

HSW

**for security
for defence**

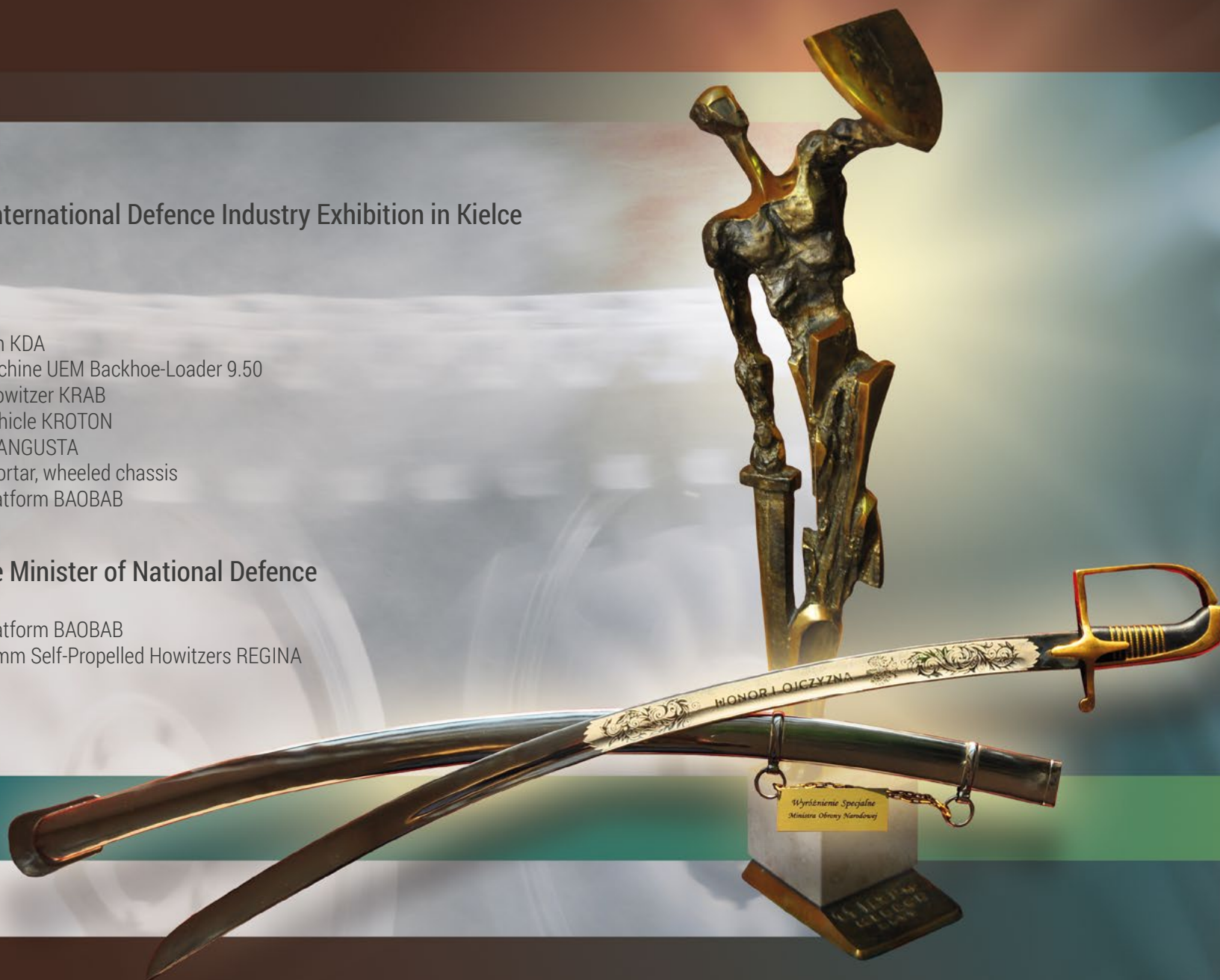
since 1938

The DEFENDER Prize of International Defence Industry Exhibition in Kielce awarded to HSW S.A.

1998 – 98 mm Mortar M98
2001 – 35 mm Automatic Cannon KDA
2002 – Universal Engineering Machine UEM Backhoe-Loader 9.50
2003 – 155 mm Self-Propelled Howitzer KRAB
2004 – Scattered Mine Laying Vehicle KROTON
2007 – Rocket Launcher LR-40 LANGUSTA
2011 – 120 mm Self Propelled Mortar, wheeled chassis
2013 – Scattered Mine Laying Platform BAOBAB

Special distinctions of the Minister of National Defence

2011 – Scattered Mine Laying Platform BAOBAB
2012 – Artillery Battalion of 155 mm Self-Propelled Howitzers REGINA



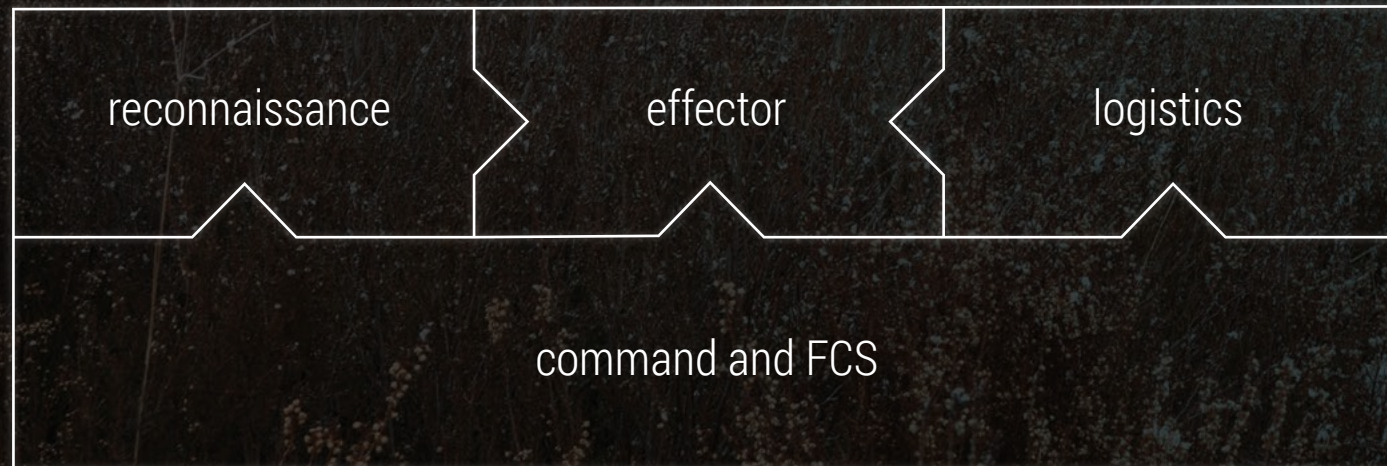
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UNIFICATION OF THE STRUCTURE OF ARMAMENTS UNITS

Armaments unit is the basic tactical and firing unit of land forces, consisting of:

- firing units - EFFECTOR
- reconnaissance vehicles - RECONNAISSANCE
- automated command and fire control system - COMMAND AND FCS
- ammunition resupply and repair vehicles - LOGISTICS



IMPLEMENTATION OF ARMAMENTS UNITS – BENEFITS

UNIFICATION of the structure of Armaments Units and Fire Control System



ADAPTATION of proven solutions, i.e. hardware and software of the Fire Control System and other elements of the Armaments Units (e.g. type of chassis used) to new Armaments Units.



TIME AND COST SAVINGS in the processes of:

- configuration of new solutions,
- crew training,
- carrying out tasks related to equipment maintenance.

Artillery Company Unit of 120 mm Self-Propelled Mortars on Wheeled and Tracked Chassis

DESIGNATION

Artillery company unit is the basic tactical and firing unit of land forces (battalion level), consisting of:

- 120 mm self-propelled mortars,
- reconnaissance system,
- automated command and fire control system,
- ammunition supply and armament and electronics repair system.

AUTOMATED COMMAND AND FIRE CONTROL SYSTEM

Automated Command and Fire Control System is intended to support the work of function persons in command and control of the armament elements, performing basic functions:

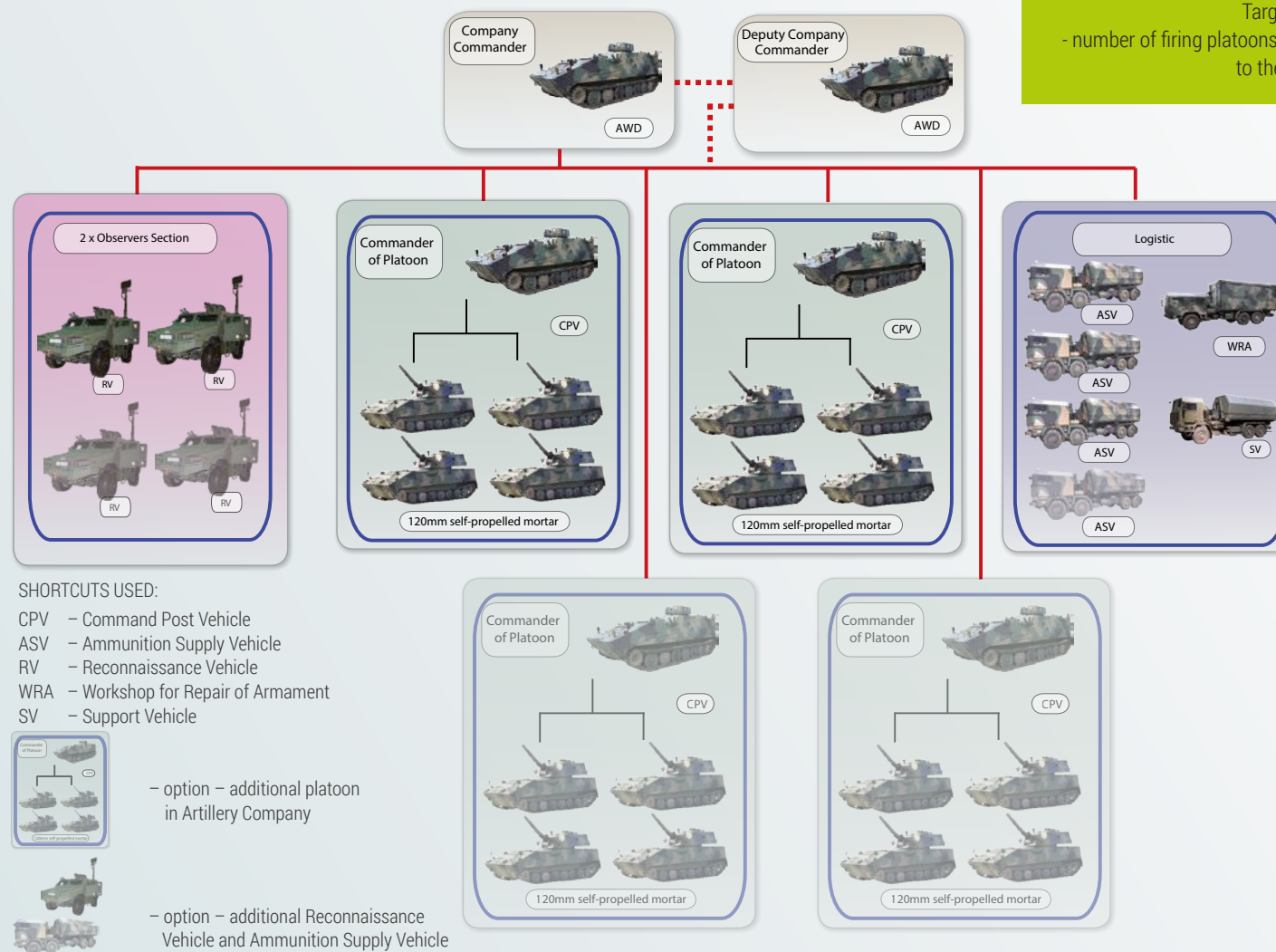
- ✓ automation of command and firing, including all firing positions,
- ✓ gathering and automatic processing of information from the theatre for firing purposes,
- ✓ supporting the commander during combat mission.

