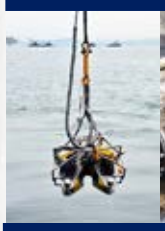
MIKO MARINE

PRODUCT CATALOGUE

UNDERWATER BLANKING TOOLS

MARINE SALVAGE TOOLS

SPECIAL PRODUCTS



MIKO MAGNETS

DAMAGE CONTROL KIT

FOR NAVY – COASTGUARD - GOVERNMENTAL SEGMENT

PRODUCT CATALOGUE

Keeping water on the outside since 1996

Miko Marine AS was founded in 1996 based on the idea of using a magnetic patch to stop water ingress and oil spill. Miko Marines solutions have since been supplied to governmental and non-governmental clients worldwide.

Working with marine salvage, naval damage control, in water repair, oil removal from sunken ships, oil-spill prevention and underwater operations Miko Marine has focus on safety of life at sea, maritime environment and costs saving through creative and liable engineering.

A broad military and civilian network, wide areas of operations and interests put Miko Marine in a position were interesting and challenging tasks that needs new alternative thinking are frequently raised and addressed. Miko Marines team of dedicated and skilled engineers are continuously searching for improved solutions. Satisfied customers, impressed agencies, refloated or/and emptied shipwrecks are our testimonies.

Miko Marine and the Naval Segment

Miko Marine has established a network within the naval community and will through this seek new or improved solutions within damage control. A High level of damage control capabilities increase the ship combat survivability and thus its combat ability.

Highlighted products

Miko Salvage Bag (MSB). The Standard Miko Salvage Bag concept was completed late February 2022. In March 2022, the first MSB was delivered to the naval segment The MSB has been developed in close dialogue and under influence by experts from various Naval Damage Control Training Centers and Material Agencies. Miko Salvage Bag provides the vessels Damage Control organization and Damage Repair Parties with a new and innovative tool to improve their capabilities when fighting the Internal Battle in peace, crisis and conflicts. The way of thinking is still the same, with other tools.

Miko Hatch Sealer Bag (MHSB) has been designed as a tool for rapid and effective sealing of hatches, trunks and manholes that are damaged or left open with or without hoses and cables running through it. The MHCB has received very positive feedback from navies where it has been introduced and tested. The MHCB will be presented and for sale to the naval community medio 2022.

Miko Pipeline Sealing Bag (MPSB) is a bag with the same features, but with lesser dimension, than the sealing bags in the standard Miko salvage Bag. The MPSB is designed to be uses to plug broken or open ends of pipelines

Miko Flexible Pipeline Sealer (MFPS). Miko Marine has been requested by the navy segment to develop a pipe sealing tool that are easier and more rapid to apply, than the current (often heavy , complicated and limited in use) tools available on the marked. Miko Marine has taken the challenge and are now in the development and design phase.

CONTENT LIST

FOR NAVY – COASTGUARD - GOVERNMENTAL SEGMENT

EMERGENCY RESPONSE BAG

The Emergency Response Bag (ERB) enables quick in-water repair of leaks caused by cracks or ruptures, and can be used as a blanking tool for routine operations. Because of the compact size and minimal weight, the kit can be hand-carried, and the plasters can be quickly applied by a single diver.

Miko Plaster® – the main component of the ERB – is a magnetic tarpaulin that is applied by diver directly over the opening. The seal is achieved by the water pressure coupled with the magnetic adhesion between the plaster and the steel surface.

The components of the ERB have been selected for maximum versatility and usability within strict weight limits.

The kit is shipped in a wooden crate, allowing for stackability during shipping and storage.

MEASUREMENTS

NET WEIGHT
40 KG

GROSS WEIGHT
65 KG

NET LENGTH
90 CM

GROSS DIMENSIONS
103 X 46 X 55 CM

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INSTALLATION PRINCIPLE

With a weight in water of 5,5 kg/m2, the Miko Plaster® is easily handled by one diver. The plaster is applied directly over the leak and can be re-positioned if necessary.

The MPM-002 Miko Permanent Magnets are placed on top of the plaster to increase the seal and prevent peeling caused by towing or current speed.

