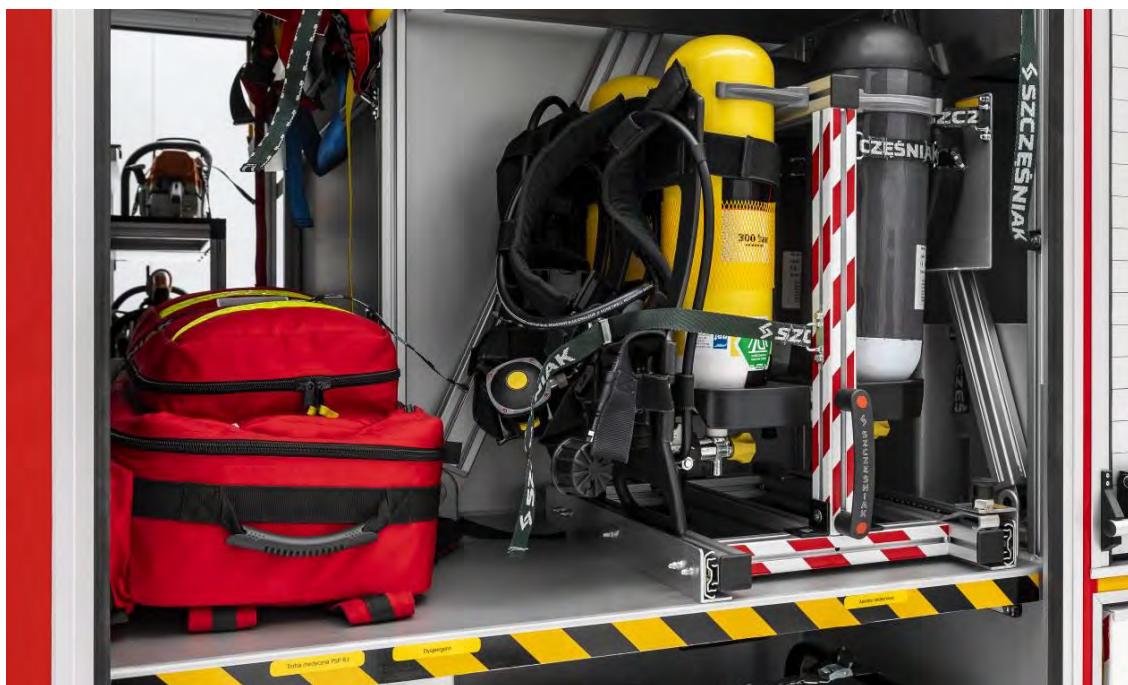
The structure of the body is designed to achieve not only a high level of ergonomics but also the greatest stability on the road. Hence the low center of gravity. Elements mounted on the roof are below the outline of the cabin to prevent damage to the equipment when moving in a forested area.

## **EQUIPMENT MOUNTS**

As standard, the vehicle is ready for operation the moment it is picked up. It not only has all the necessary elements but also mounts for equipment for a medium-sized car.

The vehicle standard includes:

- Fixing for equipment
- Shelves made of aluminum chamber profiles
- Adjustable shelves [up-down]
- Shelves with longitudinal adjustment of equipment fastenings
- Seven plastic boxes for loose equipment
- Each equipment has individual mounting
- The equipment is additionally attached using Velcro or snap straps
- A shelf system that allows the user to change their arrangement
- Three drawers slide out and lock in extreme positions
- Drawers dedicated to heavy equipment such as hydraulics, motor pumps, generators
- Two panels slide out and lock in extreme positions
- The panels have mountings for saws and demolition equipment
- Large lockable roof box for equipment
- Fastening a two- or three-span ladder on the roof
- Mounting for delivery hoses divided into the left and right sides of the vehicle for quick deployment



Example arrangement of equipment in the superstructure:



In the front part of the structure there is space for long elements that are often used during operations. There is a mount for medical equipment such as a stretcher, Kramer splints or a medical bag. The front compartment has a retractable panel with a mount for two Breathing Apparatus cameras and a drawer with a power generator.