AMMUNITION RESUPPLY AND ARMAMENT AND ELECTRONICS REPAIR SYSTEM

The system is composed of the following elements:

- ✓ ammunition resupply vehicles on trucks, adapted for transporting ammunition and its mechanized loading and unloading,
- ✓ armament and electronics repair workshop on trucks with workshop containers, providing the Armament Unit with:
 - field repairs of armament and electronics,
 - support in technical servicing,
 - supply of components and spare parts

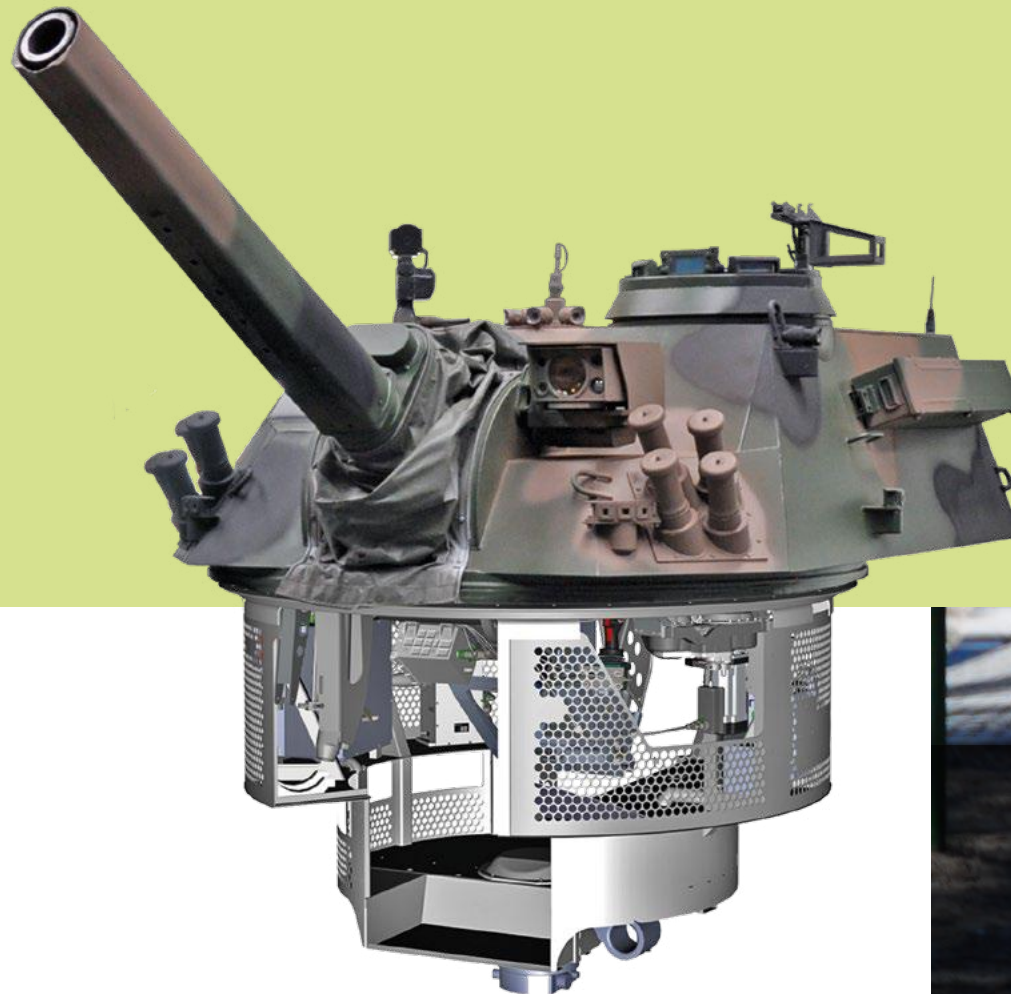
Exemplary Artillery Company Unit of 120 mm Self-Propelled Mortars on Tracked or Wheeled Chassis RAK

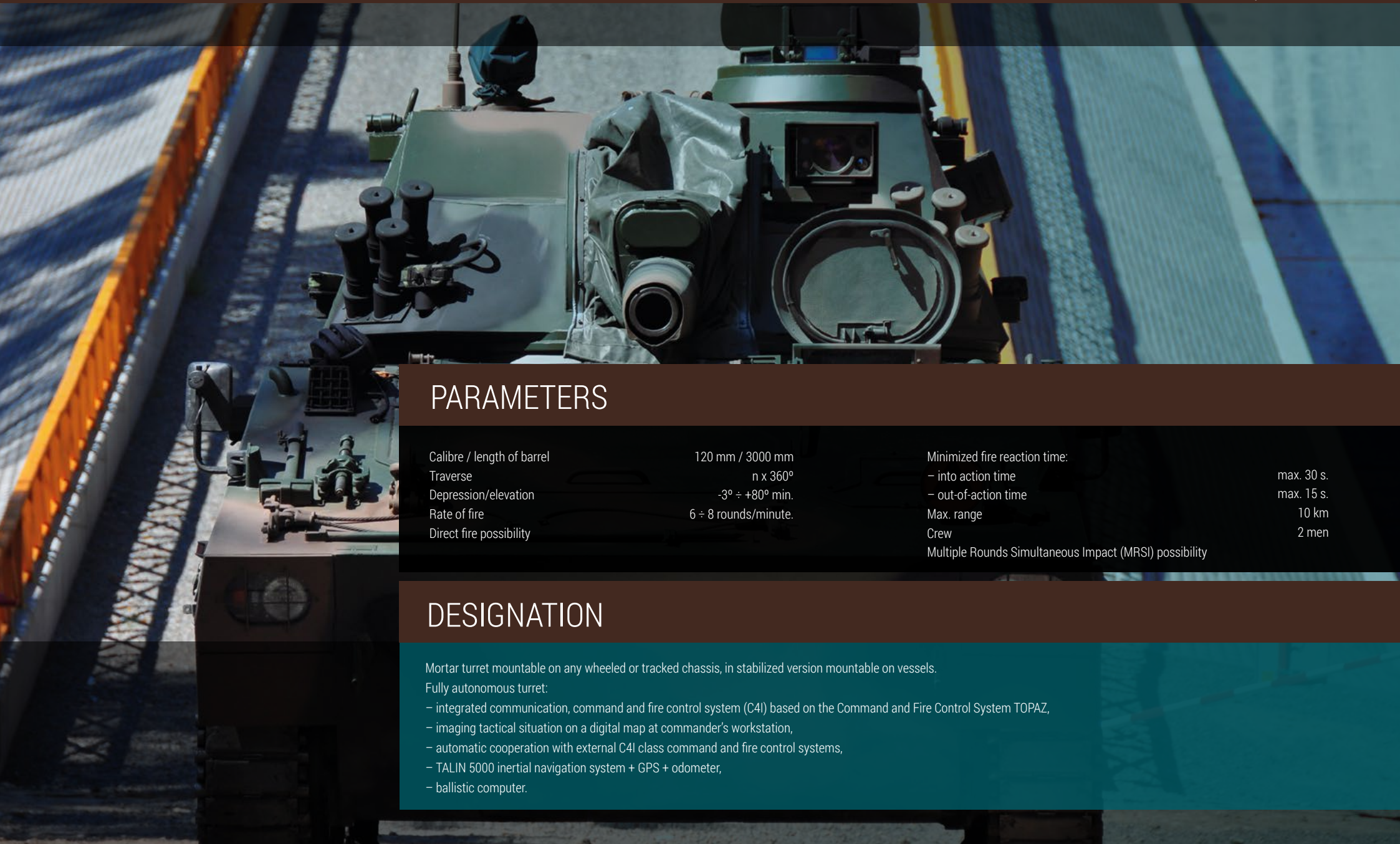


Target structure of the support company:
- number of firing platoons and reconnaissance means adapted to the number of companies in a battalion

EQUIPMENT

- ✓ optoelectronic direct fire sight with thermal imaging camera and laser range finder,
- ✓ automatic aiming system,
- ✓ loading system – loading possible in the full range of rotation angles,
- ✓ OBRA-3 SSP-1 laser warning system,
- ✓ ballistic computer with FCS system,
- ✓ intercom – FONET,
- ✓ day&night observation instruments for commander,
- ✓ omnidirectional reconnaissance system,
- ✓ TALIN 5000 inertial navigation system + GPS (+ ODOMETER in the chassis) ,
- ✓ external communication system - digital radio station VHF RRC 9311 AP,
- ✓ secondary armament 7,62 UKM 2000 D with BAZALT day-night gun sight,
- ✓ smoke grenade launchers - calibre 81 mm.





PARAMETERS

Calibre / length of barrel	120 mm / 3000 mm	Minimized fire reaction time:	
Traverse	n x 360°	– into action time	max. 30 s.
Depression/elevation	-3° ÷ +80° min.	– out-of-action time	max. 15 s.
Rate of fire	6 ÷ 8 rounds/minute.	Max. range	10 km
Direct fire possibility		Crew	2 men
		Multiple Rounds Simultaneous Impact (MRSI) possibility	

DESIGNATION

Mortar turret mountable on any wheeled or tracked chassis, in stabilized version mountable on vessels.

Fully autonomous turret:

- integrated communication, command and fire control system (C4I) based on the Command and Fire Control System TOPAZ,
- imaging tactical situation on a digital map at commander's workstation,
- automatic cooperation with external C4I class command and fire control systems,
- TALIN 5000 inertial navigation system + GPS + odometer,
- ballistic computer.

120 mm Self-Propelled Mortars

EXEMPLARY CARRIERS OF 120MM MORTAR TURRET



UNIVERSAL TRACKED CARRIER



UNIVERSAL WHEELED CARRIER

gradeability	60%
side slope	30%
vertical obstacles	0,4 m
trenches	2,0 m
fords	1,5 m
max. speed on surfaced roads	60 km/h
travel range with full fuel tanks	min. 500 km
length of carrier	7 370 mm
width	2 870 mm
ballistic protection	Level 1, STANAG 4569*
engine type	MTU 6V199 TE20
power	260 kW

* modular ballistic protection system according to customer's requirements.

TRANSPORTATION

Mortars can be transported by various means of transport, including airborne.

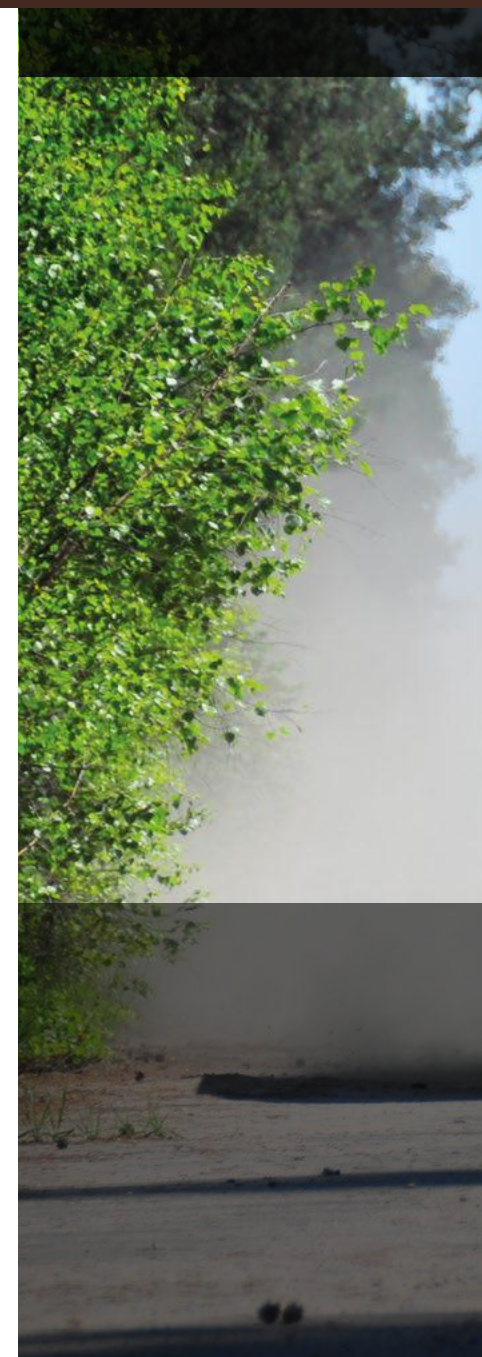
AMMUNITION CARRIED

Quantity of 120 mm ammunition carried: 46 pcs.

– 20 pcs. in rotary magazine for automatic use,

– 26 pcs. in ammunition compartment.

Depending on the chassis used, it is possible to change the quantity of ammunition in ammunition compartment.





DESIGNATION

120 mm self-propelled mortar designed for indirect, semi-direct and direct fire of enemy's:

- mechanized units and tanks on battalion level (company) in various military operations,
- detected firing means on battalion / brigade level,
- command posts and command-observation points on battalion / company level,
- subunits and reconnaissance means, as well as electronic warfare assets,
- elements of the enemy's fortifications.

Moreover, with special ammunition the mortar can fulfil tasks supporting missions in the scope of lighting and smoke screens (targeting, surveillance posts, battlefield illumination, smoke screens, masking own troops manoeuvres).

Artillery Command-Post Vehicle

– wheeled chassis

ACPV

EQUIPMENT

- ✓ computer-aided and electronic fire control system, with automated fire data preparation,
- ✓ on-board armament – 7,62 mm MG,
- ✓ laser warning and counteracting system,
- ✓ armouring ensuring ballistic and fragmentation protection of crew according to STANAG 4569 (level I, Annex A and B),
- ✓ day and night observation instruments for two crew members, including the commander,
- ✓ filtering and ventilation device,
- ✓ NBC protection system,
- ✓ OBRA-3 SSP-1 laser warning system,
- ✓ decontamination set (ZOD-2),
- ✓ fire extinguishing system in the engine compartment and explosion suppression system in the crew compartment,
- ✓ front and rear towing eyes according to STANAG 4019,
- ✓ winch for self-evacuation (front and rear rope output)
- ✓ intercom and external communication system, ICT equipment and GPS receiver,
- ✓ power system (power source - on-board auxiliary power unit)
- ✓ equipment enabling travelling on public roads,
- ✓ standard and special tools for repairs and maintenance,
- ✓ set of basic spare parts and consumables for the chassis and Command-Post Vehicle,
- ✓ vehicle camouflaging kit,
- ✓ basic first aid kit,
- ✓ mounting fixtures for crew members' individual equipment.



UNIVERSAL WHEELED CARRIER

BUILD STANDARD

"Power-pack" type drive system kit.

SCANIA DI1249A03P diesel engine with automatic transmission, seven gears forward, one reverse.

