Rybro Mine-Guzzler
Product Specification

RYBRO
International Ltd

1 PRODUCT DESCRIPTION

The Mine-Guzzler is a tracked demining vehicle for clearing both anti-personnel mines and anti-tank mines as well as other battlefield ordnance. When designing the Mine-Guzzler the EU directive for machines was applied.

1.1 Complete vehicle

The main parts of the vehicle are: undercarriage, cabin, power pack cassette, mounting unit and demining unit, *Fig. 1.1*. The vehicle can be broken down into its main parts (see item 1.2–1.6) to simplify repairs and transportation.

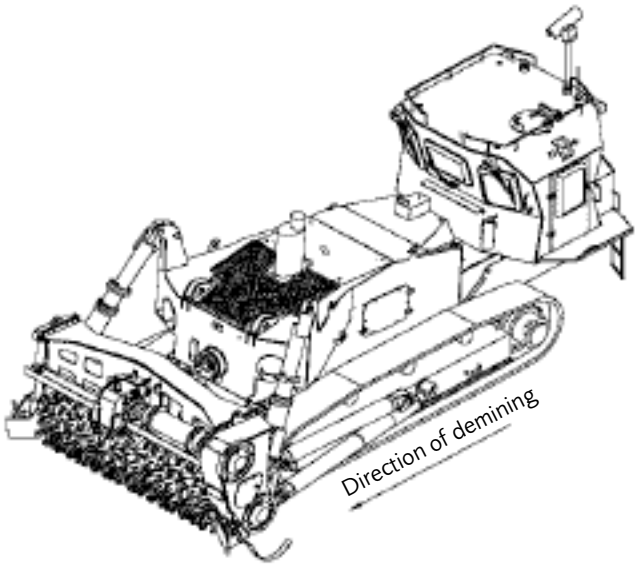


Fig. 1.1. The Mine-Guzzler.

The demining unit is constructed of a frame and a rotating demining roller. The demining roller consists of a heavy gauge steel cylinder onto which a number of steel discs are welded. The discs are fitted with holders and tungsten carbide teeth. The demining roller rotates down into the ground and either detonates or chews the mines into harmless pieces. In the event of sustaining damage, the teeth, the demining roller or the complete demining unit can be replaced in the field.

The demining vehicle can be controlled from the cabin or remotely controlled using the integrated radio and TV equipment. The vehicle is equipped with a revolving and a stationary video camera. The radio transmitter and monitor for remote control can, if required, be mounted in another vehicle.

1.2 Undercarriage

The undercarriage consists of side frames connected to the forward and rear frames. The fuel tank is built in at the rear.

The undercarriage is designed to withstand high stresses and strains (*Fig. 1.2*). Welded box-sections, strengthened with high-strength steel plates are used in areas subjected to high stresses. The construction is elastic and therefore diverts the stress.

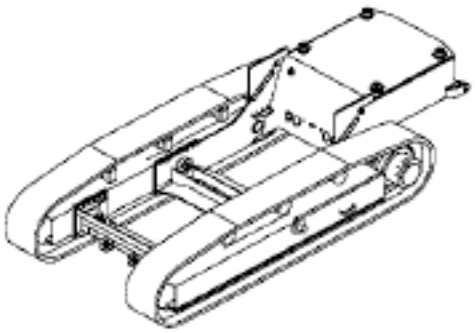


Fig. 1.2. Undercarriage.

1.3 Cabin

The Mine-Guzzler has a fragment-protected cabin located at the rear of the vehicle. The cabin is mounted on vibration and chock absorbers to minimise accelerating stress effects on the crew when mines are detonated. The driver's seat can be rotated, making it easier to drive the vehicle backwards in transport mode. The large windows, made of armoured glass, allow free sight around the vehicle.

The cabin is designed with a high level of comfort and easy access to all controls. For the comfort of the crew, the seats can be adjusted forwards/backwards, in height and for weight, as well as for back support and arm support width. Each seat is also fitted with a four-point safety belt. A fan with filters supplies the cabin with fresh air. The cabin is also equipped with an air conditioning unit with heating and cooling capacity.

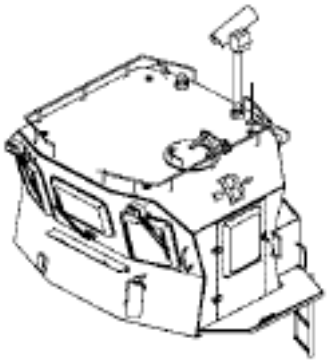


Fig. 1.3. Cabin.