The MAM-001 Miko Anchor Magnet can be used as an anchor point for the diver or to hold tools during the installation. When the plaster and the MPM-002 magnets are in place, the MAM-001 can also be placed in the centre of the patch to further reinforce the seal.

CONTENTS

1 pcs	450 × 500 mm Magnetic Miko Plaster®
1 pcs	450 × 833 mm Magnetic Miko Plaster®
1 pcs	900 × 1 250 mm Magnetic Miko Plaster®
1 pcs	MAM-001 Miko Anchor Magnets
10 pcs	MPM-002 Miko Permanent Magnets
1 pcs	MHT-002 Handling Tool for MPM-002
4 pcs	MHT-001 Handling Ropes

SHIPPING AND STORAGE

The kit is shipped in a wooden crate measuring 103×46×55 cm with gross weight of 65 kg, allowing for stackability during shipping and storage.

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TANKER KIT

The Tanker Kit Light is well proven as a cost saving alternative to drydocking. It is used worldwide for in-water repair or survey of floating structures.

Miko Plaster® – the main component of the Tanker Kit Light – is a magnetic tarpaulin that provides a temporary, but reliable, watertight seal below the waterline. It is qualified by DNV for sealing off sea chests, and water inlets and outlets directly in the water. The seal is achieved by the water pressure coupled with the magnetic adhesion between the patch and the steel surface.

No hot work or hydraulic tools are required for the installation. Supplementary tools required for installation are included in the kit.

DETAILS

GROSS WEIGHT
220 KG
(INLC. EURO PALLET)

LENGTH
2 300 MM

CONTENTS

2 pcs	900 × 1 250 mm Magnetic Miko Plaster®
2 pcs	2 250 × 2 500 mm Magnetic Miko Plaster®
4 pcs	MAM-001 Miko Anchor Magnets
10 pcs	MPM-002 Miko Permanent Magnets
2 pcs	MHT-002 Handling Tool for MPM-002
4 pcs	MHT-001 Handling Ropes
1 pcs	Installation/Storage Drum

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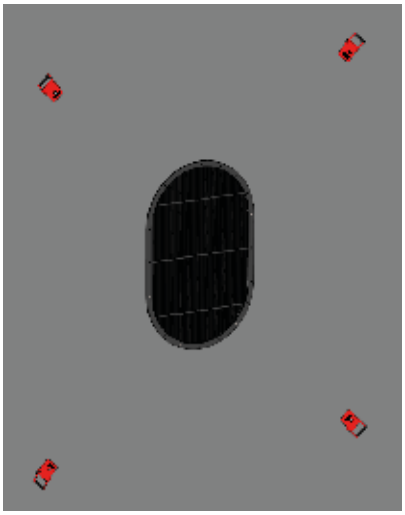
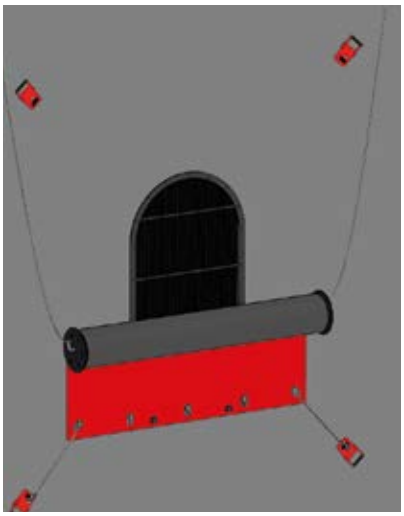
SPECIFICATIONS

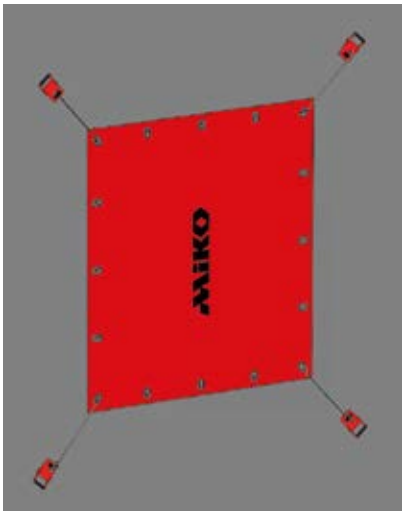
The drum is used for storage and transportation of the Miko Plaster®, as well as for its installation. Both the drum and the larger patches are close to neutral buoyancy in water.
One MAM-001 Miko Anchor Magnet is placed outside each corner of the sea chest or opening to be patched.