DESIGNATION

Artillery Command-Post Vehicles are designed to perform tasks within the scope of fire preparation and control, deployment of command posts, sourcing and preparing data concerning firing conditions and reconnaissance information, necessary for enemy's objects destruction. Platoon Commander's Command-Post Vehicles ensure independent operation



EQUIPMENT

- ✓ computer-aided and electronic fire control system, with automated firing data preparation
- ✓ on-board armament - 7,62 mm MG, with open weapon station
- ✓ laser warning and counteracting system,
- ✓ armouring ensuring ballistic and fragmentation protection of crew according to STANAG 4569 (level I, Annex A and B),
- ✓ day and night observation instruments for two crew members, including the commander,
- ✓ filtering and ventilation device,
- ✓ NBC protection system,
- ✓ OBRA-3 SSP-1 laser warning system,
- ✓ decontamination set,
- ✓ fire extinguishing system in the engine compartment and explosion suppression system in the crew compartment,
- ✓ intercom and external communication system, ICT equipment and GPS receiver,
- ✓ power system (power source - on-board auxiliary power unit)
- ✓ equipment enabling travelling on public roads,
- ✓ standard and special tools for repairs and maintenance,
 - ✓ set of basic spare parts and consumables for the chassis and Command-Post Vehicle,
 - ✓ vehicle camouflaging kit,
 - ✓ mounting fixtures for crew members' individual equipment,
 - ✓ basic first aid kit.

of firing platoons in command and fire control system. In the case of destruction of the Support Company Commander's Command-Post Vehicle, Platoon Commander's Command-Post Vehicles takes over its tasks

UNIVERSAL TRACKED CARRIER

BUILD STANDARD

260 kW engine, maximum torque: 1 730 Nm, emissions norm - EURO III
Automatic transmission LSG-1000
Brake system: hydraulic dual-circuit service brake and mechanically actuated parking brake.

EQUIPMENT

TRUCK EQUIPMENT:

- ✓ frame for fixing a 20 ft 1C-type container,
- ✓ winch,
- ✓ towing device and a tow bar,
- ✓ GPS,
- ✓ weapon station with 7,62 mm MG,
- ✓ FONET on-board intercom system,
- ✓ on-board radiostation VHF,
- ✓ filtering and ventilation device located in the cab, ensuring minimum overpressure of 200 Pa.

TRUCK CHASSIS WITH CAB

JELCZ P662D.35 truck chassis with JELCZ 144 4-man armoured cab adapted for off-road conditions, with 6x6 drive.

BUILD STANDARD

Engine: Diesel, 6 cylinders, in line, vertical, with turbocharging and cooling of the intake air, nominal power: 279 kW

Gearbox: coupled with engine, synchronized, reverse gear non-synchronized, 16-gear, mechanically operated.

Tyres: 14.00 R20 wide profile with off-road thread. Central Tyre Inflation System in all wheels.



DESIGNATION

EQUIPMENT

CONTAINER'S EQUIPMENT:

Technical compartment:

It is equipped with the following modules:

- ✓ air-conditioning,
- ✓ electrical power supply, inverter and batteries,
- ✓ filtering and ventilation, and dryer,
- ✓ on-board power generating unit - 8 kW and nominal voltage of 3x400 V AC, 50 Hz,
- ✓ removable power generating unit - 2 kW and voltage of 230V AC, 50 Hz,
- ✓ air compressor,
- ✓ self-levelling container lifting system (SUPK).

Usable compartment

Equipped with basic and special tools as well as workshop devices and spare parts. Modular tables and lockers on both sides of the compartment. Door with a window in the rear and side right wall, window with blinds in the right wall, basic dome lights, black-out lighting controlled by sensors in doors, local lighting of work stations, air conditioning, heater, filtering and ventilation unit, electrical sockets for 230 V AC, outlet of compressed air.

Nitrogen cylinder assembly mounted in the chamber which is opened from the outside, on the right side of the container.

WORKSHOP CONTAINER

20 ft 1C-type workshop container with modular equipment, with hydraulic jacks for quick unloading and loading onto the chassis, composed of:

- technical compartment,
- usable compartment.

Hydraulic jacks SUPK - For quick unloading and loading the container on the chassis, electro-hydraulic remote control or by means of a control panel located in the technical compartment..

CONTAINER DIMENSIONS:

length	6 058 mm
width	2 438 mm
height	2 438 mm

The vehicles are designed for field repair of armament and electronics, support in technical servicing and supply of subcomponents and spare parts for an artillery company unit of 120 mm self-propelled mortars.

EQUIPMENT

TRUCK EQUIPMENT:

- ✓ shooting position with 7,62 mm machine gun,
- ✓ on-board intercom (FONET) and external communication system, GPS,
- ✓ filtering and ventilation device, located in the cab, ensuring minimum overpressure of 200 Pa,
- ✓ hook container loading system, type MK IV.

TRUCK CHASSIS WITH SELF- UNLOADING SYSTEM AND CAB

JELCZ P882.53 truck chassis with 2-man armoured cab, ensuring ballistic and fragmentation protection of crew according to STANAG 4569 (level I, Annex A and B),

DIMENSIONS:

length	10 450 mm
width	2 550 mm
height	3 600 mm
ground clearance	340 mm

BUILD STANDARD

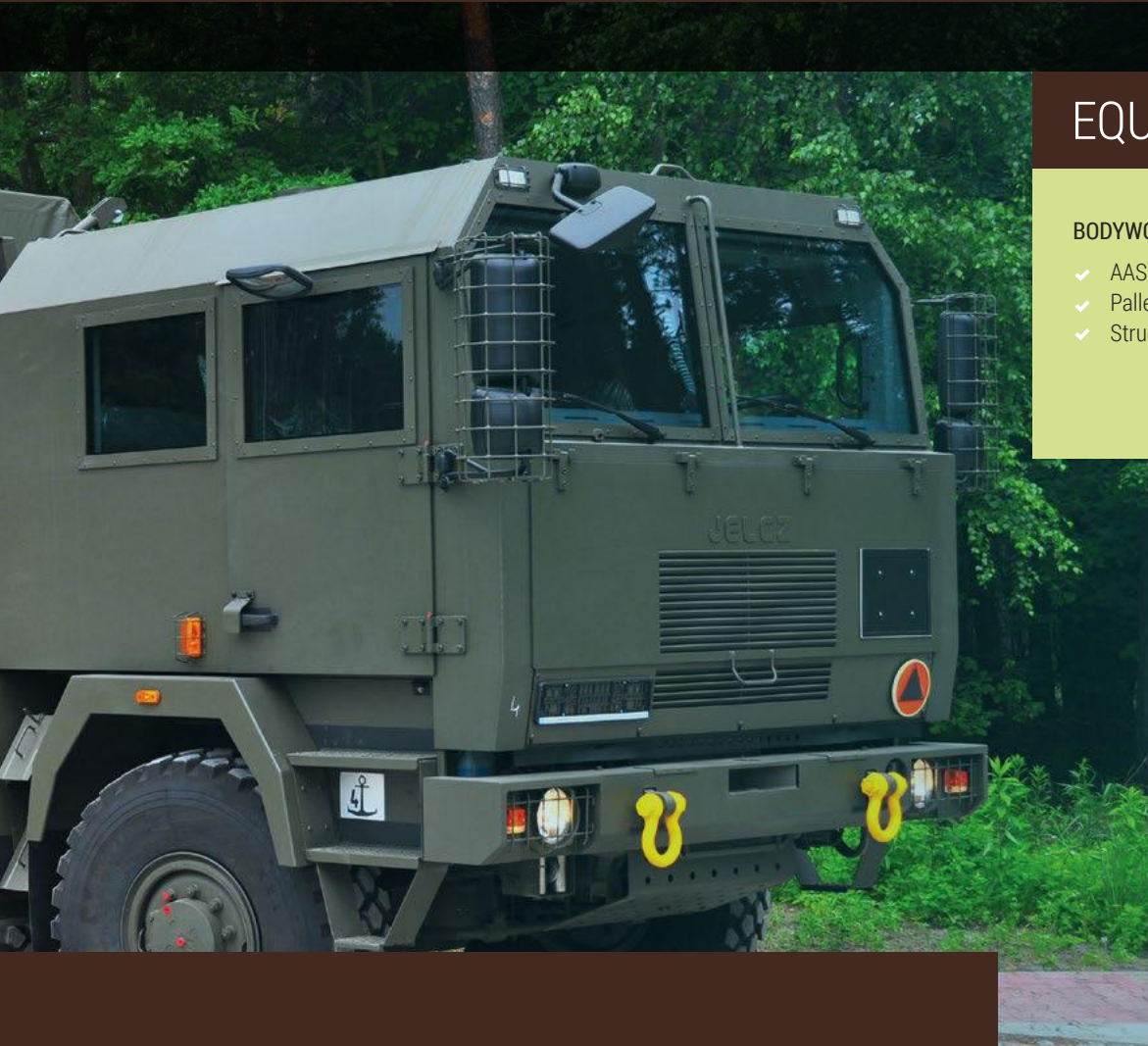
Engine: IVECO, Diesel, 6 cylinders, in line, vertical, with turbocharging, maximum power 392 kW.

Gearbox: coupled with engine, synchronized, reverse gear non-synchronized, 16-gear, mechanically operated.

Tyres: 14.00 R20 wide-profile with off-road (or universal) thread. Central Tyre Inflation System. Equipped with special Beadlock inserts for driving with low air pressure in tyres, enhancing the vehicle's mobility in difficult terrain.



DESIGNATION



EQUIPMENT

BODYWORK EQUIPMENT: SPECIAL PALLETS:

- ✓ AASV is equipped with 6 special pallets for transporting 120 mm ammunition.
- ✓ Pallets have locking mechanisms for mounting them on container platform.
- ✓ Structure of pallets allows for their loading and unloading by means of a forklift or crane and sling.

BODYWORK

AASV bodywork is comprised of:

- 20 ft "flat-rack" type container, adapted to a hook container loading system, floor equipped with slots for easy, quick and secure mounting of special pallets with 120 mm ammunition,
- sideboards: front rigid, sides split, back openable,
- demountable bars at container floor,
- tarpaulin, split by side boards.

Vehicles are designed for supplying ammunition to a company. This encompasses transportation of ammunition as well as mechanized loading and unloading.

EQUIPMENT

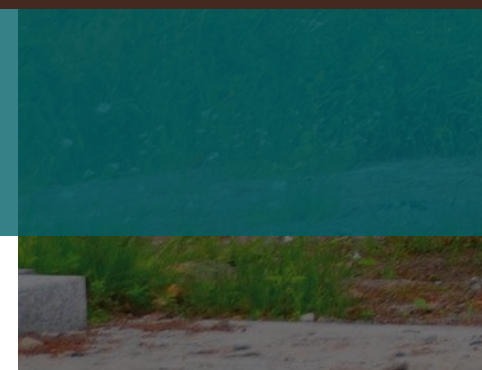
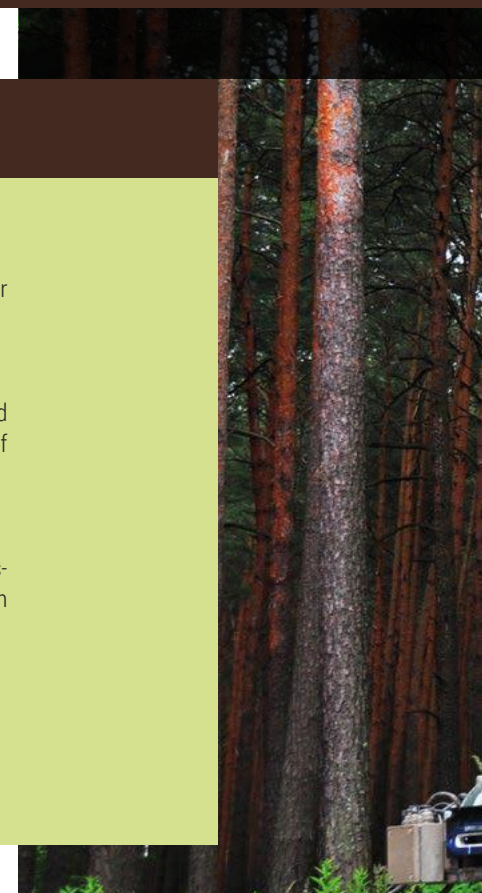
Basic equipment of the ARV includes equipment being part of the On-Board and Portable Observation and Reconnaissance Sets (PZOR and WZOR), designed to source information for target identification, target localization and preparation of firing data for support company, artillery battery or artillery battalion.

PZOR is comprised of a tactical battlefield radar and optoelectronic head (CCD, LLTV and IR cameras, laser rangefinder) installed on remotely controlled 4m high mast. WZOR is equipped with artillery rangefinding and reconnaissance instruments (CCD and IR cameras, laser rangefinder) and instruments for data exchange and audio communication with ARV by means of radio and wired connection.

ARV is equipped with three workstations – (1) commander, (2) head operator-recon and (3) radar operator-recon. Fire Control System software makes it possible to integrate reconnaissance subsystems and ICT equipment and software of AVR is fully integrated with automated FCS TOPAZ, which allows for wired and radio data exchange and audio communication with artillery command post on tactical level. Data exchange and audio communication system is based on FONET intercom..

DESIGNATION

Artillery Reconnaissance Vehicle is designed to provide ground optoelectronic reconnaissance and firing support to a company of 120 mm self-propelled mortars and other subunits of mortars and artillery. If needed, it may also be used for reconnaissance of roads, redeployment routes, areas around firing posts and organization of protection.





