LAND MINES

USED BY

IRAQI FORCES

BULLETIN NO.4

BY:FOREIGN MATERIEL INTELLIGENCE BN

54BA
10

IRAQI MINES

PMN Anti-personnel Mine

PMD-6 Anti-personnel Mine

Valmara 69 Anti-personnel Mine

M16 Anti-personnel Bounding Mine

M14 Anti-personnel Mine

MISAR P-25 Anti-personnel Mine

M18A1 Anti-personnel Mine

MISAR SB-33 Scatter-dropped Anti-personnel Mine

Valsella VS-50 Anti-personnel Scatter Drop Mine

Valsella VS-Mk2 Anti-personnel Scatter Drop Mine

Technovar TS-50 Anti-personnel Scatter Mine

Valsella VS-1.6 Anti-tank Scatter Mine

MISAR P-40 Anti-personnel Jumping Mine

MISAR SB-81 Scatter-dropped Anti-tank Mine

Valsella VS-2.2 Anti-tank Mine

Valsella VS-HCT Anti-tank Mine

M19 Anti-tank Mine

M21 Heavy Anti-tank Mine

TM-46 Anti-tank Mine

TMN-46 (Anti-lift) Anti-tank Mine

PMN Anti-personnel Mine

DESCRIPTION
The PMN anti-personnel mine was developed after the end of the Second World War and has been deployed [illegible] the East German border, as well as in Viet-Nam. [illegible]her version of this mine is the PMN-6. Its case is made of duroplastic and has a side hole for the firing mechanism and primer charge, opposite which is the initiator adaptor plug. The top half of the mine has a rubber cover which covers the pressure plate, which is secured to the case by a thin metal band.

After the mine has been laid and the safety pin removed, there is a 15 to 20 minute delay in arming. This is because the firing pin moves forward under pressure of the firing pin spring until a wire in the after end of the firing pin spindle contacts a lead strip in the arming delay assembly. After the 15 to 20 minute period the wire cuts through the lead strip and releases the pin, which moves forward into a cavity of the pressure cylinder. This is held in place by a step in the cylinder and remains in this position until the mine is set off. When pressure is applied to the top of the case, the spring-loaded striker is released which in turn hits a percussion cap capsule, which sets off the main charge.

SPECIFICATIONS
Weight: 600 g
Diameter: 112 mm
Height: 56 mm
Main charge: TNT
Main charge weight: 240 g
Booster charge: Tetryl
Booster charge weight: 9 g
Operating force: 0·23 kg

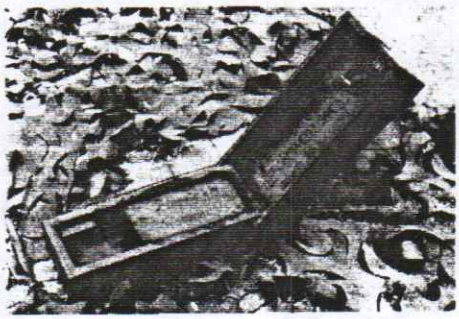
STATUS
In service with members of the Warsaw Pact including East Germany. The mine has also been encountered in the Far East and Africa. In service with Afghanistan (est 25 000 to 30 000), China and Viet-Nam.

MANUFACTURER
Soviet state arsenals.

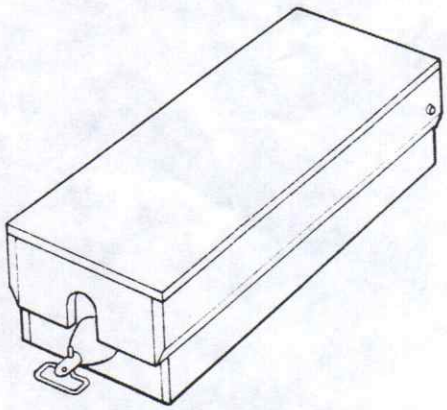
PMN non-metallic anti-personnel mine (T J Gander)

Wooden Anti-personnel Mine PMD-6, PMD-6M, PMD-7, PMD-7ts and PMD-57

DESCRIPTION
The PMD-6 wooden anti-personnel mine was developed before the Second World War and was first used operationally in the Soviet/Finnish Winter War of 1939/40. The mine consists of a wooden box with a hinged lid that overlaps the sides. A deep groove is cut in the front end of the lid so that it may fit over the fuze and rest on the striker retaining pin. Some mines have a safety device which consists of a safety rod which prevents the lid from actuating the fuze prematurely. The mine operates as follows: pressure on the lid forces the winged retaining pin from the striker and this detonates the mine.



PMD-57 wooden anti-personnel mine



Wooden anti-personnel mine model PMD-6

The PMD-6M is the post-war model of the PMD-6 and has the MUV-2 pull fuze.

The PMD-7 followed the PMD-6 and is a smaller mine and therefore has less explosive. The PMD-7ts has a mine body made of a single block of wood hollowed out for the charge. The PMD-57 is a post-war wooden anti-personnel mine.

SPECIFICATIONS

Model	PMD-6	PMD-7	PMD-7ts
Weight	0·4 kg	0·3 kg	0·3 kg
Length	200 mm	152 mm	152 mm
Width	89 mm	76 mm	76 mm
Height	64 mm	51 mm	51 mm
Main charge type	TNT	TNT	TNT
Weight of main charge	200 g	75 g	75 g
Operating force	1–9 kg	1–9 kg	1–9 kg
Fuze	MUV	MUV	MUV

STATUS
These mines are still held in the inventory of the Warsaw Pact. The PMD-6 is known to be manufactured in China and is in service with Afghanistan (PMD-6M, est 10 000 to 12 000), Viet-Nam and North Korea.

MANUFACTURER
Soviet state arsenals.

Valsella Anti-personnel Bounding Mine Valmara 69

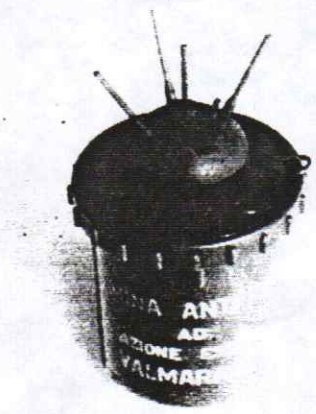
DESCRIPTION
This cylindrical anti-personnel bounding mine has a plastic case with a removable fuze mounted on the top. To obtain a more effective fragmentation pattern the main charge, surrounded by more than 1000 metal splinters, is projected about 0·45 metre into the air by a propelling charge before detonation. The lethal casualty radius is at least 25 metres. The explosive train of the mine consists of a percussion igniter cap, a propelling charge, a percussion detonator, a booster detonating charge and a main explosive charge.