The drum is lowered into the water from the deck using the handling ropes, while the diver positions it correctly. With the two first corners secured to a MAM-001, the Miko Plaster® is rolled out from the drum. The diver can easily re-position the patch if necessary.
The last two corners are secured to the other MAM-001 once the patch is completely rolled out in the correct position.

The MPM-002 Miko Permanent Magnets are placed on top of the patch to further increase the seal and to prevent peeling caused by towing or current speed.







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MAGNETIC MIKO PLASTER

Miko Plaster® is a registered trademark and covers a large variety of patches for stopping a leak. In addition to standard sizes, customized patches are supplied in any shape and size.

The patented Magnetic Miko Plaster® is qualified by DNV for sealing off sea chests, and water inlets and outlets directly in the water. The seal is achieved by the water pressure coupled with the magnetic adhesion between the patch and the steel surface. The patches are designed for long term storage and are not demagnetized after use. The outer layer is a polyester-reinforced PVC matting, giving the plaster a strong and durable cover while still maintaining flexibility. The inner layer is a nitrile rubber sheeting that provides the magnetic holding force, as well as a strong frictional force and sealing effect against the steel surface. The larger sizes are equipped with a buoyancy sheet to facilitate easy handling under water. The patches are produced in Norway and standard sizes can be delivered quickly to site in urgent situations. Standard sizes are available in the Emergency Response Bag and the Tanker Kit, together with supplementary tools for installation.

Customized patches are supplied in any shape and size.

CHARACTERISTICS

MAGNETIC HOLDING FORCE
70 G/CM2

WEIGHT IN AIR
9,0 KG/M2

WEIGHT IN WATER
5,5 KG/M2 (or slightly positive with buoyancy sheet)

LUG HOLDING CAPACITY
350 KG EACH

MAX. TEMPERATURE
120 °C

THICKNESS
3,5 MM

STRETCH STRENGTH
8 500 N/5 CM

SHEAR STRENGTH
1 500 N (DIN 53356)

WELDING STRENGTH
1 500 N (DIN 53363)

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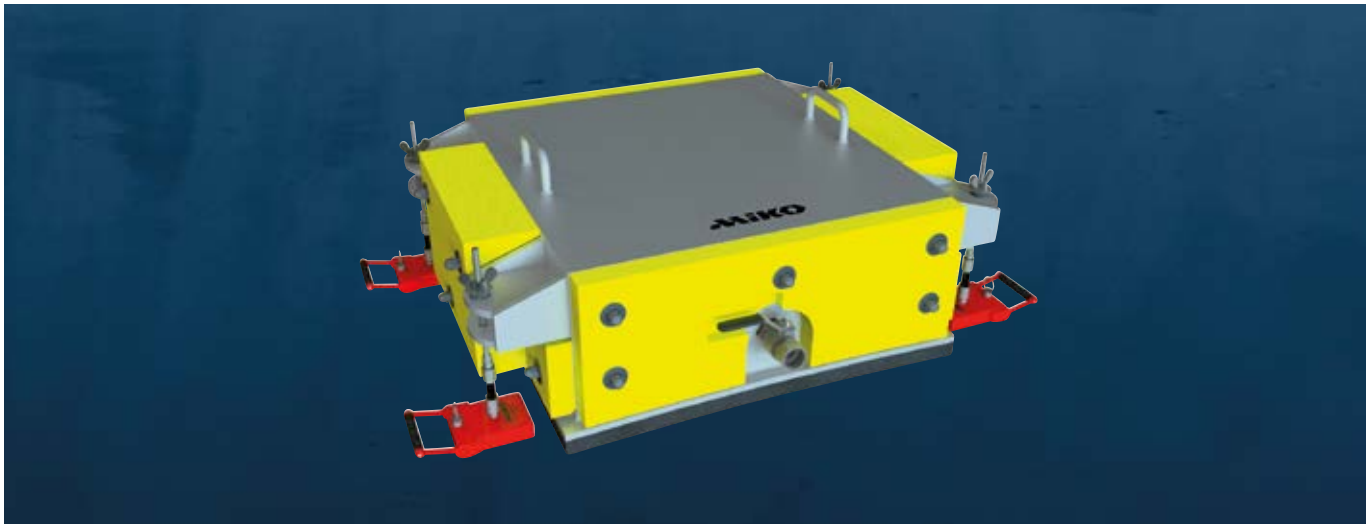
SEA CHEST COFFERDAMS

Miko delivers custom-made Cofferdams for blanking off sea chests, pipe inlets and outlets and all kinds of hull apertures below the waterline.