DESIGNATION

Battalion unit of 155 mm self-propelled howitzers constitutes the basic tactical and firing unit of the artillery of land forces.

The division unit manufactured by HSW S.A. is composed of:

- 155 mm self-propelled howitzers KRAB,
- automated battalion command and fire control system TOPAZ,
- reconnaissance system,
- ammunition resupply and armament and electronics repair system.

AUTOMATED COMMAND AND FIRE CONTROL SYSTEM TOPAZ

Automated artillery battalion command and fire control system TOPAZ is designed to support the work of function persons in an artillery battalion within the scope of command and control of available firing means. Its key functions include:

- ✓ automation of command and firing on the level of artillery battalion, including all firing positions,
- ✓ support for commander in performance of combat mission,
- ✓ automation of ballistic calculations and digital transfer of commands and reports,
- ✓ automated and continuous control of logistics, control of mission performance and control of correct flow of data in the system,
- ✓ automatic cooperation with external C4I class command and fire control systems.

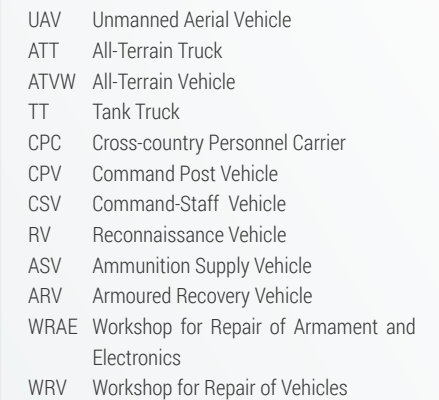
BATTALION SUPPLY AND ARMAMENT AND ELECTRONICS REPAIR SYSTEM

The system is composed of the following elements:

- ✓ ammunition supply vehicles (ASV) on JELCZ chassis, adapted for transporting containers of 155 mm ammunition and its mechanized loading and unloading,
- ✓ "cistern" type trucks (GUT-C) on JELCZ chassis adapted for transporting POL,
- ✓ Workshop for Repair of Armament and Electronics (WRAE), Workshop for Repair of Vehicles (WRV) and Armoured Recovery Vehicle (ARV).
These vehicles provide logistic support for a division, encompassing:
 - repair of armament and electronics,
 - support in technical servicing,
 - supply of components and spare parts.

Depending on its place in the structure, the Battalion Unit REGINA may be complemented with radiolocation set - Weapon Locating Radar (WLR LIWIEC)

Free configuration of modular structure depending on the customer's requirements



EQUIPMENT

- ✓ land navigation and topographical positioning system FIN 3110I + GPS + odometer,
- ✓ Fire Control System (turret control computer, layer's display unit, commander's ballistic computer),
- ✓ filtering-ventilation system,
- ✓ FONET Intercom and radiostation for external communication (Digital RRC 9311AP type VHF transceiver, Personal transceiver of gunner),
- ✓ fire extinguishing and explosion suppression systems
- ✓ day and night observation instruments for driver and commander,
- ✓ laser warning system OBRA-3 SSP-1, - Direct fire sight,
- ✓ ballistic radar MVRS-700 SCD ,
- ✓ auxiliary power unit, output power 5.5 kW.

TRACKED CARRIER

TECHNICAL DATA

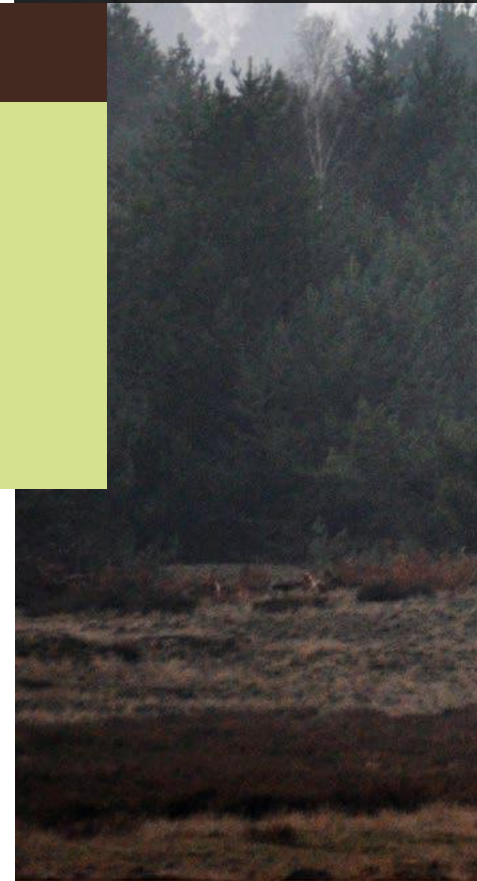
Combat weight:	48 000kg	NEGOTIATING OBSTACLES		SPEED:	
Crew	4+1 men	gradient	25 °	on surfaced roads (category I, tarmac)	60 km/h
DIMENSIONS:		side slope	17°	on field, jagged roads	15 km/h
max. length	12 050 mm	vertical	0,75 m	off-road in plant terrain	30 km/h
max. width	3 600 mm	trenches	2,5 m	cruising range	400 km
height: to top plate of turret	3 000 mm	fords	1,0 m		

BULID STANDARD

Engine: MTU MT 881 Ka 500, power, max.: 1000 KM (735kW)/ 2700 rpm

Transmission: ALLISON X1100 – 5A3, automatic, selection of four forward speeds and two reverse speeds, integral braking system, integral steering system, pivot steer in neutral (360°).

Suspension: hydro-pneumatic system.



PARAMETERS

Calibre / barrel length	155 mm / 52 calibres
RATE OF FIRE:	
– burst	3 rounds /10 s
– intense	6 rounds /min. for 3 min.
– sustained	2 rounds /min.
– “salvo” effect (MRSI)	do 3 rounds /min.
Angle of fire: depression / elevation	- 3,5° to + 70°
Angle of fire: traverse	n x 360°
Minimum range	4,7 km
Maximum range	40 km
AUXILIARY ARMAMENT:	
– machine gun	12,7 mm
– smoke grenades launchers (2 x 4)	81 mm
REACTION TIME:	
– into action time	approx. 30 s
– out-of-action time	max. 30 s
AMMUNITION STOWAGE (40 ROUNDS), INCLUDING:	
– in turret (shells + containers for charges)	29 + 28
– in chassis (shells + containers for charges)	11 + 20
Ammunition according to JBMoU	

DESIGNATION

Used by Armed Forces

The howitzer is designed to suppress and destroy:

- artillery batteries and rocket artillery,
- command posts, communication centres and ground fortifications,
- mechanized and motorized units in all locations and all kinds of combat actions,
- armoured means in enemy's deployment zone and by direct fire,
- helicopters on landing grounds,
- important logistic support facilities.

EQUIPMENT

CHASSIS EQUIPMENT:

- ✓ "Power pack" drive system,
- ✓ auxiliary power unit,
- ✓ filtering and ventilation device,
- ✓ OBRA laser warning system,
- ✓ KIDDE-DEUGRA fire extinguishing and explosion suppression systems,
- ✓ open 7,62 mm MG post with shields,
- ✓ two Air Top EVO 5500 heaters,
- ✓ hull with running system and ballistic protection – level I according to STANAG 4569 Annex A and B.

ELEMENTS OF THE FIRE CONTROL SYSTEM AND ICT SYSTEM:

- ✓ FONET on-board intercom system,
- ✓ On-board external communication system:
 - two HF – RF5800H transceivers,
 - three VHF RRC9311AP transceivers,
- ✓ power supply unit for FCS and communication,
- ✓ workstation and system components:
 - DD9620T vehicle terminals,
 - MK16A computer module
 - GPS,
 - DD9620T-S server,
 - software for FCS TOPAZ,
 - telephone and alarm panels.

TRACKED CHASSIS

TECHNICAL DATA

Total weight	17 000 kg
Crew:	
CSV	4+1 men
CPV	3+1 men
DIMENSIONS:	
max. length	7 405 mm
max. width	3 025 mm
max. height	2 790 mm

NEGOTIATING OBSTACLES:

gradeability	60%
permissible side slope	30%
SPEED:	
maximum driving speed	60 km/h
travel range with full fuel tanks	600 km.
OPERATING TEMPERATURE:	
low	-30°C
high	+50°C

BUILD STANDARD

Engine: MTU 6V199TE20 type, power output 260 kW, maximum torque 1 730 Nm. Emission standard EURO III

Automatic gearbox LSG 1000





DESIGNATION

Used by Armed Forces

Command-Staff and Command Post Vehicles are designed to:

- provide workstations for Battalion Commander, Chief of Staff, Battery Commander and Platoon Commander and function persons working with them,
- ensure IT support of planning and decision-making processes concerning battalion command and fire control,
- ensure communication.

EQUIPMENT

TRUCK EQUIPMENT:

- ✓ frame for fixing a 1C-type container,
- ✓ winch,
- ✓ towing device and a tow bar,
- ✓ GPS,
- ✓ on-board radiostation VHF,
- ✓ filtering and ventilation device: located in the cab, ensuring 200 Pa overpressure at air flow rate of 100 m³/h.

TRUCK CHASSIS WITH CAB

JELCZ P662D.35 truck chassis with JELCZ 144 4-man armoured cab, adapted for off-road conditions, with 6x6 drive.

TECHNICAL DATA

chassis weight	14 500 kg	NEGOTIATING OBSTACLES:	
permissible weight of towed trailer	16 000 kg	ground clearance	340 mm
crew	4 men	approach angle	34°
DIMENSIONS:		departure angle with rear bumper raised	26°
length	9 895 mm	departure angle with rear bumper lowered	11°
width	2 600 mm	gradeability	25°
height	3 850 mm	side slope	15°
SPEED:		fords	max. 1,0 m
maximum permissible speed:	85 km/h		
Maximum travel distance on surfaced roads (without refuelling):	650 km		

BUILD STANDARD

Engine: Diesel, 6 cylinders, in line, vertical with turbocharging and cooling of the intake air, nominal power 279 kW

Gearbox: coupled with engine, synchronized, reverse gear non-synchronized, 16-gear, mechanically operated.

Tyres: 14.00 R20 wide profile with off-road thread, Central Tyre Inflation System.



DESIGNATION

Used by Armed Forces

EQUIPMENT

CONTAINER'S EQUIPMENT:

Technical compartment:

It is equipped with the following modules:

- ✓ air-conditioning,
- ✓ electrical power supply and batteries,
- ✓ filtering and ventilation, and dryer,
- ✓ on-board power generating unit - 10 kW and nominal voltage of 3x400 V AC, 50 Hz,
- ✓ air compressor,
- ✓ self-levelling container lifting system (SUPK).

Usable compartment:

Equipped with basic and special tools as well as workshop devices and spare parts. Modular tables and lockers on both sides of the compartment.

Door with a window in the rear and side right wall, window with blinds in the right wall, basic dome lights, black-out lighting controlled by sensors in doors, local lighting of work stations, air conditioning, heater, filtering and ventilation unit, electrical sockets for 230 V AC, outlet of compressed air.

Device for filling of hydraulic systems: mounted in the usable compartment - oil tank capacity: 10 dm³.

Device for nitrogen filling: mounted in the chamber which is opened from the outside, on the right side of the container.

WORKSHOP CONTAINER

20 ft 1C-type workshop container with modular equipment, with hydraulic jacks for quick unloading and loading onto the chassis, composed of:

- technical compartment,
- usable compartment.

Hydraulic jacks SUPK

For quick unloading and loading the container on the chassis, electrohydraulic remote control or by means of a control panel located in the technical compartment.

CONTAINER DIMENSIONS:

length	6 058 mm
width	2 438 mm
height	2 438 mm

The vehicles are designed for field repair of armament and electronics, support in technical servicing and supply of subcomponents and spare parts for battalion unit of 155 mm howitzers REGINA.

EQUIPMENT

TRUCK EQUIPMENT:

- ✓ filtrating and ventilation device located in the cab (200 Pa overpressure at air flow rate of 100 m³/h)
- ✓ hook container loading system, type MK IV

TRUCK CHASSIS WITH SELF – UNLOADING SYSTEM AND CAB

JELCZ P882.53 truck chassis with 2-man armoured cab equipped with a hook container loading system.