The mine is fitted with a tripwire fuze. The traction load on the tripwire required to activate the fuze is 6 to 8 kg. The fuze can also be activated by direct pressure on one or more of the fuze prongs. When activated the fuze primes the igniter cap which fires the propelling charge. The internal body of the mine, consisting of the main charge surrounded by the splinters, the booster, the detonator and a striker mechanism, is then projected into the air. A steel wire connected to the striker mechanism is extended to its maximum length causing the percussion of the detonator and the explosion of the mine. The striker mechanism cannot strike the detonator until the body is ejected. The mine is fully waterproofed.

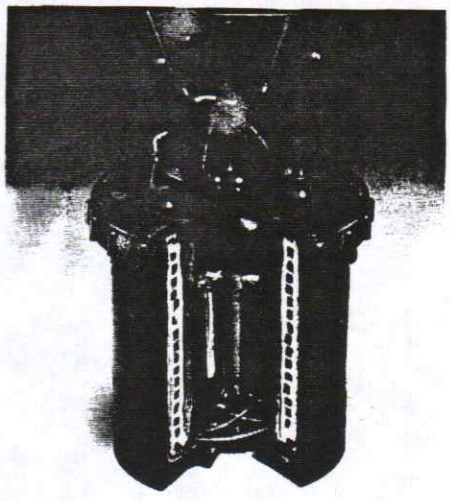
A training version of the Valmara 69 is also available. This has a smoke charge and can be used at least ten times with only the smoke candle and fuze being replaced each time.

This mine is produced by Chartered Industries of Singapore.

SPECIFICATIONS
Weight: 3·2 kg
Diameter: 130 mm
Height: (with fuze) 205 mm
Main charge type: Composition B
Weight of main charge: 420 g
Type of booster charge: RDX
Weight of booster charge: 13 g
Operating force:
(pressure) 10·8 kg
(pull) 6 kg
Operating temperature range: −32 to +60°C



Anti-personnel bounding mine Valmara 69 (Italian Army)



Cutaway anti-personnel bounding mine Valmara 69

MANUFACTURER

Anti-personnel Bounding Mines, M16, M16A1 and M16A2

DESCRIPTION

The anti-personnel bounding mine M16A1 (an earlier model was the M16) consists of a sheet steel case which contains the projectile and the propelling charge, and an M605 combination fuze which is screwed into the top of the mine and extends through the centre of the projectile to the bottom of the case where the propelling charge is located.

The mine operates as follows: pressure applied to one of the three prongs on the fuze compresses the pressure spring and forces the trigger downwards, forcing the release pin outwards and the firing pin is released. This initiates the firing chain and the cast-iron projectile is propelled into the air. When this reaches a height of one metre the main charge detonates and metal fragments are scattered in all directions. The mine can also be fitted with a tripwire and in this case operates as follows: when a pull is applied to the tripwire the release pin ring of the fuze pulls the release pin outwards to a position where the firing pin is released and the mine then operates as above. There is an inert training version of this mine. The M16A2 is an advanced version of the M16 series and incorporates only one booster detonator and delay instead of two of each. This allows for a greater explosive charge.

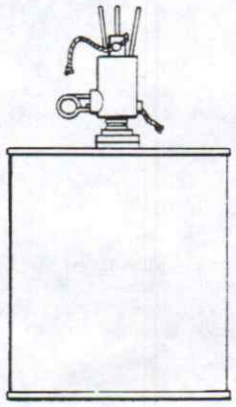
An inert version of the M16 series is known as the M16A1, inert with fuze, M605 inert.

STATUS

In service with the US Army and other countries.

SPECIFICATIONS

Model	M16	M16A1	M16A2
Weight	3·74 kg	3·74 kg	2·83 kg
Height	199 mm	199 mm	199 mm
Diameter	103 mm	103 mm	103 mm
Main charge type	TNT	TNT	TNT
Weight of main charge	521 g	513 g	590 g
Type of booster	Tetryl	Tetryl	Composition A5
Weight of booster	54 g	33 g	11 g
Weight of propelling charge	70 g	70 g	70 g
Type of propelling charge	black powder	black powder	black powder
Operating force			
(pressure)	3·6–20 kg	3·6–20 kg	3·6–20 kg
(tripwire)	1·6–3·8 kg	1·6–3·8 kg	1·6–3·8 kg
Operating temperature range	−40 to +51·5°C	−40 to +51·5°C	−40 to +51·5°C



American troops emplacing M16A1 anti-personnel bounding mine (US Army)

Anti-personnel Mine M14

DESCRIPTION

This small circular blast type anti-personnel mine consists of an all plastic body with an integral plastic fuze which has a steel firing pin, and a main charge. The plug-type plastic detonator holder with the M46 detonator is packaged separately and is installed in the base of the mine when required.

The mine operates as follows: pressure applied to the top of the mine depresses the pressure plate and this depresses the lock key, forcing the lock ring to slide through notches in the inner ring of the spider and depress the Belleville spring. This snaps into reverse and drives the firing pin into the detonator and this explodes the main charge.

The pressure plate on the top of the mine has a yellow indicating arrow which points to the letter S for safe or A for armed. Slots are provided in the pressure plate for the insertion of a steel, U-shaped safety clip which is removed by pulling the pull cord.

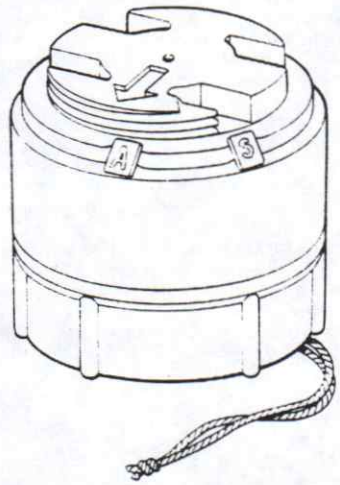
There is also a training version called the Mine, Anti-Personnel Practice: NM, M17, which emits a smoke charge when activated.

SPECIFICATIONS

Weight: 99 g
Diameter: 56 mm
Height: 40 mm
Main charge type: Tetryl
Weight of main charge: 28·4 g
Operating force: 9–16 kg
Operating temperature range: −40 to +51·5°C

STATUS

In service with the US Army and the Danish Army. (Fodfolksmine M/56).