With neutral buoyancy – achieved by blocks of rigid PVC foam mounted externally on the walls – the Cofferdams are easily handled under water by divers or ROV's.

They are kept firmly in place on the hull by utilizing Miko Anchor Magnets model MAM-003, each with an ideal holding force of 450 kg.
The magnets are fitted with rubber flex joints, which enables them to be used on curved or uneven steel surfaces. By tightening the wing nuts, the rubber gasket is compressed slightly and an initial watertight seal against the hull is created.

Once the inside has been pumped dry, the pressure difference will compress the rubber gasket further. At this point, the watertight seal is mainly achieved by the water pressure itself.

Custom-made Cofferdams are supplied to fit specific hull dimensions, and can be made diver or ROV compatible.
Miko's Cofferdams can be delivered for retrofit on operational vessels, as well as a fully-fledged solution to be integrated on new-builds and FPSO's.

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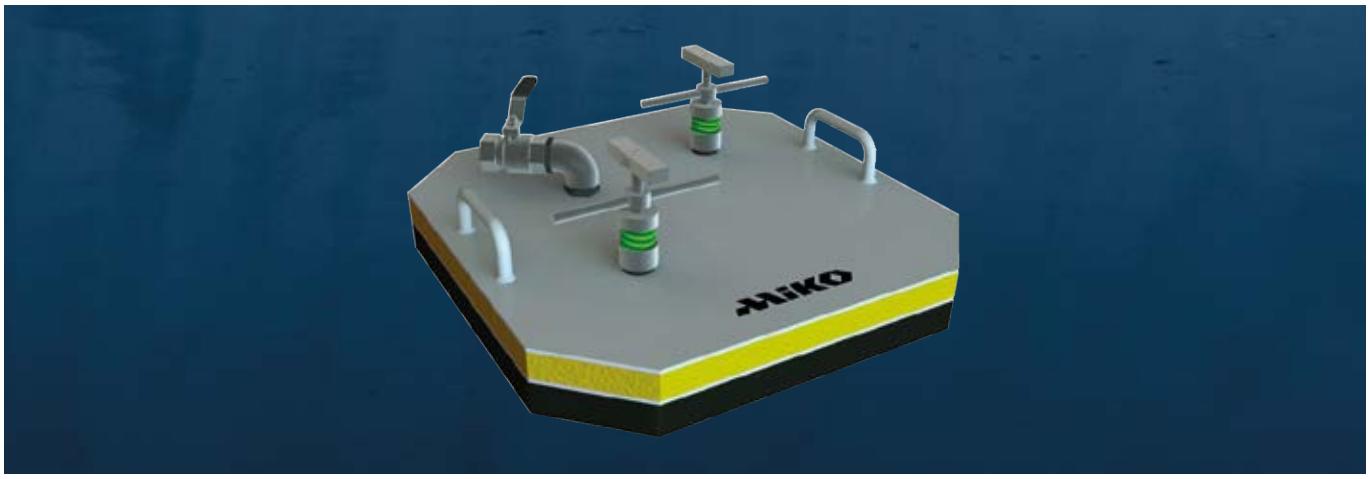
SEA CHEST COVERS

Miko delivers Sea Chest Covers for any vessel, in any size and at any depth. Hull curvature, sea chest grid arrangement and other data are taken into account for the design.



Miko's Sea Chest Covers enable underwater blanking to be installed easily by diver or ROV, eliminating the need for drydocking during repairs and maintenance of sea chests. The threaded rods are used to lock onto the sea chest grid and keep the cover firmly in place. By tightening the wing nuts, the rubber gasket is compressed slightly and an initial watertight seal against the hull is created.