TECHNICAL DATA

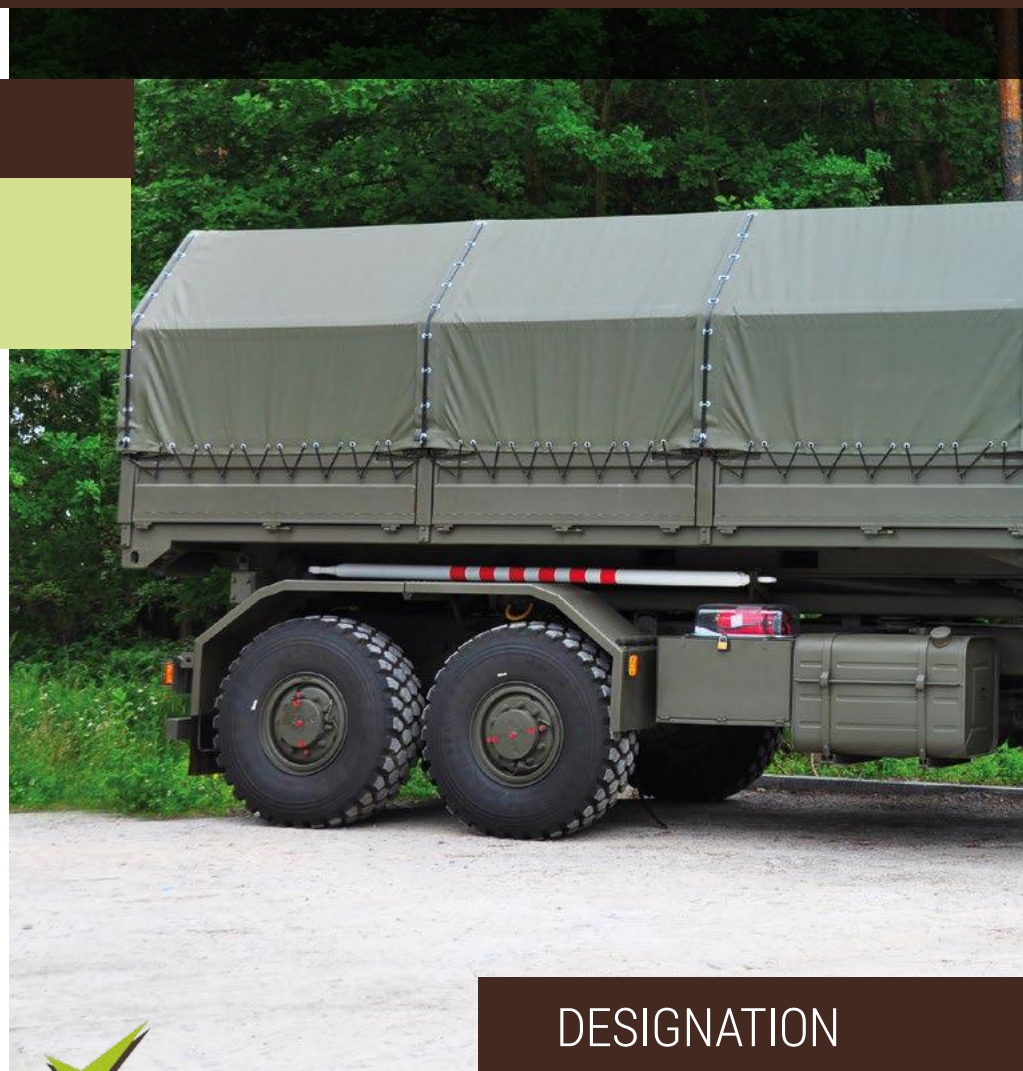
chassis weight:	18 500 kg	NEGOTIATING OBSTACLES:	
payload	13 000 kg	ground clearance	340 mm
permissible weight of towed trailer	12 000 kg	breakover angle	25°
DIMENSIONS:		approach angle	35°
length	10 450 mm	departure angle	35°
width	2 550 mm	gradeability	30°
height:	3 590 mm	side slope	20°
SPEED:		fords	max. 1,0 m
maximum permissible speed	85 km/h		
Travel distance on surfaced roads (without refuelling)	650 km		

BUILD STANDARD

Engine: Diesel, 6 cylinders, in line, vertical, with turbocharging, maximum power 392 kW

Gearbox: coupled with engine, synchronized, reverse gear non-synchronized, 16-gear, mechanically operated, transfer box with on-road/off-road selection.

Tyres – 14.00 R20 wide-profile with off-road (or universal) thread. Central Tyre Inflation System. Equipped with special Beadlock inserts for driving with air low pressure in tyres, enhancing the vehicle's mobility in difficult terrain.



DESIGNATION

Used by Armed Forces



Vehicles are designed for supplying ammunition to a battalion unit of 155 mm howitzers REGINA. This encompasses transportation of ammunition as well as mechanized loading and unloading. Palletized ammunition transportation system allows for adaptation to different types of ammunition.

EQUIPMENT

BODYWORK EQUIPMENT: SPECIAL PALLETS

ASV is equipped with 6 special pallets for transporting 155 mm artillery ammunition.

Each pallet can be used to transport the following amounts of ammunition and special equipment:

- ✓ 16 projectiles with transport fuses,
- ✓ 16 modular charges in transport tubes,
- ✓ necessary quantity of fuses and primers in manufacturer's packaging,
- ✓ necessary quantity of base bleed units in manufacturer's packaging,
- ✓ auxiliary equipment for setting depth of the missile container and for projectile arming.

Pallets have locking mechanisms for mounting them on container platform.

Construction of pallets allows for their loading and unloading by means of a forklift or crane and sling.

BODYWORK

Bodywork of the Ammunition Resupply Vehicle includes:

- 20 ft "flat-rack" type container, adapted to a hook container loading system, floor equipped with slots for easy, quick and secure mounting of special pallets with 155 mm ammunition,
- sideboards: front rigid, sides split, back openable,
- demountable bars at container floor,
- tarpaulin, split by side boards.

DESIGNATION

Battalion Unit of Rocket Launchers is designed for performing missions within the scope of direct fire support at long distances (40-70 km), in particular for fighting enemy fire support means and command systems, firing at armed forces in marshalling area, destruction of logistic infrastructure, disruption of enemy supply systems, isolation of uncommitted forces and gaining military advantage in the air through strikes on enemy air defence means.

AUTOMATED COMMAND AND FIRE CONTROL SYSTEM TOPAZ

Automated artillery battalion command and fire control system TOPAZ is designed to support the work of function persons in an artillery battalion within the scope of command and control of available firing means. Its key functions include:

- ✓ automation of command and firing on the level of artillery battalion, including all firing positions,
- ✓ support for commander in performance of combat mission,
- ✓ automation of ballistic calculations and digital transfer of commands and reports,
- ✓ automated and continuous control of logistics, control of mission performance and control of correct flow of data in the system,
- ✓ automatic cooperation with external C4I class command and fire control systems.

BATTALION SUPPLY AND ARMAMENT AND ELECTRONICS REPAIR SYSTEM

The system is composed of the following elements:

- ✓ Ammunition Supply Vehicles (ASV) on JELCZ trucks, adapted for transporting containers of 122 mm rocket ammunition and its mechanized loading and unloading,
- ✓ "cistern" type trucks (GUT-C) on JELCZ chassis adapted for transporting POL,
- ✓ Workshop for Repair of Armament and Electronics (WRAE), Workshop for Repair of Vehicles (WRV) and Armoured Recovery Vehicle (ARV).

These vehicles provide logistic support for a division, encompassing:

- repair of armament and electronics,
- support in technical servicing,
- supply of components and spare parts.

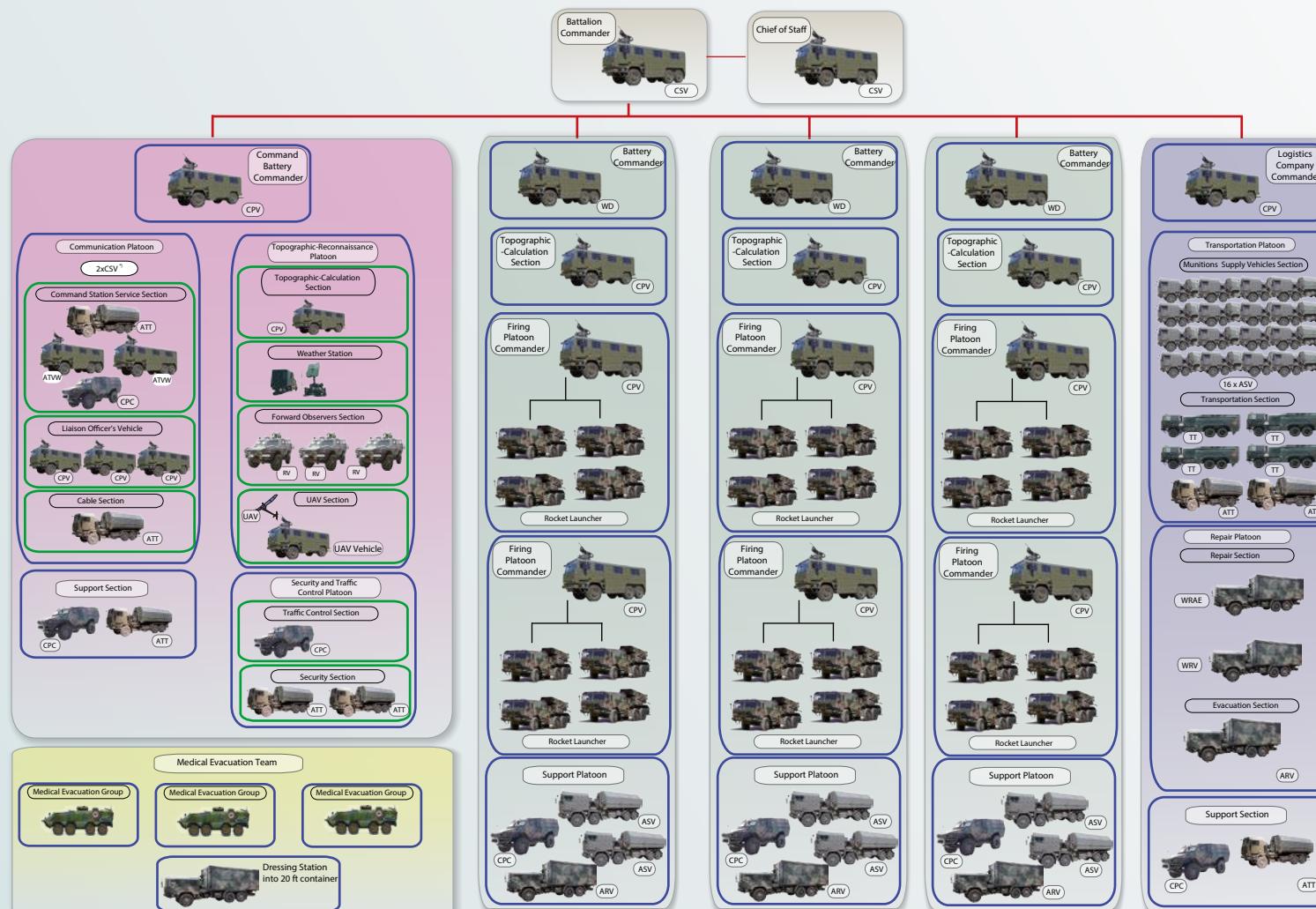
Depending on its place in the structure, the Battalion Unit LANGUSTA may be complemented with Weapon Location Radar (WLR LIWIEC).

Exemplary Battalion Unit of Rocket Launchers RL-40 LANGUSTA

Free configuration of modular structure depending on the client's requirements

SHORTCUTS USED:

UAV	Unmanned Aerial Vehicle
ATT	All-Terrain Truck
ATVW	All-Terrain Vehicle
TT	Tank Truck
CPC	Cross-country Personnel Carrier
CPV	Command Post Vehicle
CSV	Command-Staff Vehicle
RV	Reconnaissance Vehicle
ASV	Ammunition Supply Vehicle
ARV	Armoured Recovery Vehicle
WRAE	Workshop for Repair of Armament and Electronics
WRV	Workshop for Repair of Vehicles



EQUIPMENT

- ✓ Fire Control System (FCS) components:
 - DD9620T ballistic computer,
 - VHF RRC9311 AP transceiver,
 - FONET intercom,
 - TALIN 5000 inertial navigation system,
- ✓ stationary and portable firing device,
- ✓ filtering and ventilation device.

TRUCK CHASSIS

JELCZ P662D.M27 truck chassis with armoured cab, three axle, 6x6 drive with load capacity of 10 000 kg. Meets ADR requirements.

TECHNICAL DATA

total weight (without rockets)	17 100 kg	NEGOTIATING OBSTACLES:		SPEED:	
permissible towed weight	17 000 kg	ground clearance	410 mm	maximum speed	85 km/h
		fords	1,2 m	maximum travel distance	650 km
DIMENSIONS:		gradeability	30°		
length	8 600 mm	permissible side slope	20°		
width	2 540 mm				
minimum height	2 740 mm				

BUILD STANDARD

IVECO aifo CURSOR 8 engine, EURO 3, Diesel, 4-stroke, 6 cylinder, in line, vertical, with turbocharging and cooling of charge air, nominal power 259 kW.

Cab: Armoured 6-man cab, hydraulic tilting, four doors, ensuring ballistic protection level 1 according to STANAG 4569.

Wheels and tyres: Central Tyre Inflation System, standard tyre size: 14.00 R20 with insert for short run-flat.





PARAMETERS

Calibre	122 mm
Numer of barrels:	40 pcs.
Rate of fire (40 rounds)	20 s
MAXIMUM RANGE:	
– for rockets with HE warheads	42 km
Range can be extended depending on rockets used.	
ELEVATION:	
– maximum elevation	55°
– minimum elevation	0°
– minimum in limited section (above the cab)	11°
TRAVERSE:	
– to the right from chassis axis	70°
– to the left from chassis axis	102°
LAYING SPEED:	
with electric drive:	
– in horizontal plane	7°/s
– in vertical plane	5°/s
with hand-operated drive:	
– in horizontal plane:	6°/ handwheel turn
– in vertical plane	4°/ handwheel turn

DESIGNATION

Rocket Launcher LANGUSTA is designed to:

- destroy and suppress enemy's manpower and combat equipment in its concentration areas,
- destroy enemy's firing means and command posts,
- disrupt and disorganize enemy's actions,
- lay scattered mines,
- suppress enemy's command system and logistic support.