Anti-personnel mine M14

MISAR P-25 Anti-personnel Mine

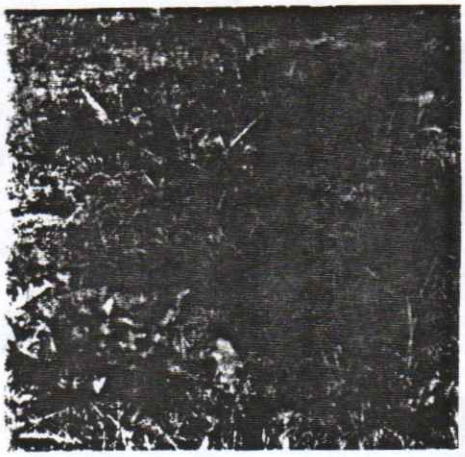
DESCRIPTION
The MISAR P-25 anti-personnel mine was developed from early 1977 and entered production in 1978. It consists of a cylindrical plastic casing which can be delivered in any colour, with the fuze mounted on top. The mine can be buried but for maximum effect should be staked to the ground. A slot for mounting a stake is provided on the side of the mine. It is activated by two tripwires which can extend up to 15 metres away from the mine. When activated the charge explodes and splinters are scattered in a radial path. The effective range of the P-25 mine is 15 metres.

The mine is waterproof, will not float and has a maintenance-free life of at least ten years. Smoke-producing and inert models are available for training.

SPECIFICATIONS
Weight: 0·68 kg
Diameter: 75 mm
Overall height: 180 mm
Main charge type: HE
Operating force: 2–10 kg
Packing: case of 15 mines weighs 14 kg

STATUS
In production.

MANUFACTURER
MISAR SpA. Via Brescia 39/41, 25014 Castenedolo, Brescia, Italy.



MISAR P-25 anti-personnel mine

Anti-personnel Mine M18A1

DESCRIPTION
The M18A1, or Claymore as it is usually known, is a directional, fixed fragmentation mine which is used for defensive and ambush purposes. The original model was designated the M18 and was slightly lighter than the current model.

The M18A1 consists of a curved rectangular moulded case of fibreglass-filled polystyrene plastic. In the front panel 700 steel spheres embedded in a plastic matrix, with C4 plastic explosive behind the spheres. The fragmentation face is convex horizontally to direct the fragments and concave vertically to control the vertical dispersion of the fragments. A moulded peepsight is provided on the top of the mine for sighting. The two detonator wells are in the top of the mine. The mine is mounted on two pairs of scissors type folding legs.

The mine is normally fired from a distance by an M57 firing device. This is a hand-held pulse generator which by a single actuation of the handle produces a double electrical pulse. The M57 is attached to 30 metres of wire which is connected to an M4 blasting cap in the mine. The Claymore can also be activated by a pull wire or a tripwire.

American soldier aiming emplaced anti-personnel

When detonated, a fan-shaped sheaf pattern of spherical steel fragments is projected in a 60-degree horizontal arc covering a casualty area of 50 metres to a height of 2 metres. There is a danger area of 16 metres to the rear of the mine.

The M7 bandolier contains the mine, firing device, M40 test set and electric blasting cap assembly M4.

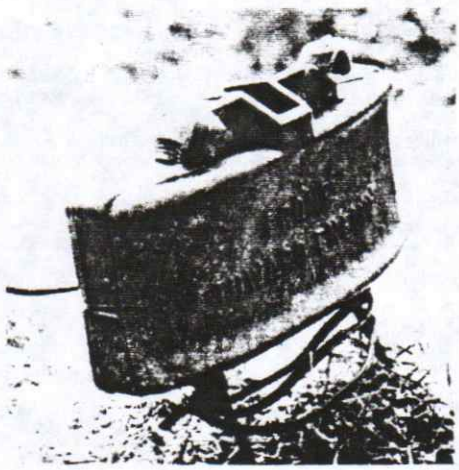
There is a practice version of the M18A1 designated the M68.

The M18A1 is widely licence-produced, for example in Chile and South Korea (qv). The design has also been copied direct as with the South African Shrapnel Mine No 2 (qv).

SPECIFICATIONS
Weight: 1·58 kg
Length: 216 mm
Width: 35 mm
Height: 83 mm
Main charge type: Composition C-4
Weight of main charge: 682 g
Operating temperature range: −40 to +51·5°C

STATUS
In service with the US Army.

MANUFACTURER
Morton Thiokol Inc. Aerospace Group, PO Box 30058, Shreveport, Louisiana 71130, USA.



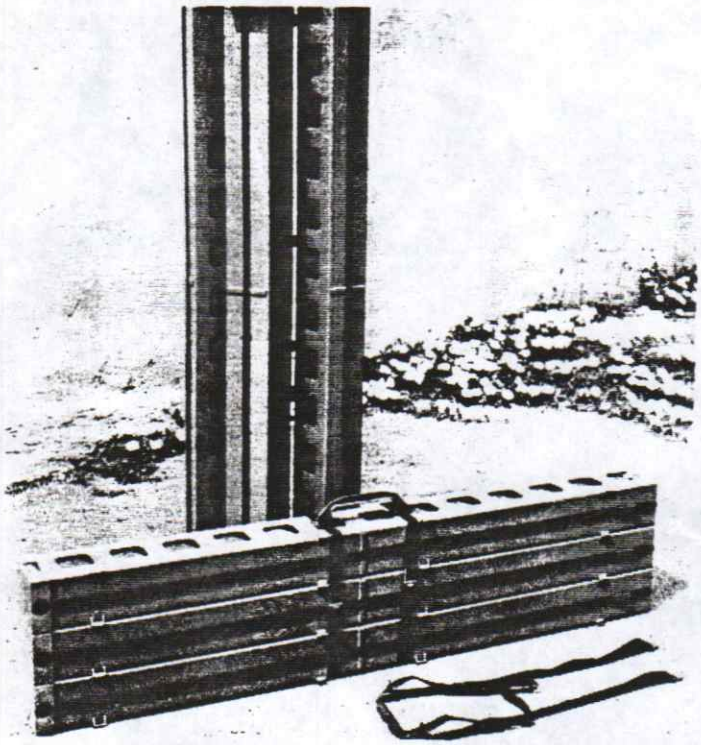
M18A1 anti-personnel mine in position (US Army)