From the commander's side there is, among others:

A retractable panel located in the front compartment with, on one side, a mount for demolition equipment, i.e. an axe, a crowbar, a hammer, and on the other side, a mount for a wood saw, a concrete saw, a spare chain, and fuel:



Each drawer has ergonomic handles, the hydraulic drawer allows you to assemble the entire set in one place. The drawer system allows, after some time of use, to be modified for a new set without any significant modifications:



As standard, there is a lockable equipment box on the roof measuring 2030x630x300 mm. The roof is flat so there is no risk of tripping. The standard version includes permanent mounting of the ladder, rigid towbar and 110 suction hoses:



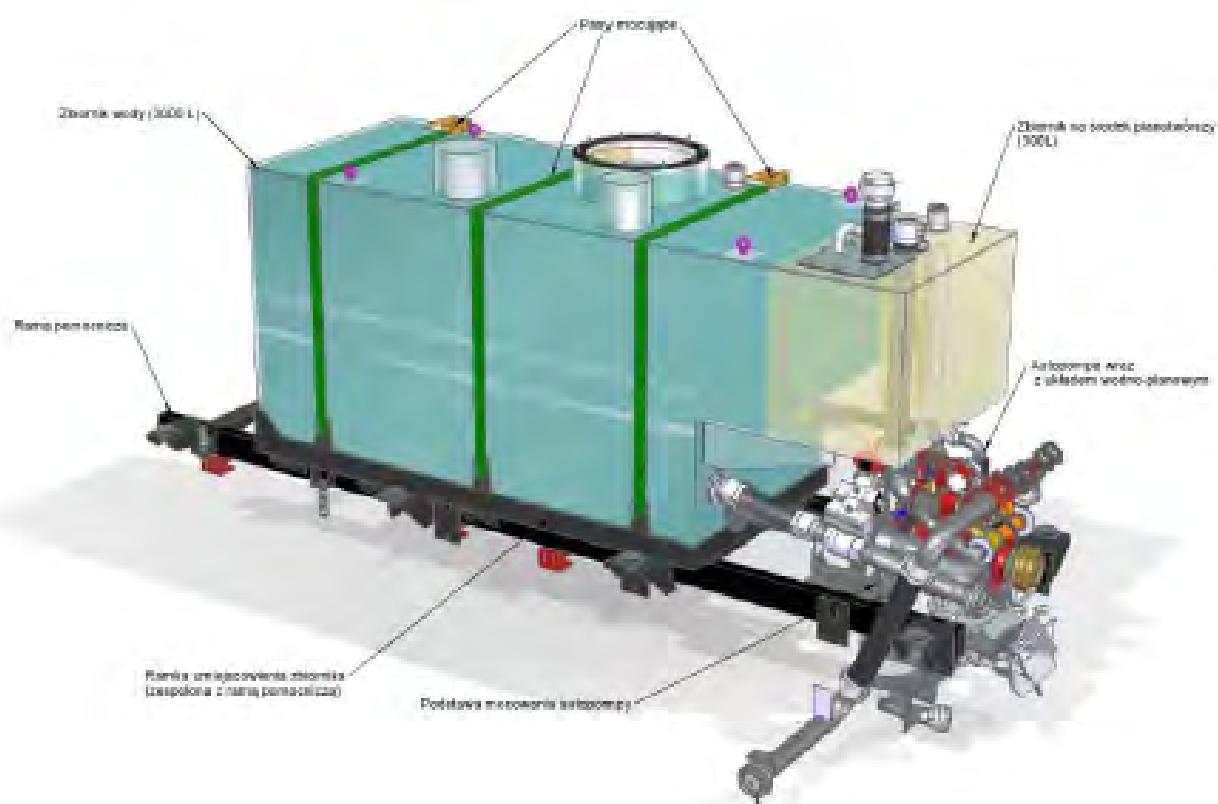
## **EXTINGUISHING AGENTS TANK**

The extinguishing agent tank is placed low in the structure to obtain greater stability of the fire truck. Mounting in the intermediate frame provides the best center of gravity on the market.

**Capacity:** Water tank 4,000 liters (+/- 1%),  
Foam concentrate tank 400 liters (+/- 1%).

**Water tank** with a capacity of 4,000 liters, made of corrosion-resistant composite materials, equipped with equipment enabling its safe operation, with a system protecting against water outflow while driving, adapted to a test overpressure of 20 kPa. The tank is equipped with an inspection hatch, settling tank and bulkheads protecting against water movement.