Used by Armed Forces

EQUIPMENT

- ✓ external and internal artillery part and automated loading control panels,
- ✓ filtering and ventilation device
- ✓ Fire Control System:
 - DD9620T ballistic computer with FCS software
 - new electronic fire control unit PALBA (stationary and portable version),
 - artillery part and loading system control panel coupled with FCS (mounted in the cab and outside),
 - TALIN 5000 inertial navigation system,
 - digital RRC 9311AP type VHF transceiver,
 - FONET intercom.

LOADING SYSTEM

First loading of artillery part and automated loading/ reloading system – manually, by crew.

Second loading of artillery part - by the automated loading/ reloading system, controlled from the cab or outside in less than 5 minutes.

LAYING SYSTEM

Automatic: artillery part is setting itself up on a position (azimuth and elevation) calculated by Fire Control System (FCS).

Assisted: artillery part is set up on a position (azimuth and elevation) by the internal (or external) control unit. Actual azimuth and elevation data are available on the control display unit.

Manual: in the case of system failure, artillery part elevation and azimuth can be controlled manually (by means of handwheels).

FIRING SYSTEM

New fire control unit PALBA (stationary and portable version), which control panel resembles that of the CZS family, enables firing of rockets in sequence or from a specific barrel (chosen by the commander). Moreover, the fire control unit keeps a record of loaded rockets (providing information for the commander which barrels are loaded). New impulse generator is also used to control firing operation (based on the KOMUT-10TA series).

Firing protection is provided by two hardware protection keys, which must be installed on the impulse generator unit (KOMUT) and fire control unit (FCS). Fire control unit can be connected to FCS software, enabling automated recording launched rockets.

TRUCK CHASSIS

JELCZ truck chassis with 8x8 drive, armoured 4-man cab (level 1, Annex A and B, according to STANAG 4569).

TECHNICAL DATA

Total weight (without rockets)	23 500 kg	NEGOTIATING OBSTACLES:		SPEED:	
		ground clearance	not less than 300 mm	maximum speed	85 km/h
DIMENSIONS:		fording	1,2 m	travel distance without refuelling	650 km
length	10 500 mm	gradeability	30°		
width	2 550 mm	permissible side slope	20°		
minimum height	3 330 mm				

BUILD STANDARD

IVECO aifo CURSOR 10 engine, EURO III, Diesel, 4-stroke, 6-cylinder in line, vertical with turbocharging and cooling of charge air. Nominal power: 316 kW.

Cab: Armoured 4-man cab, hydraulic tilting, four doors, ensuring ballistic protection level 1 according to STANAG 4569.

Wheels and tyres: Central Tyre Inflation System. Standard tyre size: 14.00 R20 with insert for short run-flat





PARAMETERS

Calibre	122 mm
Number of barrels	40
Automatic loading system capacity	40 rockets
Number of rockets carried	80 rockets
Rate of fire (40 rounds):	20 s
MAXIMUM RANGE:	
– for rockets with HE warhead	42 km
Range can be extended depending on rockets used.	
ELEVATION:	
– maximum elevation	55°
– minimum elevation:	0°
TRAVERSE:	
– to the right from chassis axis	70°
– to the left from chassis axis	102°

DESIGNATION

Rocket Launcher LANGUSTA II is designed to:

- destroy and suppress enemy's manpower and combat equipment in its concentration areas,
- destroy enemy's firing means and command posts,
- disrupt and disorganize enemy's actions,
- lay scattered mines,
- suppress enemy's command system and logistic support.

Artillery Battalion Unit of 155 mm Self-Propelled Howitzers

DESIGNATION

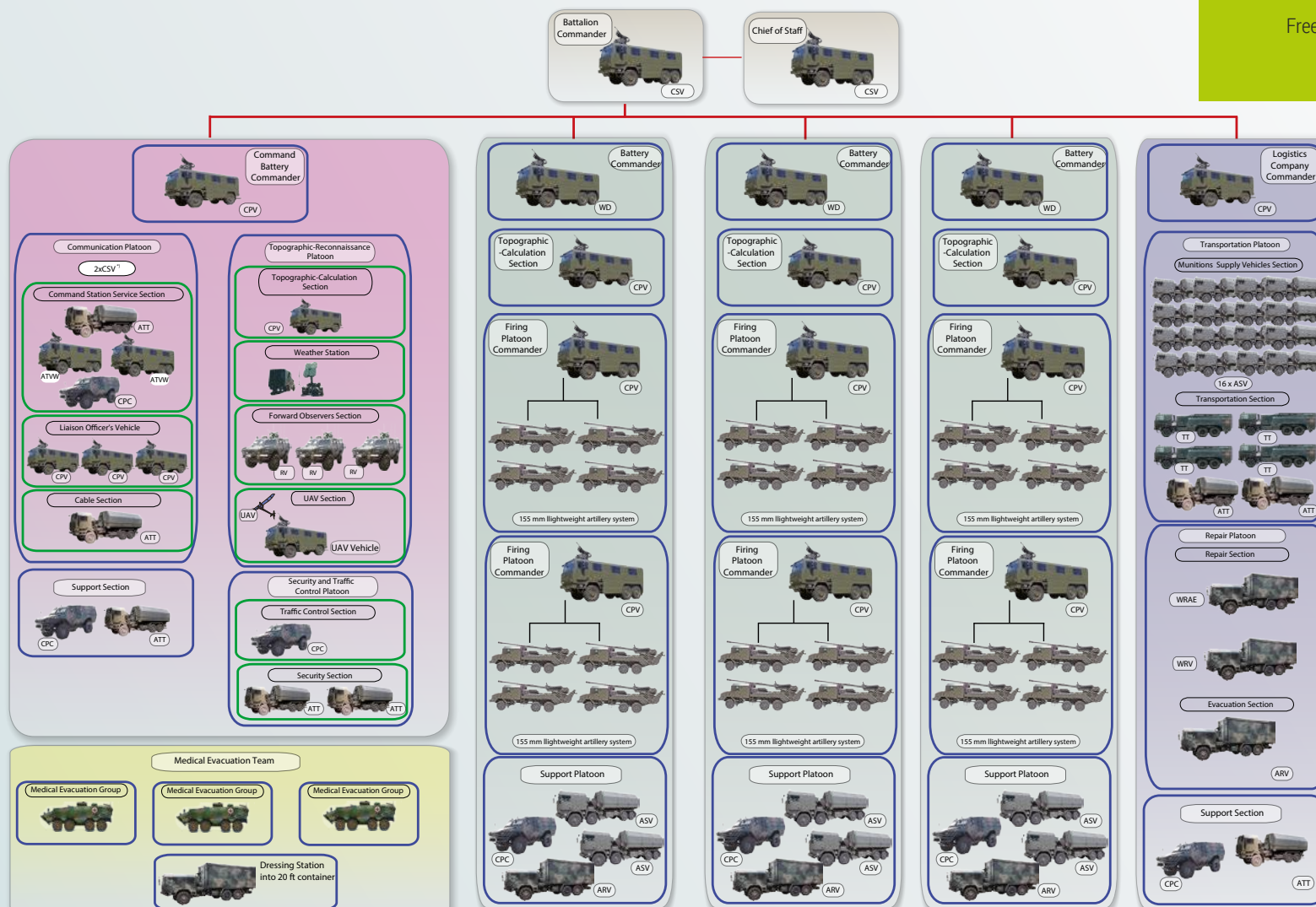
The Artillery Battalion Unit of 155 mm Self-Propelled Howitzers KRYL is designed to carry out tasks in the field of close and deep supporting fire at the level of mechanized and motorized brigade and regiment artillery.

Because of the tasks performed battalion is equipped with military equipment forming part of the following subsystems:

- a) destruction (155 mm self-propelled howitzers on truck chassis equipped with electronic command and fire control, enabling rapid fire by autonomous howitzer);
- b) command (Command Staff Vehicles and Command Vehicles);
- c) reconnaissance (artillery reconnaissance and topographic cars, the UAV sectioncar);
- d) logistics (ammunition supply vehicles, workshop containers on trucks, other armoured trucks to pick up the technical means, armoured cars to transport people and cargo, ambulances, etc.).

Exemplary Artillery Battalion Unit of 155 mm Self-Propelled Howitzers KRYL

Free configuration of modular structure depending on the customer's requirements



155mm Self-Propelled Howitzer on truck*

*prototype

EQUIPMENT

Fire Control System (FCS) elements:

- ✓ ballistic computer,
- ✓ gun system computer,
- ✓ aimer's display,
- ✓ commander's display,

- ✓ inertial navigation system TALIN 5000,
- ✓ muzzle velocity radar MVRS 700 SCD.

Communication:

- ✓ digital radio-station, FONET intercom

TRUCK CHASSIS

TECHNICAL DATA

combat weight (+crew, ammunition and fuel)	21 000 kg
air-transport mode	≤ 19 000 kg
crew	5 men

DIMENSIONS:

length	10 300 mm
width	2 550 mm
height	3 440 mm

NEGOTIATING OBSTACLES:

trenches	0,6 m
gradient	20° (36,4 %)
fords	– without preparation 0,7 m – after preparation 1,2 m

TRAVEL SPEED:

on surfaced roads	90 km/h (ADR)
usable ground speed	20 km/h
Cruising range with full fuel tanks	500 km

BUILD STANDARD

In-line, supercharged, 6 cylinder Diesel MTU 6R106TD21 engine, EURO III, with charge air cooler, maximum power: 240 kW at 2 200 rpm, maximum torque: 1 300 Nm at 1 200 -1 600 rpm, engine capacity: 7 200 [cm³]

Cooling system: liquid cooling system with expansion tank.

Gearbox: mechanical, coupled with engine, synchronized, reverse gear not synchronized, 9 gears, operated mechanically.





PARAMETERS

Calibre	155 mm
Length of the barrel	52 calibres
RATE OF FIRE:	
– intensive fire	6 rounds / min.
– sustained fire	2 rounds / min.
– salvo effect (MRSI)	not less than 3 rounds /min.
ARC OF FIRE:	
– elevation	-2° to 70°
– azimuth	50° (right/left per 25°)
RANGE OF INDIRECT FIRE:	
– minimum	5 km
– maximum	40 km
Ammunition stowage	18 rounds
Ammunition in accordance with JBMoU	
REACTION TIMES:	
– into-action time	less than 60 s.
– out-of-action time	less than 60 s.

DESIGNATION

Lightweight, truck mounted howitzer system KRYL is designed to destroy missile systems, artillery batteries and air defence missiles, command posts, communication posts and field fortifications, armoured and mechanized units localized in enemy's rear area, and other important support and supply objects. Project financed by the National Research and Development Centre.

EQUIPMENT

- ✓ periscope sight,
- ✓ day and night observation devices for commander and driver,
- ✓ external and internal communication means,
- ✓ filtering and ventilation device,
- ✓ heater,
- ✓ engine pre-heater (one in driver's compartment, second one in the turret).

TRACKED CHASSIS

TECHNICAL DATA

Vehicle weight	15 700 kg	NEGOTIATING OBSTACLES:	
Crew	4 men	track width	2 500 mm
DIMENSIONS:		ground clearance	400 mm
length	7 620 mm	average unit pressure	0,05 MPa
width	2 850 mm	gradeability	35°
height	2 725 mm	side slope	25°
SPEED			
maximum travel speed	60 km/h		
maximum floating speed	4,5 km/h		
maximum travel range	500 km		



PARAMETERS

Calibre	122 mm
ANGLE OF FIRE:	
– elevation	- 3° to + 70°
– azimuth	n x 360°
Maximum range	15 200 m
Maximum rate of fire	4 - 6 round/min.
QUANTITY OF AMMUNITION CARRIED:	
– HE projectiles	35 pcs.
– HEAT projectiles	5 pcs.
AMMUNITION:	
– 122 mm HE grenade,	
– 122 mm HEAT.	

DESIGNATION

- destroying enemy's manpower and firing means,
- direct support for units fighting off attacking enemy,
- combating enemy's artillery,
- smoking, illuminating of battlefield and dazzling observation posts and firing means.

Used by Armed Forces

Remote-Controlled 30 mm Turret System on Universal Wheeled Chassis*

*prototype

EQUIPMENT

- ✓ hunter killer,
- ✓ laser warning system,
- ✓ observation devices:
 - stabilized commander's observation and aiming device,
 - stabilized armament operator's observation and aiming device,
 - emergency device,
 - periscope,
- ✓ automatic and emergency fire modes,
- ✓ smoke grenade launchers.

WHEELED ARMoured CARRIER

Ballistic protection: level II according to STANAG 4569 (modular ballistic protection system as ordered by client)

TECHNICAL DATA

DIMENSIONS:

length	7 700 mm
width	2 800 mm

NEGOTIATING OBSTACLES:

gradient	60%
side slope	35%
vertical obstacles	0,5 m
trenches	2,1 m
fords	1,5 m

SPEED OF DRIVING:

maximum speed on surfaced roads	80 km/h
Range with full fuel tanks	min. 500 km

BUILD STANDARD

Engine: SCANIA DI1249A03P, power: 294 kW





PARAMETERS

ARMAMENT:

30 mm automatic cannon with dual-feed system.