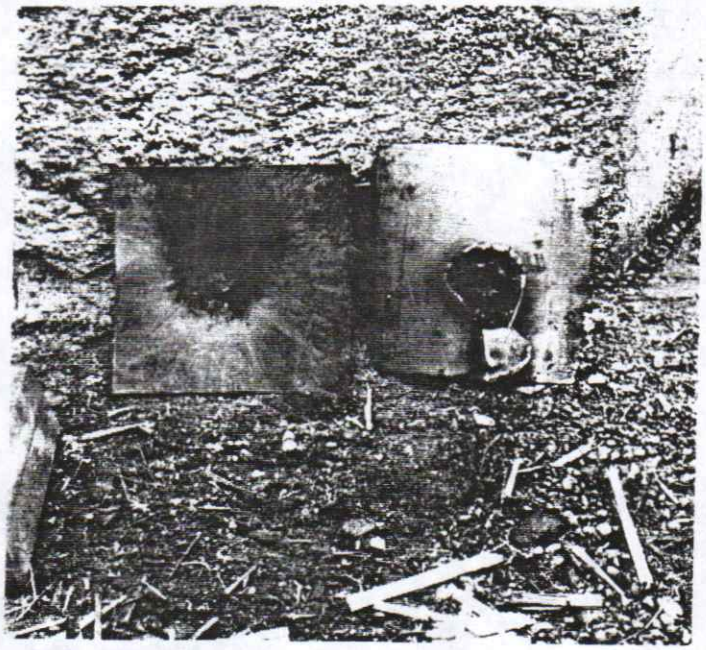
MISAR SB-33 Scatter-dropped Anti-personnel Mine

DESCRIPTION

The SB-33 scatter-dropped anti-personnel mine was as follows: irregular shape and small size that make it difficult to locate on the ground; low weight which increases the quantity of mines that can be carried by a helicopter; wide pressure plate which allows the mine to function either upright or upside down; an anti-shock device which makes it insensitive to countermeasures or laid by hand. It can also be buried just under the surface of the ground.

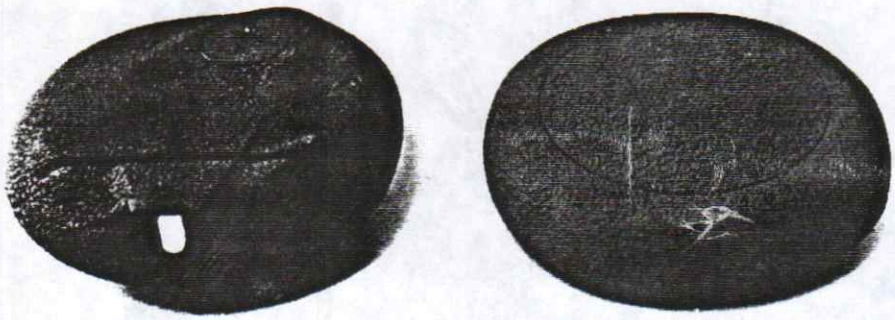
The mine is circular and has a plastic case which is available in any colour. If required it can also be delivered coated with a special paint that makes it undetectable by infra-red equipment.





Results of effectiveness test of SB-33 mine placed upright or upside down on 400 × 400 mm steel plate, 5 mm thick

Magazines for SB-33 mines



MISAR SB-33 scatter-dropped anti-personnel mine

magazine. The mine is maintenance-free and has a shelf life of ten years. It is waterproof and will not float. It is available with an electronic anti-removal device and a training version is produced.

The magazine is used for carrying and storing the mines as well as being used in the SY-AT system. The detonator can be inserted into the mine when the mine is still in its magazine.

The SB-33 is also produced in Spain for the Spanish Army and in Greece where it is known as the EM-20 anti-personnel mine.

SPECIFICATIONS

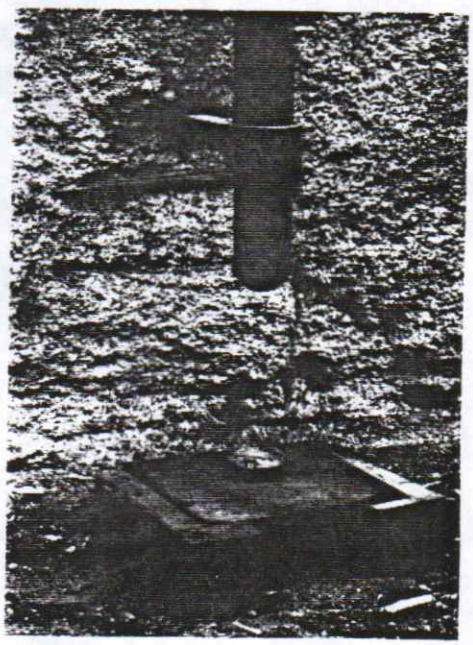
Weight: 140 g
Diameter: 88 mm
Height: 32 mm
Main charge type: HE
Weight of main charge: 35 g
Operating force: 5–20 kg
Packaging: magazine of 78 mines weighs 15 kg

STATUS

In production. In service with some NATO and other countries including Spain and Argentina. The SB-33 is also produced in Spain and Greece.

MANUFACTURERS

MISAR SpA, Via Brescia 39/41, 25014 Castenedolo (Brescia), Italy.
Explosivos Alaveses, SA, Vitoria, Spain.
ELVIEMEK SA, Atrina Centre, 32 Kifissias Av, Paradissos Amarousiou, Athens, Greece.



MISAR SB-33 mine before detonation on 400 × 400 mm steel plate, 5 mm thick

Valsella VS-50 Anti-personnel Scatter Drop Mine

DESCRIPTION
The VS-50 non-metallic mine has been designed for scatter laying from helicopters using the Valsella developed VS/MD helicopter-mounted mine-dropping system. The mines can also be scattered from vehicles or laid by hand to a maximum depth of 20 mm.

The VS-50 mine has a plastic case. It is available in various colours including khaki, marshy green and sand. It is waterproof and non-buoyant and is not affected by the explosion of another VS-50 mine more than 100 mm away.

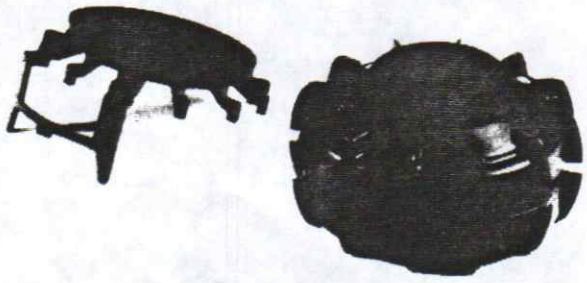
A training model which gives off smoke when actuated is available. One plastic case containing 60 mines, with the detonators stowed separately in the same case, weighs 15 kg.