When the water has been pumped out on the inside and the pressure difference is acting on the sea chest cover, the rubber gasket will be compressed further. The springs under the wing nuts maintain a constant tension in the rods as this happens, by compensating for the movement of the cover. This eliminates the need for the diver or ROV to go back and re-tighten the wing nuts after emptying the sea chest.

Miko's Sea Chest Covers can be delivered for retrofit on operational vessels, as well as a fully-fledged solution to be integrated on new-builds and FPSO's.

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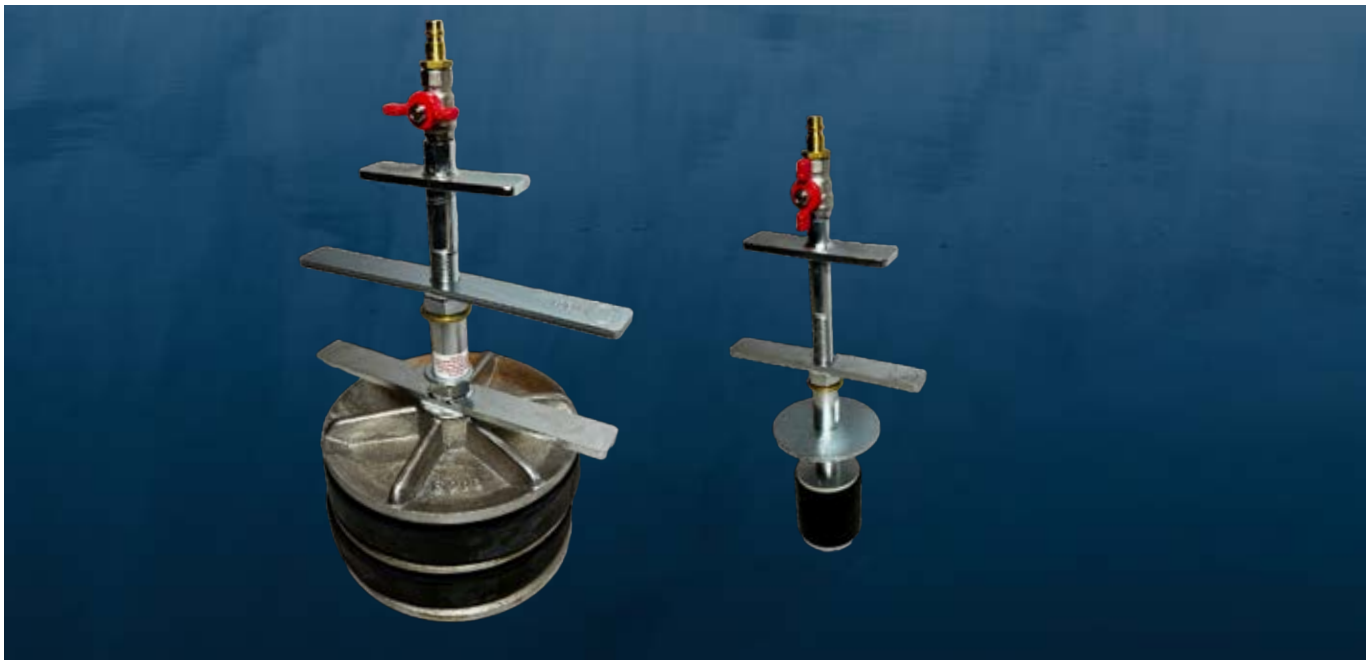
WRV-8000

The WRV-8000 is an expansion plug intended for sealing pipe openings below the water surface. It is used for planned operations, during maintenance, in-water survey or repair, as well as for emergencies and salvage operations.



A watertight seal is established against the inside of the pipe by closing the turning bar, pressing the aluminium or steel disks together and expanding the soft rubber rings. The diver uses one hand to rotate the handle and the other to hold the plug and keep it from rotating. The crossbar or flange will rest against the outer end of the pipe opening and prevent it from being sucked in. The plugs have a lockable pressure balance valve for flooding upon completion of the repair work. All plugs are designed to withstand a pressure differance of 2 bar.