1.4 Power pack cassette

The power pack is located in a fragment-protected cassette (*Fig. 1.4*). The power pack cassette and the demining unit, which are connected, can be raised and lowered by the two hoist cylinders. The power pack is mounted on a frame together with the cooling system and transmission for the demining roller and tracks (*Fig. 1.5*). The quick-release couplings between the power pack and undercarriage, allows the frame with the power pack to be mounted in position or removed from the power pack cassette for repairs and service.

At the front of the power pack cassette and in the undercarriage there are connecting points for the demining unit. The construction withstands mine detonations and is also optimised to absorb shocks.

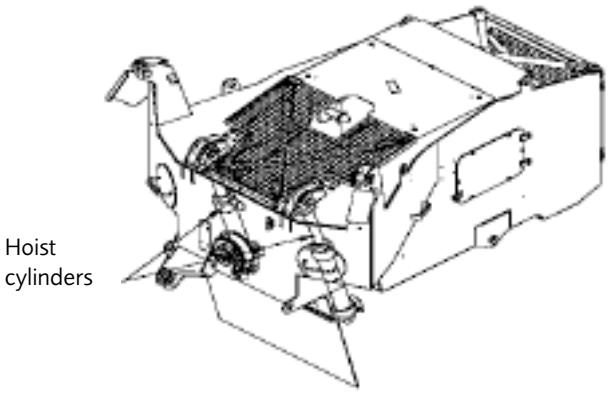


Fig. 1.4. Power pack cassette.

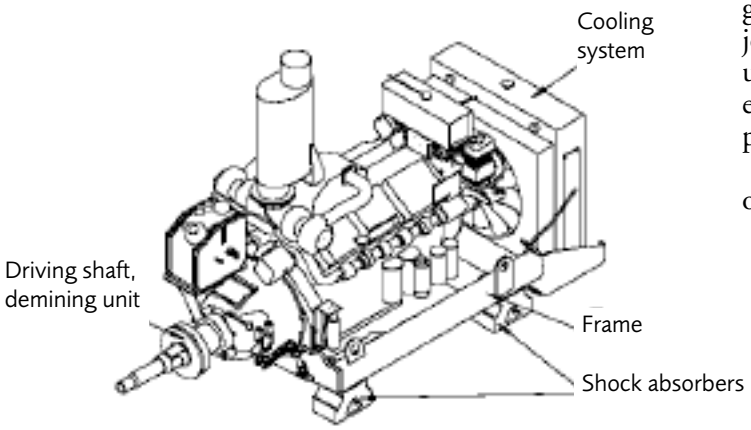


Fig. 1.5. Power pack with frame and shock absorbers.

1.5 Mounting unit

The mounting unit for securing the demining unit to the vehicle consists of tilt cylinders, shock absorbers, side supports with shock absorbers, shock absorbing stabilizer and mounting plates. The shock absorbers are designed to absorb any shocks generated by mine detonations. The complete mounting unit reduces the effects of mine detonations from spreading into the vehicle (*Fig. 1.6*). The tilt cylinders are used to tilt the demining unit.

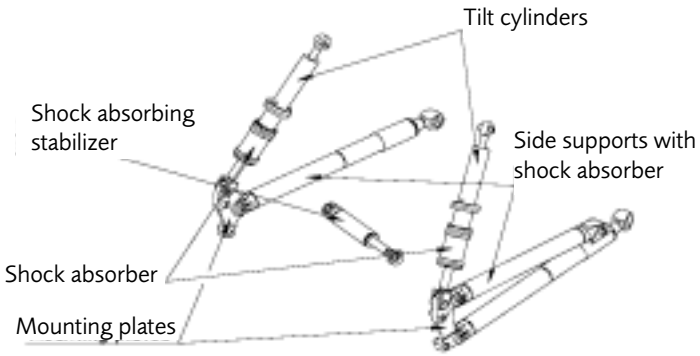


Fig. 1.6. Mounting unit.