This mine is now produced by Chartered Industries of Singapore.

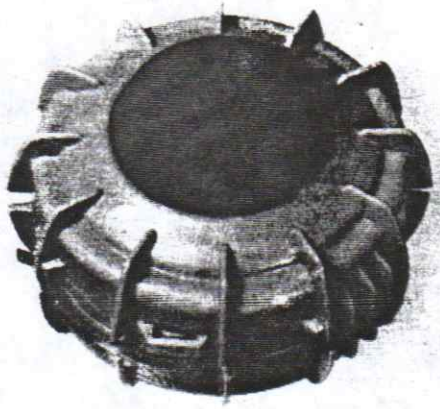
STATUS
In production. In service with undisclosed countries.

MANUFACTURER
Valsella Meccanotecnica SpA, 25014 Castendolo, Brescia, Italy.

SPECIFICATIONS
Weight: 185 g
Diameter: 90 mm
Height: 45 mm
Main charge type: RDX/TNT
Weight of main charge: 43 g
Operating force: about 10 kg
Operating temperature range: −32 to +60°C



Valsella VS-50 anti-personnel scatter mine without safety device



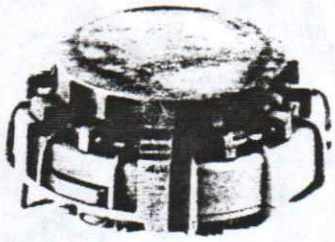
Valsella VS-50 anti-personnel scatter mine with safety device

Valsella VS-Mk 2 Anti-personnel Scatter Drop Mine

DESCRIPTION
The VS-Mk 2 non-metallic mine has been designed for scatter-laying from helicopters using the Valsella helicopter-mounted mine-dropping system. It can also be scattered from vehicles or by hand. It is fully waterproof.

The VS-Mk 2 has a disc-shaped resin-based plastic case available in various camouflage colours. It is activated by pressure applied to both the pressure plate on the mine's top face and on its bottom face. A model fitted with an electrical anti-lift device is known as the VS-Mk 2-E.

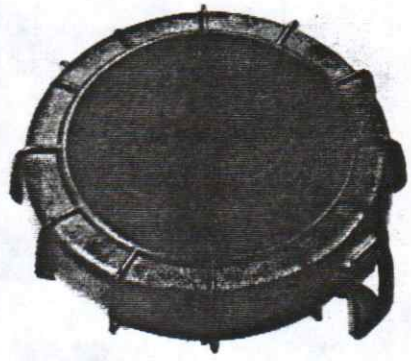
SPECIFICATIONS
Weight: 135 g
Diameter: 90 mm
Height: 32 mm
Main charge type: RDX
Main charge weight: 33 g (22 g for VS-Mk 2-E)



Valsella VS-Mk 2 anti-personnel scatter drop mine with safety device

Operating force: 10 kg
Operating temperature range: −32 to +60°C

STATUS
In service with the Italian Army.



Valsella VS-Mk 2 anti-personnel scatter drop mine with hand safety pin

MANUFACTURER
Valsella Meccanotecnica SpA, 25014 Castendolo, Brescia, Italy.

Technovar TS-50 Anti-personnel Scatter Mine

DESCRIPTION
The TS-50 is a circular plastic anti-personnel mine which is fully waterproof and non-buoyant. It can be laid by hand, to a maximum depth of 30 mm, or by the Technovar DAT minelaying system for helicopters flying at a maximum speed of 200 km per hour and at altitudes of up to 100 metres. Actuation is by application of a 12·5 kg force to a pressure plate. A training version is also available.

This mine is produced in Egypt as the Anti-personnel Plastic Mine T/79.

SPECIFICATIONS
Weight: 186 g
Diameter: 90 mm
Height: 45 mm
Main charge type: T4
Weight of main charge: 50 g
Operating force: 12·5 kg
Operating temperature range: −40 to +70°C

Technovar TS-50 anti-personnel scatter mine with safety device removed (Italian Army)

STATUS
In production. In service with the Egyptian armed forces and Italian Army.

MANUFACTURER
Technovar, 95 Via Argiro, 70121 Bari, Italy.

MISAR P 40 Anti-personnel Jumping Mine

DESCRIPTION

The MISAR P-40 anti-personnel jumping mine was developed from early 1977 and entered production in 1978. It consists of a cylindrical plastic casing, which can be made in any colour, inside which is another container holding the high explosive and shrapnel. The mine is buried with just the fuze showing above the ground. The fuze is attached to the two tripwires which can be up to 15 metres from the mine. The mine operates as follows: when the tripwire is pulled the inside container is ejected into the air and when it reaches a pre-determined height it explodes and scatters the shrapnel in a radial path. Trials conducted by MISAR have shown that this mine will cause injury to at least 55 per cent of men standing within a radius of 15 metres of the mine when it is ignited.

The mine is waterproof, will not float and has a minimum maintenance-free life of ten years. Smoke-producing and inert training models are available.

SPECIFICATIONS

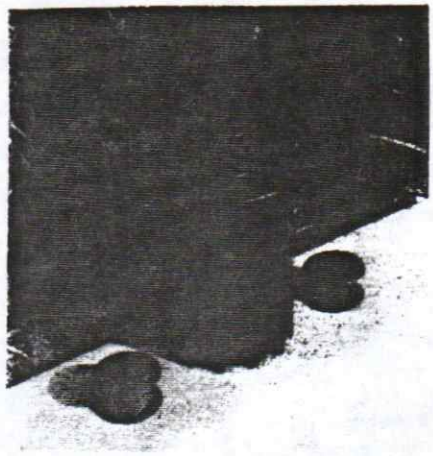
Weight: 1·5 kg
Diameter: 90 mm
Height with fuze: 200 mm
Height of casing: 120 mm
Main charge type: HE
Weight of main charge: 0·25 kg
Operating force: 2–10 kg
Packing: case of 8 mines weighs 16 kg

STATUS

In production.

MANUFACTURER

MISAR SpA, Via Brescia 39/41, 25014 Castenedolo, Brescia, Italy.



MISAR P-40 anti-personnel mine

Valsella VS-1.6 Anti-tank Scatter Mine

DESCRIPTION

The VS-1.6 plastic non-metallic anti-tank mine is circular and has been designed for rapid laying from helicopters by means of the Valsella developed VS/MD helicopter-mounted minelaying system. The mine can also be scattered from trucks or laid by hand. It is normally left on the surface but can also be buried to a maximum depth of 75 mm. The VS-1.6 is pressure-activated. An electronic version of this mine has been developed, fitted with an electronic anti-disturbance and self-neutralising device. A training model is also available.