Coaxial machine gun, calibre: 7,62 mm

Double ATGM, SPIKE

ANGLE OF FIRE:

– horizontal

n x 360°

– vertical

-9° ÷ 60°

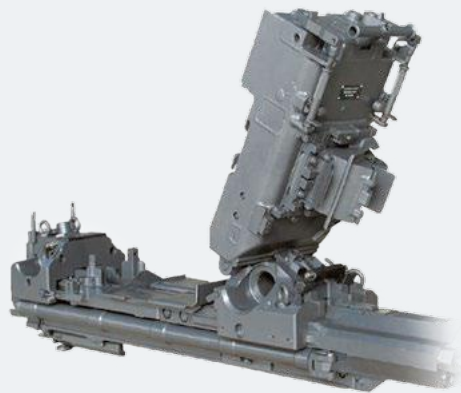
RATE OF FIRE

200 rounds/min (120 rounds/ min. for ABM ammunition)

DESIGNATION

Remote-controlled turret system on wheeled armoured vehicle is designed to combat, destroy and suppress enemy light and heavy armoured targets and other objects, including the enemy's infrastructure, in different climate conditions and to provide fire support for units during combat activities, irrespective of the time of the day. Project commissioned by the Polish MoD.

35 mm Automatic Cannon



PARAMETERS

Calibre	35 mm	Rate of fire	550 rounds/min.
Weight	675 kg	Recoil force	29,4 kN
Total barrel length	3 150 mm	Recoil stroke	55 mm
Maximum muzzle velocity	1 385 m/s	Length of round	370 – 387 mm
Pressure in barrel	380 MPa	Weight of round	1 460 – 1 562 g



Used by Armed Forces under
the Loara Program

DESIGNATION

Intended for installation in anti-aircraft systems. For fighting:

- air targets at the distance of up to 4 000 m
- ground targets at the distance of up to 2 500 m

EQUIPMENT

- ✓ transport cart,
- ✓ individual set of spare parts, tools and equipment.

PARAMETERS

Calibre	98 mm
Minimum range	400 m
Maximum range	7 000 m
Average number of effective splinters (weight > 1.7 g)	~4 000
Sight MPM-44/04 60-00	
Effective lethal radius of HE missile	75 m

RATE OF FIRE:	
– with aiming correction	8-10 rounds/min.
– without aiming correction	15 rounds/min.

Gravity launch or launch by trigger mechanism.	
Maximum weight of round	10 kg

WEIGHT:	
in combat position	135,4 kg
with transport cart	300 kg

AMMUNITION	
– HE,	
– special (smoke and illuminating),	
– precision (guided in the final part of trajectory)	



Used by Armed Forces

DESIGNATION

As basic firing means for mechanized troops, paratroops and mountain infantry support, these units it is mostly used for:

- destroying and suppressing enemy's manpower and firing means,
- destroying enemy's light field fortifications,
- destroying enemy's armoured combat equipment,



EQUIPMENT

- ✓ transport cart,
- ✓ individual set of spare parts, tools and equipment.

PARAMETERS

Calibre	120 mm
Minimum range	480 m
Maximum range (assisted)	5 700 m (7 100 m)

RATE OF FIRE:	
– with aiming correction	8-10 rounds/min.
– without aiming correction	15 rounds/min.
Gravity launch or launch by trigger mechanism.	
Maximum weight of round	17,9 kg

WEIGHT:	
– in combat position	257 kg
– with transport cart	414 kg

AMMUNITION	
– HE and special (illuminating, smoking)	



Used by Armed Forces

- making passages in engineering wire barriers
- smoking enemy's observation and firing posts,
- battlefield illumination.

EQUIPMENT

- ✓ on-board computer,
- ✓ imaging terminal with digital map,
- ✓ junction box,
- ✓ cables,
- ✓ FONET intercom,
- ✓ RRC 9311AP VHF transceiver,
- ✓ GPS and odometer,
- ✓ 81 mm smoke grenades launchers (8 pcs.),
- ✓ control panel for smoke grenades launcher (delivered separately to be mounted in vehicle cab),
- ✓ tester for mine cassettes (delivered separately, as accessory),
- ✓ simulator (option).

CONTROL SYSTEM

Automatic or manual.

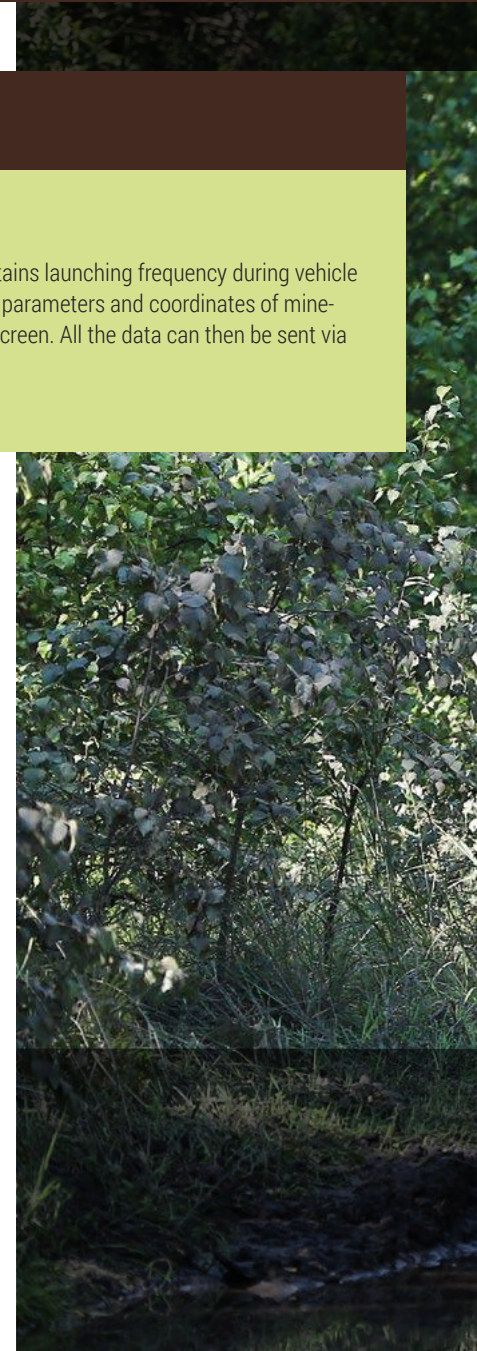
In the automatic mode, the computer calculates launcher's settings and retains launching frequency during vehicle travel to ensure correct parameters of the minefield. Additionally, minefield parameters and coordinates of minefield corners are recorded on digital maps and displayed on the computer screen. All the data can then be sent via radio to a higher command level.

TRUCK CHASSIS WITH CAB

JELCZ P662.35G34 type truck off-road chassis with armoured 2-man cab and a bed.

TECHNICAL DATA

Total weight (platform loaded with mines)	21 020 kg	NEGOTIATING OBSTACLES:	
DIMENSIONS:		ground clearance	415 mm
total length	9 400 mm	approach angle	30°
height (to mine launchers)	3 100 mm	departure angle	30°
width (march mode)	2 550 mm		
width (combat mode)	2 850 mm		
VERSION WITH FOUR LAUNCHERS:		VERSION WITH SIX LAUNCHERS:	
weight of the platform	3 420 kg	weight of the platform	4 620 kg
weight of platform loaded with mines	5 500 kg	weight of platform loaded with mines	6 700 kg
permissible chassis load capacity	7 000 kg	permissible chassis load capacity	9 000 kg
minimum length of loading platform	3 500 mm	minimum length of loading platform	5 500 mm





PARAMETERS

VERSION WITH FOUR LAUNCHERS:

- reloading time for one unit of mines < 20 min.
- time of scattered laying for one unit of mines < 15 min.

VERSION WITH SIX LAUNCHERS:

- reloading time for one unit of mines < 30 min.
- time of scattered laying for one unit of mines < 22 min.

LAYING RANGE:

- from vehicle axis 30 to 90 m (both sides)
 - speed of laying: 5 to 25 km/h
- Possibility of laying on both sides and to the rear of the vehicle

MINE CASSETTES:

- with immediate action MN123.1
 - with delayed action MN123.2
- Weight of mine cassette with 5 mines: 22,8 – 23 kg

DESIGNATION

BAOBAB Scattered Mine Laying Platform enables deployment of minefields of various sizes, laying density and self-destruction times. Required parameters of the barrier are achieved through appropriate programming of the on-board computer in manual or automatic mode and positioning of launchers. Additionally, the Scattered Mine Laying Platform with launchers and control system can be mounted on any off-road truck chassis with medium load capacity.

EQUIPMENT

- ✓ control unit,
- ✓ tester,
- ✓ anti-tank HE mines (400 pcs.),
- ✓ 12,7 mm machine gun,
- ✓ heater,
- ✓ automatic or manual fire suppression system,
- ✓ day and night observation instruments,
- ✓ contamination detector,
- ✓ radiometer DPO,
- ✓ external and internal communication means,
- ✓ decontamination and deactivation set.

HIGH-SPEED TRACKED CHASSIS

TECHNICAL DATA

Combat weight	15 870 kg	NEGOTIATING OBSTACLES:		SPEED:	
Crew	2 men	track width	2 500 mm	maximum driving speed	60 km/h
		ground clearance	350 mm	maximum travel distance	500 km
DIMENSIONS:		gradeability	35°		
length	7 450 mm	side slope	25°		
width	2 950 mm				
height (march mode, with tarpaulin)	2 910 mm				
height (combat mode)	2 470 mm				





Used by Armed Forces

PARAMETERS

Four launchers – each launcher can be loaded with 20 launch tubes (5 mines each).
80 mine cassettes with 400 anti-tank mines

Reloading time for one unit of mines	< 40 min.
Time of scattered laying for one unit of mines	< 15 min.
Distance of laying from vehicle axis	30 to 90 m
Mine laying speed:	5 to 25 km/h

Possibility of laying on both sides and to the rear of the vehicle

MINE CASSETTES:

– with immediate action	MN123.1
– with delayed action	MN123.2

DESIGNATION

Scattered Mine Laying Vehicle is designed for laying scattered anti-tank mines by engineering sub-units of tactical level. KROTON enables laying minefield barriers with different positioning, size, density of laying and time of self-destruction. Required parameters of the barrier are achieved through appropriate programming of the control unit, positioning of launchers and speed of travelling while laying

EQUIPMENT

- ✓ travel stabilization equipment,
- ✓ fixtures for arms,
- ✓ electrical installation for mounting RR3501 transceiver and passive night vision goggles,
- ✓ air compressor with pressure hose,
- ✓ sapper tool set,
- ✓ hooks for transporting camouflage net,
- ✓ hooks for mounting grid shields,
- ✓ personal equipment containers,
- ✓ special tail-light NOTEK,
- ✓ loading equipment with quick-release joint,
- ✓ forklift equipment with quick-release joint,
- ✓ excavating equipment.

OPTIONAL EQUIPMENT

- ✓ loading bucket,
- ✓ multi-purpose bucket,
- ✓ grab for tree trunks,
- ✓ hydraulic quick connector,
- ✓ dozer blade,
- ✓ snow blade,
- ✓ forks,
- ✓ backhoe bucket capacity 0,10 m³ / 0,13 m³ / 0,16 m³ / 0,24 m³,
- ✓ slopping bucket,
- ✓ trapezoidal bucket,
- ✓ hydraulic hammer,
- ✓ sack-filling machine.

The backhoe loader is a multifunctional machine thanks to the possibility of using various buckets and shovels as well as additional tools and equipment.

TECHNICAL DATA

Weight with bucket	8 850 kg
Weight with forks	8 150 kg
Overall wheel width	2,3 m
Machine length (with folded excavator equipment)	6 280 mm

Machine adapted for air transport aircraft C – 130
In transportation mode, the machine does not exceed limiting outline of roads and railways.

Maximum speed (outside public roads)	37,5 km/h
Uninterrupted work under medium duty of up to 10 hours.	

Time to convert from transportation to work mode with any equipment	max. 10 min.
---	--------------

The machine can work on slopes:

– longitudinal - front/back	25°
– lateral - left/right	15°
Operating temperatures	–30°C do +40°C

BUILD STANDARD

The machine is equipped with modern, low-emissions engine meeting the requirements of stage III A according to the Directive UE97/68EC and tier 3 according to U.S. EPA. Engine power: 74/100,6 kW/KM.
Shape of the body and cab meets the requirements of a contemporary user, fulfilling at the same time all HES&S norms. Operator's work efficiency is increased thanks to comfortable cab, designed for convenience and ergonomics.

The machine is equipped with:

- EU/EC declaration of conformity for CE marking requirements,
- (Polish) Defence and Security conformity declaration.





Used by Armed Forces

PARAMETERS

LOADING EQUIPMENT WITH QUICK-RELEASE JOINT

- Multi-purpose bucket with teeth	
- soil loosening depth	100 mm.
- bucket capacity	1 m ³
- digging depth (bucket horizontally)	min. 80 mm
- maximum unloading height	2,7 m
- diameter of lifted tree trunks	ø 350 mm
- bucket levelling indicator	

FORKLIFT EQUIPMENT WITH QUICK-RELEASE JOINT:

- lifting height	from 0,05 do 3,2 m
- lifting capacity	2 000 kg
- maximum fork overhang	1 m

-EXCAVATING EQUIPMENT

- bucket width	800 mm
- bucket capacity	0,24 m ³
- digging depth (telescopic boom)	5,80 m
- maximum digging range on ground level from turning axis	5 790 mm
- unloading height	3,6 m
- lifting capacity at max. overhang	660 kg

DESIGNATION

- reloading onto means of transport,
- moving loose and agglomerated materials,
- making trenches of various cross-sections in soil of different density,
- ground levelling,
- loading pallets onto means of transport with forks,
- dozing and heaping soil,
- spreading and levelling soil,
- removing snow from squares and roads,
- transporting tree trunks and construction elements on short distances,
- other civil works.