1.6 Demining unit

The demining roller is integrated with the demining unit (*Fig. 1.7*). The demining roller is constructed of a number of steel discs welded onto a heavy gauge steel cylinder. The discs are fitted with easy-to-change holders and tungsten steel teeth which, either detonate the mines or chew them up into small harmless pieces, as the demining roller rotates in a forward direction. Heavy gauge steel in combination with high quality welded joints ensures that the demining roller with demining unit retains its high level of strength throughout its extensive lifespan. The demining roller has been tested, proving its high level of demining efficiency.

For servicing and transport the demining unit is placed on its supports.

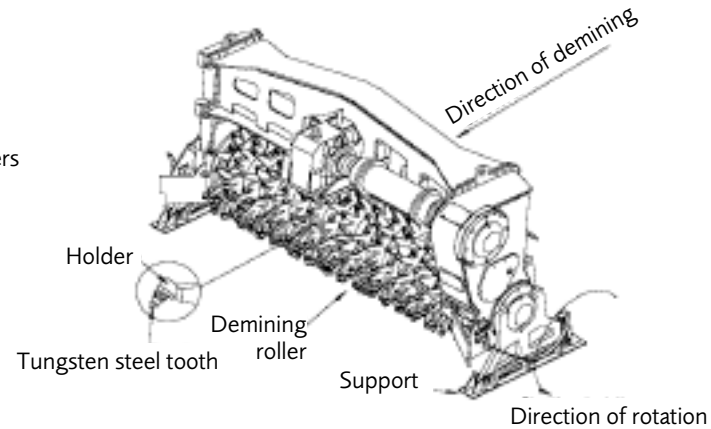


Fig. 1.7. Demining unit with demining roller.

2 DEMINING

2.1 Safety

To prevent injury to the crew and damage to the material the demining vehicle is equipped with:

- Warning signs
- Safety belts
- Protective covers
- Emergency stop with interrupted radio control
- Fire extinguishers
- Emergency stop (automatically activated parking brake)
- Faulty handling prevention i.e. built-in functions that prevent certain combinations of unsafe driving manoeuvres.
- Remote-control equipment.
- Operation Description.

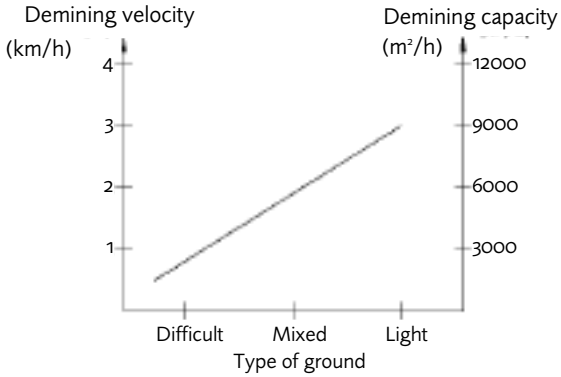
2.2 Protection

To ensure a high level of protection against fragments the vehicle carries armoured steel plates and the cabin is also provided with armoured glass windows.

2.3 Vehicle performance

2.3.1 Capacity

The following typical values apply to continuous operation at a depth of 300 mm and width of 3 m:



The total demining capacity depends on:

- Number and size of mines per area unit.
- Ground type
- Demining pattern
- Demining depth.
- Demining speed.

2.3.2 Efficiency

To increase demining efficiency the vehicle is equipped with an automatic depth control system (depth-holding) and a function to reduce the forward speed, in the event of the engine being overloaded and when the demining roller's rotation speed is too low.

3 CHARACTERISTICS AND PERFORMANCE

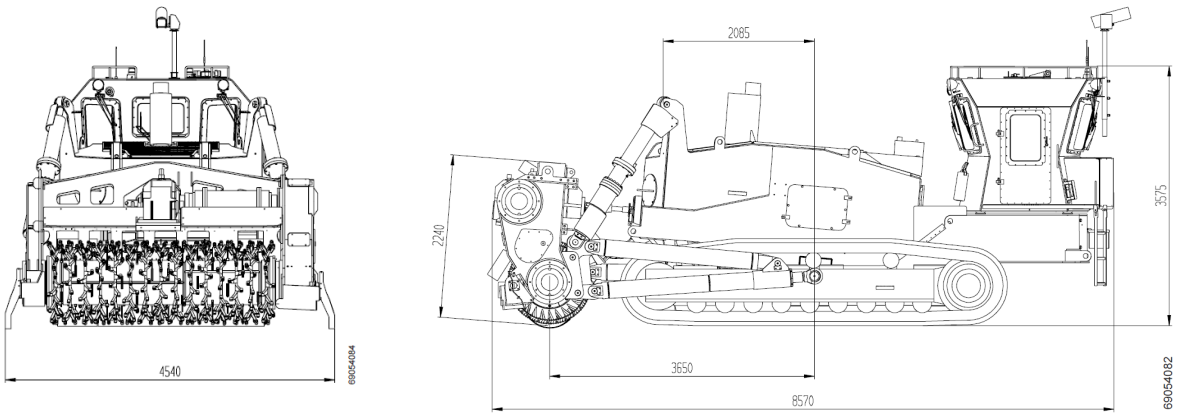


Fig. 3.1 Dimensions complete vehicle.