SPECIFICATIONS

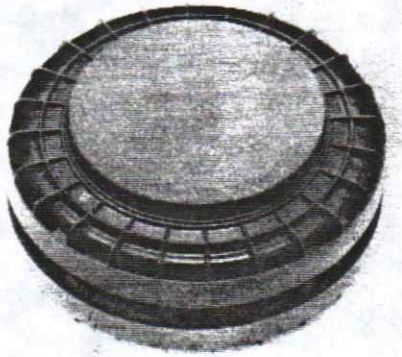
Weight: 3 kg
Diameter: 222 mm
Height: 92 mm
Main charge type: HE
Weight of main charge: 1·85 kg
Operating force: 190–220 kg

STATUS

In production. In service with several countries. Under evaluation by the Italian Army.

MANUFACTURER

Valsella Meccanotecnica SpA, 25014 Castenedolo, Brescia, Italy.



Valsella VS-1.6 anti-tank scatter mine

MISAR SB-81 Scatter-dropped Anti-tank Mine

DESCRIPTION

The MISAR SB-81 can be scattered from helicopters with the MISAR SY-AT system, or laid manually. It can be buried in the ground to a maximum depth of 100 mm. Air-dropping does not impede its ability to destroy tank tracks or irreparably damage tank running gear.

The mine is circular and has a plastic case available in any colour. It is pressure-activated and will function whether it lands on its top or its bottom.

The SB-81 is waterproof, will not float, is maintenance-free and has a shelf life of ten years. The explosive content of the mine can be removed and stored separately. The magazine is used for carrying and storing the mine as well as being used in conjunction with the SY-AT scattering system. The detonator can be inserted into the mine even when it is stored in the magazine.

Other versions of the mine are available including a model with an electronic anti-removal and self-neutralising device, and another with an electronic anti-removal device and a self-destruction device, which both operate at pre-determined times. In appearance these are identical to the standard mines. Smoke and inert models are available for training purposes.

The SB-81 is produced in Spain as the EXPAL SB-81.

SPECIFICATIONS

Weight: 3·2 kg
Diameter: 232 mm
Height: 90 mm
Main charge type: HE
Weight of main charge: 2 kg
Operating force: 150–310 kg
Packaging: magazine containing 5 rounds weighs 19·5 kg

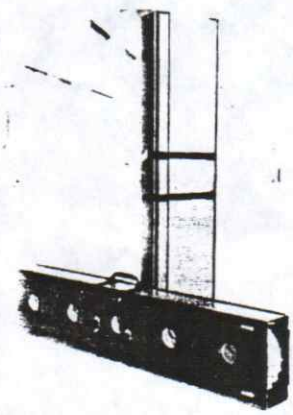
STATUS

In production. In service in Argentina, Italy and Spain (for Spanish Army).

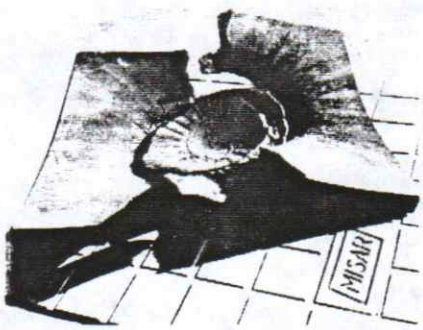
MANUFACTURERS

MISAR SpA, Via Brescia 39/41, 25014 Castenedolo, Brescia, Italy.
Explosivos Alaveses SA, Vitoria, Spain.

MISAR SB-81 scatter-dropped anti-tank mine



MISAR magazines for SB-81 anti-tank mine



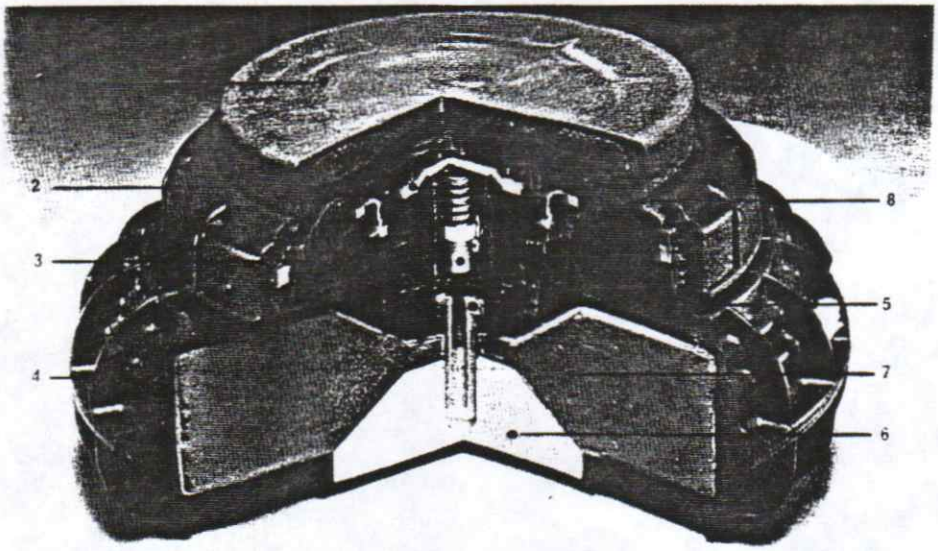
Result of effectiveness test of MISAR SB-81 mine placed on 30 mm thick steel plate 400 × 400 mm

Valsella VS-2.2 Anti-tank Mine

DESCRIPTION

This non-metallic anti-tank mine has a resin-based plastic case with an integral carrying handle. The VS-2.2 is waterproof, non-buoyant and shockproof. A VS-N pneumatic type fuze is fitted to the main body by a thread coupling. The mine is laid manually with the pressure plate placed to a maximum depth of 100 mm. An inert training version of the mine is produced.

Practice mines are available of the same size, shape and weight. They are of the smoke type and can be reused. A box containing four VS-2.2 mines, with the fuzes packed separately in the same box, weighs about 17 kg.