The standard WRV-8000 plugs can be used to seal off pipe openings ranging from 13.5 mm (DN14)to 615 mm (DN600). The expansion plugs require a certain amount of space without any obstacles inside the pipes. Before installation, the piping must be cleaned from marine growth.

Pipe plugs with higher diameter than DN600 can be delivered upon request. Larger plugs with high submerged weight can be customized and delivered with PVC sheeting to provide nautral buoyancy for easy handling under water. Miko Marine can also customize pipe plugs with pipe cover to provide a double barrier sealing. Send enquiry for more information.

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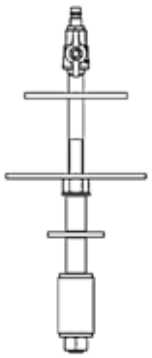
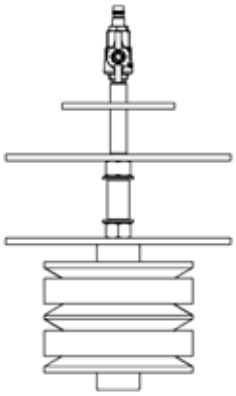
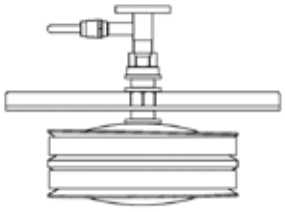
Type	Rubber Rings	Nominal Diameter	Sealing Range
Plugs size DN14 - DN75 are defined as type A. • Aluminum construction • One cylindrical rubber sealing element made of natural rubber 	1	14 mm	13.5 - 15 mm
	1	16 mm	15 - 21 mm
	1	20 mm	19 - 25 mm
	1	25 mm	24 - 30 mm
	1	30 mm	29 - 35 mm
	1	35 mm	34 - 40 mm
	1	40 mm	39 - 45 mm
	1	45 mm	45 - 50 mm
	1	50 mm	49 - 55 mm
	1	55 mm	55 - 60 mm
	1	60 mm	59 - 65 mm
	1	65 mm	64 - 70 mm
	1	70 mm	69 - 75 mm
	1	75 mm	74 - 80 mm
Plug size DN80 - DN300 mm are defined as type B. • Steel construction with pressure discs made from strong-walled aluminum • Two sealing rings • Bronze sliding disc to reduce friction during tightening 	2	80 mm	76 - 85 mm
	2	90 mm	86 - 95 mm
	2	100 mm	96 - 115 mm
	2	110 mm	106 - 125 mm
	2	125 mm	121 - 140 mm
	2	130 mm	125 - 145 mm
	2	140 mm	136 - 155 mm
	2	150 mm	146 - 165 mm
	2	160 mm	156 - 175 mm
	2	175 mm	171 - 190 mm
	2	190 mm	186 - 205 mm
	2	200 mm	196 - 215 mm
	2	210 mm	206 - 225 mm
	2	225 mm	221 - 240 mm
	2	250 mm	246 - 265 mm
	2	260 mm	256 - 275 mm
	2	275 mm	271 - 290 mm
	2	300 mm	296 - 315 mm
Plug size DN310 - DN600 are defined as type C. • Steel construction with pressure discs made of sheet steel. • Two sealing rings • Axial ball bearing to reduce the friction during tightening 	2	310 mm	306 - 325 mm
	2	325 mm	311 - 340 mm
	2	350 mm	336 - 365 mm
	2	375 mm	370 - 395 mm
	2	400 mm	392 - 415 mm
	2	425 mm	410 - 440 mm
	2	450 mm	436 - 465 mm
	2	500 mm	486 - 515 mm
	2	600 mm	593 - 615 mm