**Foam concentrate tank** with a capacity of 400 liters, made of composite materials resistant to corrosion and the effects of approved foam concentrates and modifiers, designed for a test overpressure of 20kPa. The location of the tank does not cause any obstacles to access to the water reservoir. The tank is equipped with a filling and emptying system.



## **WATER PUMP**

**Type:** **Godiva P2A 2010** dual-range car pump.

**Efficiency:** 2,846 dm<sup>3</sup>/min. at 8 bar suction pressure Hgs = 1.5m,  
429 dm<sup>3</sup>/min. at a pressure of 40 bar.

**Construction:** All elements of the water and foam system are corrosion-resistant and made of stainless steel and reinforced rubber. The design of the water and foam system allows its complete drainage using two valves. A mesh is installed at the suction inlet of the car pump to prevent

contaminants from entering the water. It is equipped with an automatic venting device that allows sucking in the so-called water. trokomat ensuring suction from a depth of 1.5 m in up to 30 seconds and from a depth of 7.5 m in up to 60 seconds.

**Foam dispenser:** ensures concentrations of 3% and 6% (tolerance +/- 0.5% ) over the entire pump capacity range, made of brass to ensure the greatest durability and resistance to the chemicals used.

**The truck pump enables the administration of extinguishing agents through:**

- two pressure heads directed to the sides of the vehicle
- one high-pressure fast attack line
- water and foam roof cannon
- four sprinklers



**Refueling the extinguishing agent tank** is done by:

- one hydrant cap size DN75
- one suction cap DN110
- two attachments (DN52 and DN75) for refueling the foam tank

**Control panel** based on the CAN bus (system description in the next section), and its location provides easy access from the ground level.



#### Other:

- Built-in lubrication system - oil change every 250 hours
- Trokomat based on membranes
- Control elements available from ground level (!)
- Manually changing the high pressure level on the pump
- Pump body made of hardened aluminum
- Automatic system for maintaining constant discharge pressure
- Automatic hydrant refueling system
- Independent heating of the car pump compartment

## WATER AND FOAM SYSTEM

**The truck pump enables the administration of extinguishing agents through:**

- two pressure heads directed to the sides of the vehicle
- one high-pressure fast attack line
- water and foam roof cannon
- four sprinklers under the chassis

**The pressure attachments** are located in the rear, outer part of the structure, behind the flap of the working platform, which protects against the accumulation of ice and dirt on the attachment. Each attachment has individual pressure relief and drainage.



**Sprinkler system** installed in the chassis to limit chemical contamination zones or for fire-fighting purposes, equipped with 4 nozzles with a capacity of 50 dm<sup>3</sup>/min. each. Two sprinklers placed in front of the front axle, two sprinklers on the sides of the vehicle. Sprinklers are made of brass.



**Fast attack hose reel line:** The car is equipped with a high-pressure fast attack line with a hose length of 60 m on the reel, ending with a water and foam nozzle with adjustable capacity with short-circuit and dispersed current. The device is equipped with an adjustable drum brake, an electric hose reel drive and a crank enabling emergency hose rewinding. As standard, the vehicle is equipped with a system for blowing water from the reel after the action is finished.



**Roof monitor:** In the rear roof part there is a manually controlled water and foam roof cannon with adjustable capacity from 800 l/min. up to 2,400 l/min. and a throw range of 60 m. The gun is equipped with a pressure gauge and a pressure cut-off valve.



## **CONTROL SYSTEM**

The vehicle is equipped with a control system based on the CAN system bus, which is very safe, resistant to errors, interference and reliable.

There is a 4-inch control panel installed in the compartment, informing about the level of extinguishing agents in the tank (water + foam), the status of opening of compartments or platforms of the building, connection to external power supply and extension of the lighting mast. In addition, it allows you to control the body lighting, the vehicle's main valve (electro-pneumatically controlled) and sprinklers divided into the front and rear of the vehicle.



Control panel In The car pump compartment is based on a 7-inch display equipped with 10 buttons and enabling control of:

- vehicle engine START - STOP
- minimum engine speed (function)
- vehicle engine speed controller
- water level indicator in the car tank
- foam level indicator in the tank
- pump shaft rotation speed meter
- car pump operating hours counter
- indicator light indicating the engine operating status
- pump pressure
- low pressure automatic control
- control of the hydrant refueling system
- lighting control

In addition, the most reliable pressure gauges in the pump compartment are:

- pressure gauge to indicate the pressure in the pump
- low pressure manometer
- high pressure manometer
- hydrant refueling pressure gauge



## **UNDERRUN PROTECTION**

The basic version of the vehicle has a raised underrun beam. The beam arms are protected against corrosion by galvanization.