Valsella VS-2.2 anti-tank mine: **(1)** *pressure plate* **(2)** *pressure membrane* **(3)** *striker* **(4)** *plastic casing* **(5)** *detonator* **(6)** *booster* **(7)** *explosive charge* **(8)** *sealing membrane*

SPECIFICATIONS

Weight: 3·5 kg
Diameter: 240 mm
Height: 120 mm
Weight: (main charge) 2·13 kg
Charge type:
(main) Composition B
(booster) RDX
Operating force: 180–220 kg
Operating temperature range: −32 to −60°C

STATUS

In production. In service with Singapore and with several other undisclosed countries.

MANUFACTURER

Valsella Meccanotecnica SpA, 25014 Castenedolo, Brescia, Italy.

Valsella VS-2.2 anti-tank mine

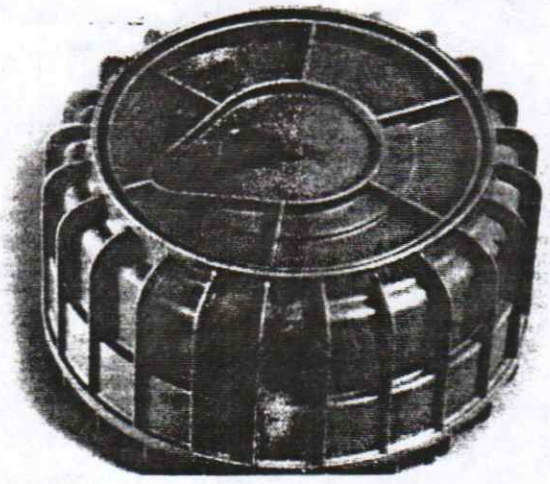
Valsella VS-HCT Anti-tank Mine

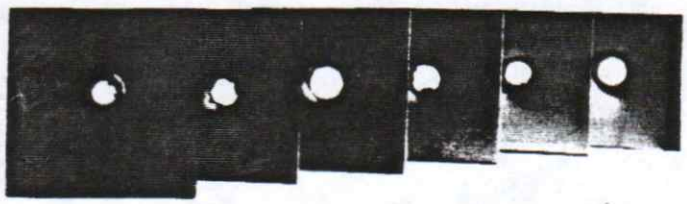
DESCRIPTION

The Valsella VS-HCT anti-tank mine was developed to meet specifications issued for a full-width mine by the Italian Army and entered series production in 1979. The VS-HCT anti-tank mine is fitted with a high-performance shaped charge and a dual-sensor electronic influence fuze that is effective across the full width of an armoured vehicle. The blast effect is used to damage the tracks and the shaped charge can penetrate the belly armour to a depth of more than 175 mm.

The VS-HCT can be laid manually or mechanically to a maximum depth of 100 mm. A number of safety features are incorporated for use during storage, transporting and laying. These include a removable composite detonator and interruption of the detonating train when in the safe, mechanical and electronic arming delay states.

The VS-HCT is cylindrical and has a plastic watertight casing. The fuze is powered by a replaceable military-grade lithium battery pack.





M19 Anti-tank Mine

DESCRIPTION

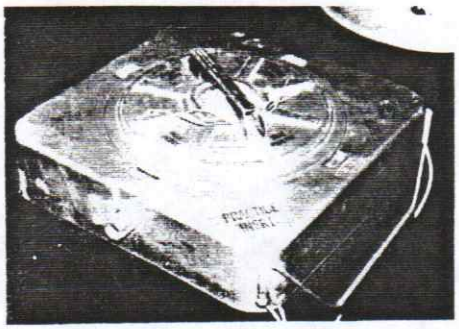
The M19 non-metallic anti-tank mine is square and has an all-plastic case. A carrying handle is provided on one side of the mine. The main fuze-well is in the centre of the mine and there are also two anti-lifting fuze-wells, one in the side of the mine and the second in its base.

The mine has an M606 fuze which is of the mechanical pressure type and is also plastic. The mine operates as follows: when sufficient pressure is applied to the top of the mine, the pressure plate is depressed and this depresses the Belleville spring of the fuze, which snaps into reverse driving the firing pin into the detonator. This explodes and sets off the booster, which then sets off the main charge.

Sympathetic detonation can be avoided if the mine is buried 38 mm deep, with a 45-degree slope of holes and 5·5 metres centre-to-centre between adjacent mines. The M19 is waterproof and can be laid on riverbeds.

An inert training version of this mine is available, designated the mine, AT: training, M80.

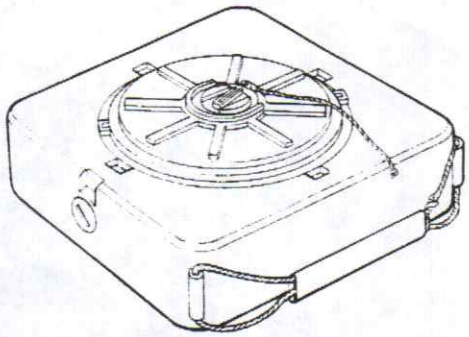
The M19 is also licence-produced in South Korea (qv) and Chile (by Industrias Cardoen).



Mine: AT: Training, M80, inert practice version of M19 anti-tank mine (T J Gander)

SPECIFICATIONS

Weight: 12·56 kg
Length: 332 mm
Width: 332 mm
Height: 94 mm
Main charge type: Composition B
Weight of main charge: 9·53 kg



M19 anti-tank mine

Type of booster: RDX
Weight of booster: 52 g
Operating force: 136–227 kg
Operating temperature range: −40 to +51·5°C

STATUS

In service with the US Army.

M21 Heavy Anti-tank Mine

DESCRIPTION

The M21 metallic anti-tank mine is circular and has a sheet steel case. An adjustable carrying strap attached to the side of the mine can also be used for lifting the mine into position.

The top cover of the mine contains a charge cap assembly which has a threaded hole in the centre into which the fuze is screwed. For travelling this is covered by a plug assembly. Under the charge cap assembly is the black powder expelling charge and under this is the concave steel plate, beneath which is the HE charge.

The M21 mine has an M607 fuze which can be fitted with an extension rod adaptor and an extension rod which is actuated when it comes into contact with the tracks or belly of the tank. With the extension rod and adaptor removed, the fuze may be used as a pressure type fuze.

When fitted with the extension rod the mine is operated as follows: when the rod is tilted with a minimum horizontal force of 1·7 kg through an angle of 20 degrees or more the plastic collar in the fuze is broken. When used with the rod, a minimum force of 132 kg applied to the top of the mine will shatter or break the plastic collar. Once this plastic collar is shattered or broken, the tilt-rod in the fuze presses against the bearing cap, forcing it downward causing the Belleville spring to snap into the reverse position, driving the firing pin assembly into the M46 detonator which fires the black powder charge. This blows off the top cover of the mine and the pressure created by this explosion drives a firing pin into the M42 primer, initiating the main firing chain. The main charge detonates and blows the body of the mine apart and causes the steel plate to be ejected upwards at a high velocity into the belly of the tank.