EQUIPMENT

STANDARD EQUIPMENT

- ✓ split Drott's bucket,
- ✓ forks with optional extension and adjustable fork spacing, adapted for loading and unloading elements on europallets or in containers,
- ✓ Rockinger RO 561 E type hitch with pneumatic and electrical connectors for towing trailers,
- ✓ hermetic cab with filtering and ventilation device and mounts for rifles,
- ✓ water heater for heating the cab and engine pre-heating,
- ✓ equipment for reconnaissance of roads, bridges and fords.

OPTIONAL EQUIPMENT

- ✓ split bucket,
- ✓ bucket for quick connector,
- ✓ bucket for high unloading,
- ✓ bucket for stones,
- ✓ bucket for light materials (5,7m³),
- ✓ bucket with teeth for stones,
- ✓ hydraulic grab,
- ✓ forks for quick connector,
- ✓ forks (5,5 t).

TECHNICAL DATA

OPERATING WEIGHT:

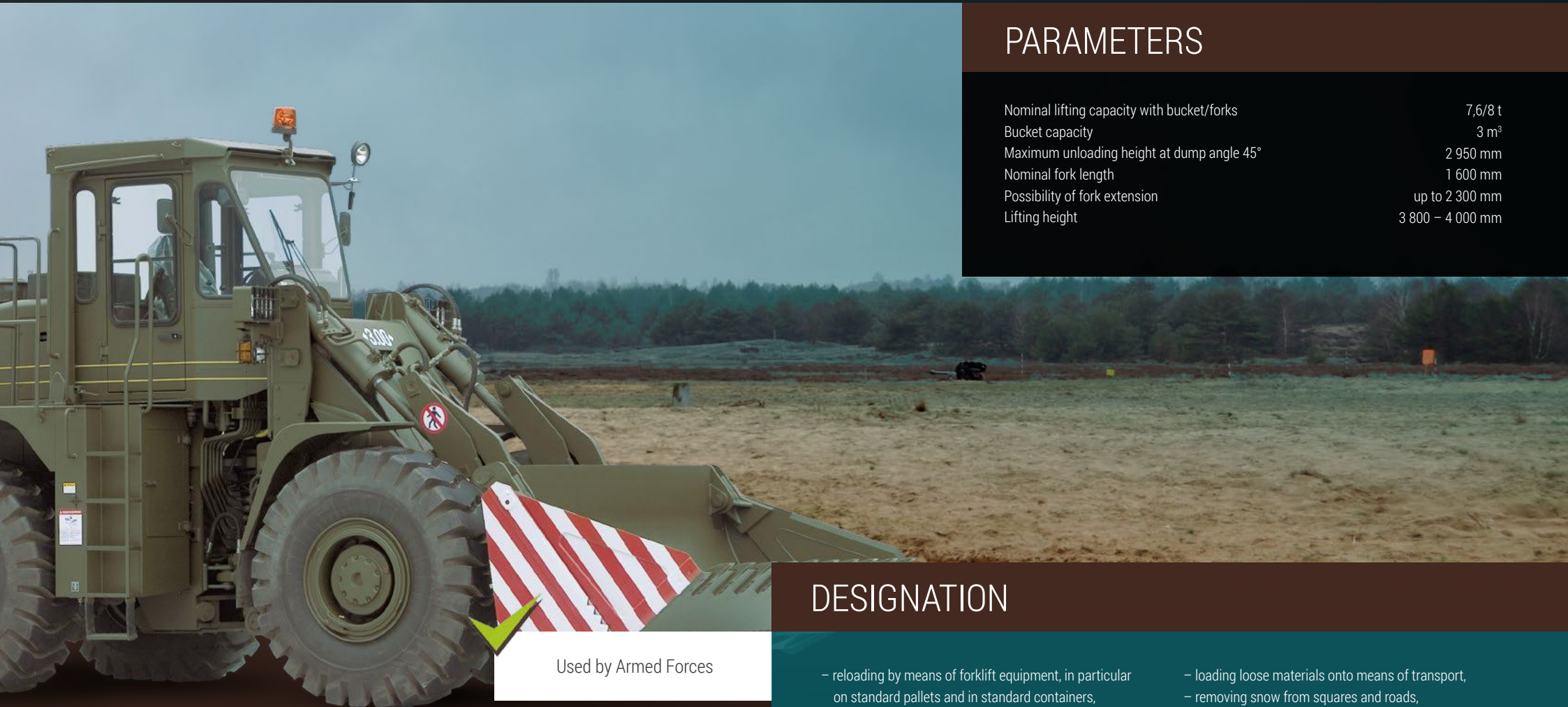
with bucket	22 830 kg
with forklift equipment	22 310 kg

Maximum speed on non-public roads 39 km/h

DIMENSIONS AND NEGOTIATING OBSTACLES:

length with bucket/forklift	8 380/9 595 mm
width	2 982 mm
height to cab roof	3 607 mm
wheelbase	3 145 mm
wheel track	2 090 mm
turning angle left/right	40°
ground clearance	450 mm





Used by Armed Forces

PARAMETERS

Nominal lifting capacity with bucket/forks	7,6/8 t
Bucket capacity	3 m ³
Maximum unloading height at dump angle 45°	2 950 mm
Nominal fork length	1 600 mm
Possibility of fork extension	up to 2 300 mm
Lifting height	3 800 – 4 000 mm

DESIGNATION

- reloading by means of forklift equipment, in particular on standard pallets and in standard containers,
- sloping the ground,
- dozing and heaping soil,
- digging trenches,
- ground levelling,
- filling trenches, craters and shelters with soil.
- loading loose materials onto means of transport,
- removing snow from squares and roads,
- transporting tree trunks and construction elements on short distances,
- other civil works.

EQUIPMENT

STANDARD

- ✓ rotating turret with 7,62 mm MG,
- ✓ self-entrenching equipment,
- ✓ filtering and ventilation device,
- ✓ internal communication means,
- ✓ heater,
- ✓ engine pre-heater,
- ✓ towing device,
- ✓ individual set of spare parts, tools and equipment.

OPTIONALLY

- ✓ VHF transceiver,
- ✓ driver's night vision goggles,
- ✓ dosimeter,
- ✓ decontamination and deactivation set,
- ✓ 12,7 mm MG on turntable mounting



Used by Armed Forces

DESIGNATION

TECHNICAL DATA

Vehicle weight	10 500 kg	NEGOTIATING OBSTACLES:	
CREW:		track width	2 500 mm
number of seats	2 + 11	ground clearance	395 – 415 mm
DIMENSIONS:		average unit pressure	0,045 MPa
length	6 980 mm	SPEED:	
width	2 950 mm	maximum travelling speed	60 km/h
height	1 990 mm	maximum floating speed	5 – 6 km/h
LOAD CAPACITY:		maximum travel distance	500 km
nominal	1 650 kg	time of digging hiding pit	1,5 – 2 h
maximum	2 150 kg		

- transport of men and loads,
- towing objects with total weight of up to 6,5 t,
- transport of ammunition to units directly engaged in combat and evacuation of men and equipment,
- mounting various special equipment,
- digging trenches for itself and for towed objects.



DESIGNATION

Track pads are used for driving tracked vehicles on surfaced roads. Track pads are designed for mounting on forged (pins with silent blocks) and cast tracks.

Such pads are used in GOŻDZIK, KROTON, MTLB, MORS, ŁOWCZA, HORS, self-propelled mortars and other products.

Track pads can be used in winter and summer conditions, with external temperatures ranging from minus 45°C to 55°C above zero. Life (mileage) of track pads used in any conditions is at minimum 2 500 km.

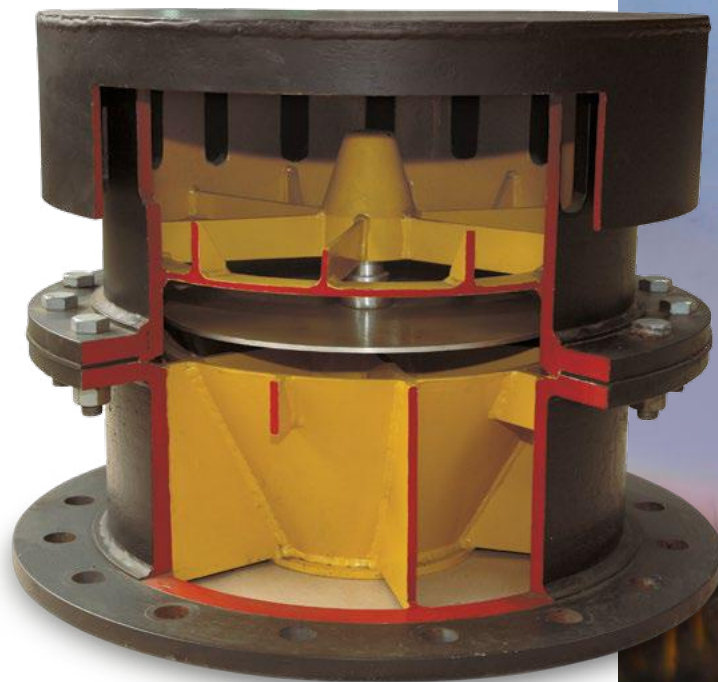
They can be stored in roofed, non-heated warehouses and in open air. Application of track pads does not negatively impact vehicle's operating norms. During operation no maintenance is required.

PADS FOR FORGED TRACKS

Length	290 mm
Width	98 mm
Height	82 mm
Weight	2,8 kg
Colour	black rubber

PADS FOR CAST TRACKS

Length	292 mm
Width	82 mm
Height	35 mm
Weight	1,8 kg
Colour	black rubber



DESIGNATION

Diameter of mounting tube Dz	193,7 mm
Diameter of valve body	508 mm
Valve height	506 mm
Valve weight	280 kg
Overpressure of air shock wave	0.5 MPa
Minimum valve closing overpressure	0,015 MPa
MPa aerodynamic drag	< 200 Pa
Flow rate	500 m³/h

The valve ensures air flow in both directions. Valve construction enables vertical and horizontal mounting.

Protection of ventilation ducts in buildings against shock wave (overpressure and negative pressure).



DESIGNATION

New generation Explosion-Proof Valve is designed for protection of stationary shelters. Its basic task is to protect ventilation installation in the shelter against impact of air shock wave and radioactive and chemical contamination.

Overall valve dimensions:

1 058 x 940 x 400 mm

THE VALVE IS COMPOSED OF THE FOLLOWING ELEMENTS:

- set of optoelectronic sensors for detecting typical striking factors,
- information distribution and steering system,
- actuator.

Valve components are resistant to direct impact of air shock wave and its secondary effects such as collisions and shock.

Valve resistance levels are relatively low (90 – 300 Pa) at working flow rate of 17 000 to 30 000 m³/h; moreover, it has high dynamic resistance.

DESIGNATION

The Hermetic Protection Bulkhead is designed to protect buildings against shock wave. It ensures Class EI 60 to EI 120 fire resistance and retains 100 Pa overpressure in the protected facility, with the filtrating and ventilation device operating. The Hermetic Protection Bulkhead is opened and closed by an electronic drive. In emergency cases, one man can manually open or close the bulkhead from the outside or from the inside. The bulkhead can be bolted manually by means of two independent bolting mechanisms.

BULKHEAD MOUNTING DIMENSIONS (PERMISSIBLE, AS PER ORDER)

width	do 3 000 mm
height	do 3 500 mm
weight	1 550 kg

MECHANICAL RESISTANCE

– to static overpressure	0,1 MPa (10 T/ m ²)
– fire resistance	to Class EI 120 according to Resolution of the Ministry of Infrastructure of 7.04.2004 r.
Finish	painting

Primary drive: electrical, with motoreducer, power supply voltage: 400 V/230 AC.

Opening/closing 48 s.

Emergency drive: manual, chain with gear, inside or outside the facility, manual bolting from the inside or the outside.

Air-tightness (overpressure): 100 Pa overpressure drop in protected facility within 0 to 2 min after turning off the filtering and ventilation device

Ballistic Inserts to Bullet-Proof Vests



Used by Armed Forces

DESIGNATION

Inserts are intended for bullet-proof, splinter-proof and needle-proof vests. Their task is to neutralize the impact of bullets from rifles / machine guns, eg. AK-47.

Weight of ballistic insert up to 2,8 kg

BALLISTIC INSERTS HAVE CLASS IV BULLET-PROOF BALLISTIC PROTECTION ACCORDING TO POLISH NORM PN-V-87000 PER THE FOLLOWING REQUIREMENTS:

– Weapon type	7,62 kbk AKM rifle
– Bullet type	7,62 mm PS
– Weight (with steel core):	7,9 g

Bullet impact velocity 710 + 20 m/s

PROTECTIVE VESTS TYPE OF OLV AND KLV FOR TROOPS

LUBAWA S.A. offers OLV with rigid ballistic inserts manufactured by Huta Stalowa Wola S.A. The vests meet the following standards: Polish standard PN-V-87000, NIJ Standard 0101.04, NIJ Standard 0115.00. They are intended for land forces - infantry (OLV) and drivers of military vehicles (KLV).



The present catalogue has informative character and does not constitute a commercial offer in the understanding of article 66 para.1 of the Civil Code and other relevant provisions of law.



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