CHARACTERISTICS AND PERFORMANCE

3.1 Complete vehicle

3.1.1 Dimensions

Dimensions[3] of the complete vehicle are shown in Fig. 3.1.

3.1.2 Weights and dimensions

The following weights, dimensions[4] and ground pressures apply to the vehicle:

	Weight	Dimension
Complete vehicle	51 000 kg	8560 x 4340 x 3936 mm
Undercarriage	20 000 kg	6740 x 3340 x 1515 mm
Cabin	4 000 kg	2305 x 3050 x 2395 mm
Power pack cassette	10 000 kg	4350 x 2930 x 2700 mm
Demining attachment and chock absorber units	2 000 kg	
Demining unit	15 000 kg	1725 x 4340 x 2555 mm
Demining roller	7 000 kg	3475 x 1200 mm
Ground pressure[5]	99 kg/dm2	

3.1.3 Cross country mobility

	During demining	During transport
Climbing ability[6]	±15	±30
Side slope[6]	±10	±15

3.1.4 Transportation

The demining vehicle is transportable by rail, truck, boat and aircraft (see item *3.1.1*). The vehicle can be divided into its main units to simplify transportation (see item *3.1.2*). The demining unit can be removed from the vehicle and placed on its supports (see item *1.6*).

3.1.5 Environmental conditions

The engine is equipped with an air filter system fitted with visual indicator. Both the ventilation system and air conditioning system in the cabin are equipped with filters. To simplify starting the engine in cold conditions the vehicle is equipped with an ether start. The cooling-system allows the machine to work in temperatures up to 40°C with full capacity.

3.1.6 Surface treatment

All parts are phosphate treated and painted to obtain the best possible protection against corrosion. The demining vehicle is painted white but the colour can be changed in accordance with customer requirements.

3.2 Tracks

Track data:

Number of track plates per side	52
Track plate type[7]	3 ridges
Track plate width[7]	550 mm
Surface contact area[7]	4.71 m2
Chain type	One-time lubricated links
Track tension	Hydraulic

3.3 Engine

The engine is a water-cooled, turbo, 4-stroke diesel engine:

Make	CATERPILLAR
Model	C27, ACERT
Fuel injection	Electronic
Effect at 2 100 r/min	652 kW (875 hp)
Number of cylinders	12
Cylinder volume	27 litres

3.4 Hydrostatic transmission

Each track is driven by an axial piston pump, axial piston engine and planetary drive. Secondary and parking brakes are spring-applied and hydraulically released. The engine, brakes and planetary drive are integrated with the tracks. The vehicle is also equipped with an automatic cruise control. It can also make a centre turn giving maximum manoeuvrability.

Max. transport speed	7.5 km/h

3.5 Electrical system

The demining vehicle is equipped with the following electrical system:

Voltage supply	24 V
Battery capacity	106 Ah
Generator	2.8 kW
Two start motors	20 kW

1) Implies 550 mm wide track plates.
2) Max chassis width
3) All dimensions are approximate.
4) All weights and dimensions are approximate.
5) Implies 550 mm wide track plates.
6) Not in combination and only in good ground conditions.
7) If required 1 and 2 ridged plates are available.

3.6 Lighting

The vehicle is equipped with:

Permanent halogen head lamps	6 (4 forward and 2 rear)
Effect	2 at 140 W and 4 at 70 W

3.7 Demining unit transmission

The power pack drives the roller via a clutch, universal driving shaft, bevel gear, torque limiter and chain.

3.8 Demining unit with demining roller

The demining unit is constructed to withstand extremely high levels of stress.