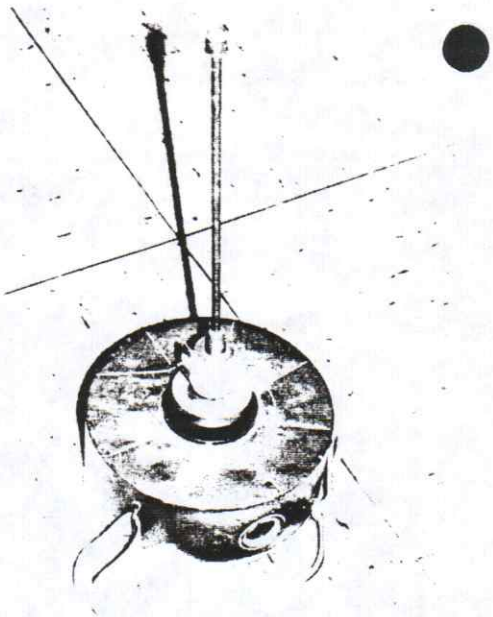
The M21 can also use the M612 pneumatic fuze and the M609 influence fuze.

SPECIFICATIONS

Weight: 7·9 kg
Diameter: 230 mm
Height:
(with tilt-rod) 813 mm
(with fuze) 206 mm
Main charge type: Composition H6
Weight of main charge: 4·9 kg
Type of booster: RDX
Weight of booster: 11 g
Operating force: 132 kg
Operating temperature range: -40 to +51·5 C

STATUS

In service with the US Army.



M21 heavy anti-tank mine (T J Gander)

TM-46 Anti-tank Mine

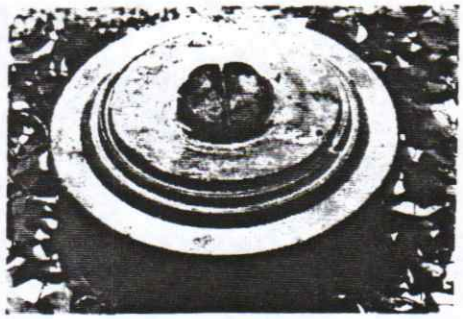
DESCRIPTION
The TM-46 is metallic and can be laid either by hand or mechanically. The MVM pressure fuze is used for mechanical laying, or the MV-5 fuze for hand laying. The mine is detonated as follows (MV-5): pressure applied to the pressure plate compresses the striker spring in the fuze until the striker-retaining ball escapes into a recess in the pressure cap, releasing the spring-loaded striker which detonates the mine. In appearance the TM-46 is almost identical to the TMN-46, which however has a fuze-well in the bottom of the mine for booby-trapping.

The Israeli No 6 anti-tank mine is an exact copy of the TM-46. A version produced in China is known as the Type 72 and one produced in Egypt is known as the M/71.

SPECIFICATIONS
Weight: 8·4 kg
Diameter: 304 mm
Height: 91 mm
Main charge type: TNT
Main charge weight: 5·3 kg
Booster charge: TNT
Booster charge weight: 198·45 g
Operating force: approx 210 kg
Fuze model: MV-5 or MVM (angled tilt-rod) MVSh-46

STATUS
In service with members of the Warsaw Pact and has been exported to the Middle and Far East and Africa.

MANUFACTURER
Soviet state arsenals.



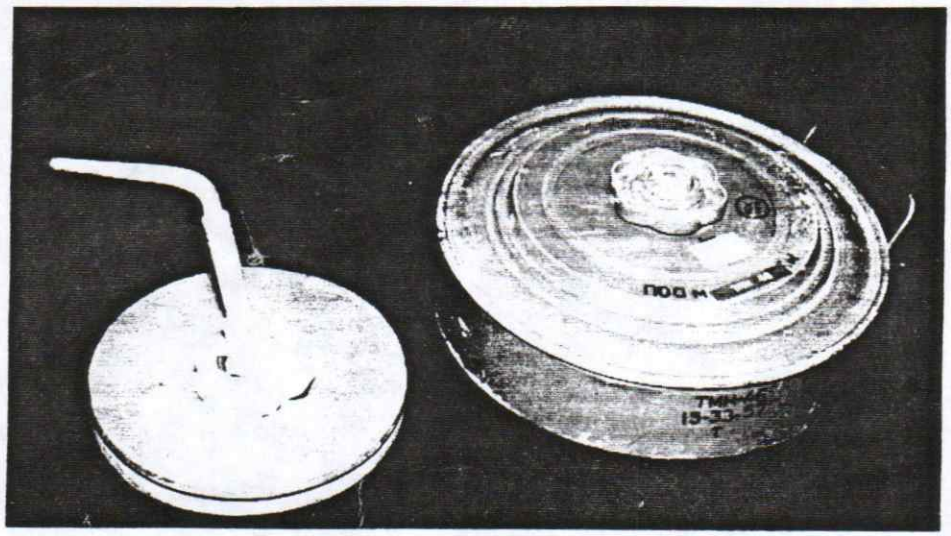
TM-46 metallic anti-tank mine (T J Gander)

TMN-46 (Anti-lift) Anti-tank Mine

DESCRIPTION
The TMN-46 is metallic and can be laid either by hand or mechanically. The MVM pressure fuze is used for mechanical laying, or the MV-5 fuze for hand laying. There is a fuze-well in the bottom of the mine for booby-trapping. The mine is detonated as follows (MV-5 fuze): pressure forces the pressure cap down on the head of the fuze, depressing it and releasing the striker to detonate the mine. In appearance, the TMN-46 is almost identical to the TM-46, which does not have the fuze-well in the bottom of the mine for booby-trapping.

SPECIFICATIONS
Weight: 8·98 kg
Diameter: 304 mm
Height: 110 mm
Main charge type: TNT
Main charge weight: 5·95 kg
Booster charge: Tetryl
Booster charge weight: 76·54 g
Operating force: 210 kg
Fuze model: MV-5 or MVM (hand laying) MVSh-46 angled tilt-rod

STATUS
In service with members of the Warsaw Pact.



TMN-46 (anti-lift) anti-tank mine with pressure/tilt plate on left (T J Gander)

MANUFACTURER
Soviet state arsenals.