## **TOWING HOOKS**

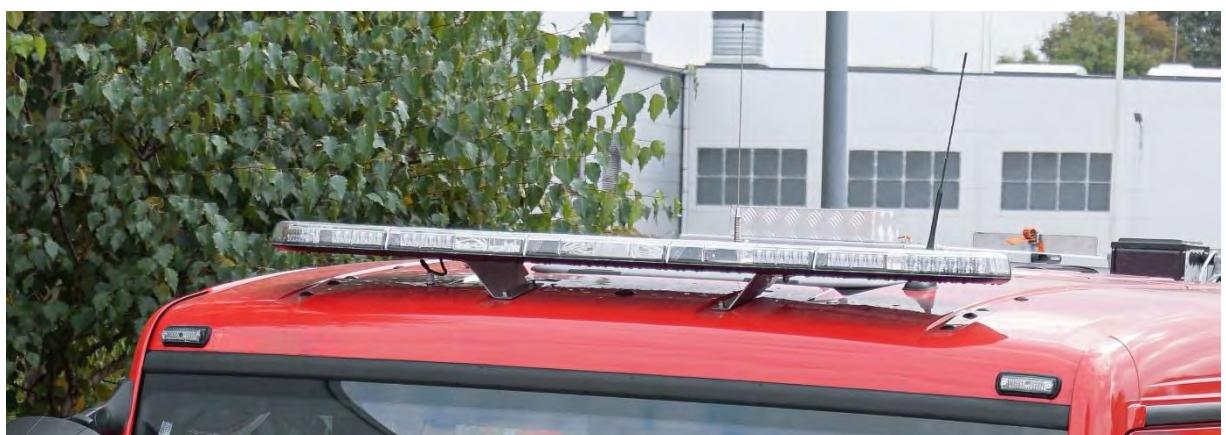
The vehicle is equipped with emergency towing hooks at the front and rear. The hooks enable the evacuation of a vehicle weighing up to 16,000 kg.



## **WARNING LIGHTING**

A rescue and fire-fighting vehicle must be perfectly visible, which is why each vehicle of our production is equipped with 10 light points as standard, which are arranged as follows:

1. A low-profile signal beam with a length of 1520 mm with 8 LED modules on the cabin, which gives a larger illumination area than any integrated lamp.



2. Two signal lamps on the front of the vehicle and two lamps on the corner of the cabin.



3. Four signal lamps in the rear corners of the structure and one on the rear wall.



4. The vehicle is equipped with an emergency vehicle sound modulator with a megaphone function and a 100 W loudspeaker.
5. Additional pneumatic horn signal.

## **VEHICLE LIGHTING**

1. External lighting of the building in the form of an IP67 class LED lamp above each compartment



2. Inside each box there is LED lighting on both sides.
3. A long-range lamp in the form of an LED beam with a power of 26,000 lumens, mounted on the front grille of the vehicle, next to the searchlight lamp mount.



4. In the rear part of the structure, above the shutter, there is a light wave located to protect activities while working on the road.



5. The vehicle is equipped with additional reverse gear lighting on the rear wall and under the cabin steps.

## **ELECTRICAL INSTALLATION**

The vehicle is standardly equipped with a 230V charging system with a 230 V socket with a dedicated plug, a 230/24V rectifier for charging batteries from an external source located on the left side of the vehicle next to the battery box (signaling the connection to an external source on the control panel in the driver's cabin ).



There is a system installed in the cabin that protects against excessive battery discharge.

## **ELECTRIC WINCH**

Electric winch with a pulling capacity of 9,979 kg and a 28 m long rope. Galvanized base with the possibility of towing with a rigid tow. The winch is protected by a composite cover.



## **LIGHTING MAST**

Pneumatically extendable lighting mast with LED floodlights with a total luminous flux of 36,000 lm. Mast height (from the ground) when unfolded - 5.4 m. Mast control from a wired control panel. Masts from FIRECO, the largest manufacturer of lighting masts in the world.