Demining roller width	3 150 mm
Demining roller diameter	1 200 mm
Demining roller rotation direction	Same as demining direction
Type of teeth and holders	Standard
Max. depth	500 mm
Max. lifting height demining roller	800 mm
Max. lowering depth demining roller	700 mm
Max. tilt	6
Teeth	405

3.9 Hydraulics

Hydraulic oil is supplied to the hoist and tilt cylinders by an axial piston pump.

3.10 Automatic depth-holding system

The demining vehicle is equipped with an automatic depth-holding system, ensuring that the set depth is retained.

Demining adjustment marks	0, -100, -200, -300, -400, -500 mm

3.11 Remote-control equipment

The demining vehicle is equipped with remote-control equipment. The remote-control equipment consists of a radio-control system and a TV system:

Max. distance unrestricted vision	500 m

3.11.1 Remote-control

All demining functions can be remotely controlled from the control panel.

Radio-controlled equipment frequency
Adaptable to customer requirements

Remote-control panel as per *Fig. 3.11*.

1 Tilt demining unit, left
2 Demining unit, joystick
3 Lower demining unit
4 Tilt demining unit, right
5 Zoom IN/OUT
6 Camera centring
7 Camera pan
8 Antenna
9 Focus +/-
10 Camera, Front/Back
11 Driving joystick
12 Speed lock button
13 Flusher, cameras
14 Battery lamp
15 Main current button, Stop engine, 0/1
16 Operation lamp, GREEN/RED
17 Start engine
18 RPM control, engine, HI/M/LOW
19 Emergency stop
20 Transport/Demining mode
21 Working lights, Front/OFF/Rear
22 Transmission, ON/OFF
23 Raise demining unit
24 Demining depth
25 Depth control, ON/OFF
26 Signal horn
27 Zero tilt

CHARACTERISTICS AND PERFORMANCE

The following data applies to the video-system:

Camera:

Type of camera	Fully automatic CCD colour pictures
Number of cameras	2
Light sensitivity	2 lx
Forward mounted camera turntable	±90° azimuth and ±20 elevation

Video-link:

Video-link frequency	Adaptable to customer requirements.

Monitor and monitor house:

Monitor type	10" colour screen, CCIR-PAL, Low-radiation
Monitor house	Temperature regulated
Front glass	Scratch-proof and antireflex treated
Voltage supply	12-24 V DC

3.12 GPS Navigation & Documentation System

The machine can be equiped as an option with a GPS system allowing Navigation and Documentation of cleared area. The system will record the area covered including the preset depth that is set for the area.

3.13 Pneumatic supply system

The vehicle is equipped with an air compressor for pneumatic tools and servicing.

Equipment data:

Working pressure	10 bar
Capacity compressor	340 l/min at 2100 rev/min
Volume air tank	20 l

3.14 Service refill capacities

Fuel tank	800 litres
Cooling system	155 litres
Crankcase	62 litres
Transmission	235 litres
Hydraulic systems	70 litres
Oil bevel gear	60 litres

4 SERVICE AND MAINTENANCE

4.1 General

The system is built for minimum maintenance and maximum service-friendliness. Standard components are used that are available as spare parts throughout the world.

4.2 Equipment, material and spare parts

Delivered with the vehicle is a supply of maintenance equipment and spare parts for initial requirements and preventive maintenance.

4.3 Documentation

The Bofors Mine-Guzzler is delivered with documentation in English consisting of:

- 1 Operation Description.
- 1 Spare Parts List
- 1 Manual Diesel Engine.
- 1 Manual Propelling System and Hydraulics.
- 1 Manual Demining Roller Transmission.
- 1 Manual Remote-control Equipment and TV-system.

4.4 Training

Training of operators is carried out in connection with the delivery. The training can be in accordance with customer requirements.

Target group: Operators who shall operate and maintain the vehicle.

Previous knowledge: The participants have basic knowledge of heavy vehicles and their systems, for example electrical systems, hydraulics, mechanical systems etc.

Number of participants: 4/vehicle.

Course: 5 days.

Objective: To give each participant the necessary knowledge regarding:

- Design and function.
- Safety regulations.
- Operation and care in accordance with preventive maintenance.
- Crew repair work
- Driving and demining.
- Spare parts and expendable supplies.

Course content:

- Safety regulations.
- Description, design and function.
- Operating the demining vehicle.
- Driving and demining live mines.
- Driving and demining in manual and remote-controlled mode.
- Preventive maintenance.

Tested by:

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Egypt Army - Egypt

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