## **CERTIFICATE OF APPROVAL**

The vehicle has a **valid** CNBOP approval certificate no. 5123/2023 and it takes into account the weight of the equipment indicated in the guidelines for the standardization of firefighting vehicles of the KG PSP GBA 2/16 edition II. The CNBOP approval certificate proves, that the vehicle fully meets the requirements of the EN 1846 standard.

## **WEIGHT AND DIMENSIONS OF THE VEHICLE**

GVW <sup>1</sup>	18,600 kg
GLM <sup>2</sup>	15,850 kg
Weight reserve <sup>3</sup>	2,750 kg (14.7%)

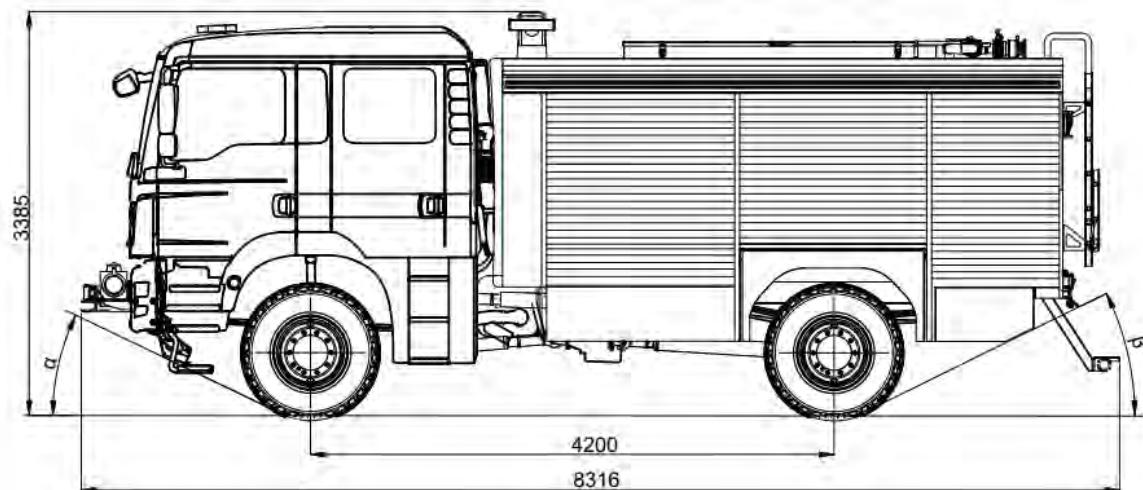
Height	With a two-span ladder – 3,385 mm
Length	8,316 mm
Width	2535 mm (without mirrors)
Departure angle	25.2 °
Angle of attack	23.6 °

1) Permissible Gross Vehicle Weight

2) Maximum Actual Vehicle Weight (ready for operation with crew and equipment)

3) Difference between GVW and GLM

## Drawing with the dimensions of the vehicle



\* All dimensions with a tolerance of +/- 1%

If the dimensions of the garage differ from the dimensions of the car given in the offer, please contact a PS Szczęśniak representative to discuss the possibility of adapting the vehicle.

## COMPLETION OF THE VEHICLE

The optimal version of the vehicle contains the following elements:

MAN TGM 4x4 chassis	Godiva two-range pump
235 kW EURO V engine	- capacity 2800 l/min at 8 bar
Twin tires on the rear axle	- capacity 400 l/min at 40 bar
Spare wheel delivered loose	Two DN75 pressure heads
Breathing Apparatus camera mounting in the cabin (4 pcs.)	Manual foam dispenser 3% - 6%
Holder for Breathing Apparatus masks	Reel 60 m with pneumatic blowing system
Electric winch	Sprinkler system under the chassis
Reversing camera with 7" monitor	DWP16/24 stainless steel roof cannon
Galvanized intermediate frame	CAN digital bus.
Water tank 4000 liters	Control panels. 7" car pump compartment
Foam tank 400 liters	Control panel 4" cabin compartment
Aluminum bodywork 3+3+1	60 mm LED beam / 8 LED modules
Tilt wheel arches Platforms under the blinds	10 LED light points Light wave
5.4 m LED lighting mast	Covers for warning lamps
26,000 lumen beam	Equipment mounting.
Additional pneumatic signal	Independent heating of the car pump
Pull-out drawer (3 pieces)	Raised underrun beam
Pull-out panel (2 pieces)	Towing hitch for trailers
	230V charging system

## **TERMS OF WARRANTY**

**Terms of warranty:** 12 months without mileage and motohours limit