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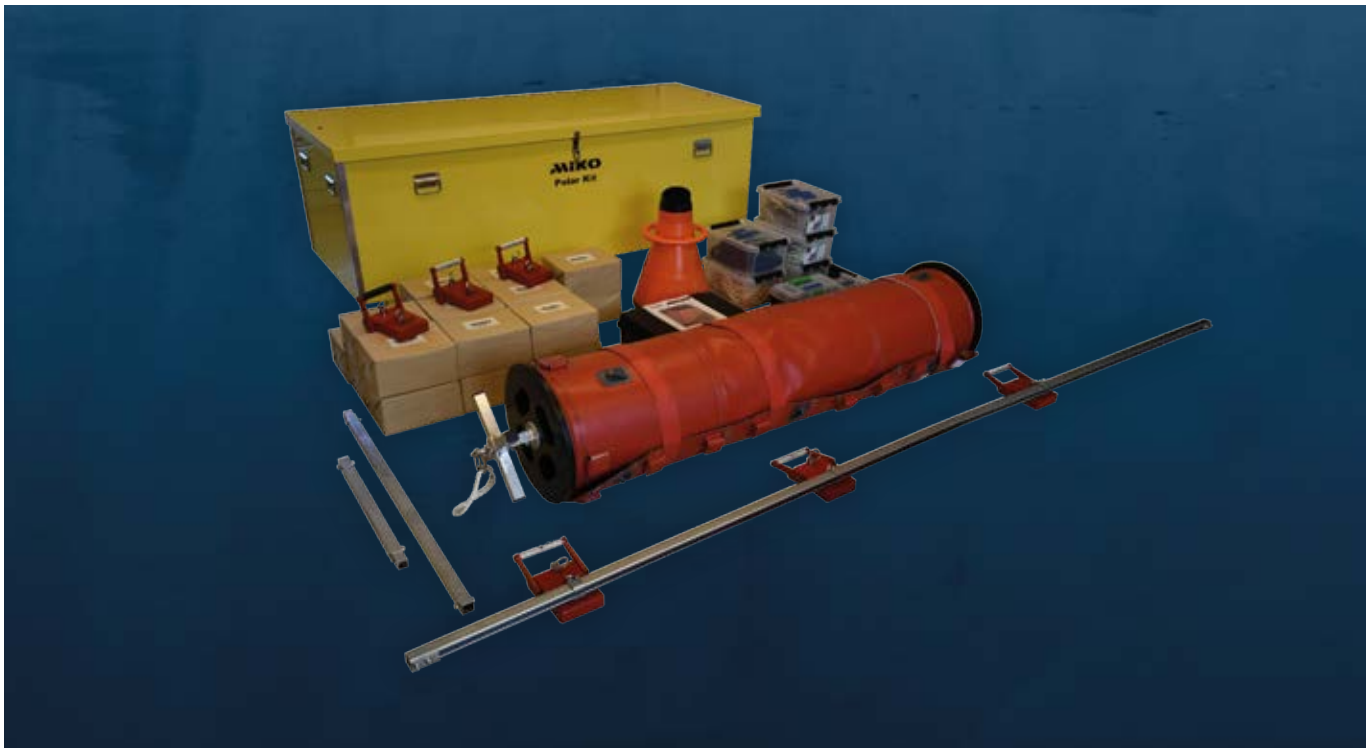
MIKO POLAR KIT

Collisions with ice in the polar regions may lead to hull puncture and water ingress. For this reason Miko Marine AS has developed the Miko Plaster® Polar Kit.



Based on earlier experience, and in compliance with the Polar Code requirements* of being more independent of help from outside, Miko Marine with the operational guidance of Capt. Benny Didriksen, has developed a kit to potentially keep your vessel afloat and prevent it from sinking. The kit consists of the well known, patented and DNV qualified Magnetic Patches, Miko Plaster® and flexible handling– and installation tools enabling subsea installation without divers or ROV's.

*In compliance with the IMO Polar Code Emergency response requirements (chapter 2).

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INSTALLATION PRINCIPLE

The Miko Polar Kit is a versatile tool which can be used for many different applications. The operating instructions provide a step-by-step installation guide. Additions and/or deviations may be required for individual cases.

Based on the curvature of the hull at point of damage, decide if the plaster should be installed vertically, horizontally (short drum) or if the Miko Plaster is sufficient.

Work sequence

1. Place one MPM magnet in each pocket on the long or short side depending on horizontal or vertical installation method.
2. Install the designated batten on top of the magnet pockets.
3. Roll the plaster so that the inner side is pointing outwards. For horizontal installation, attach the velcro strip to the drum.
4. Fasten lifting tackles to either the rail or MAM-003 magnets depending on the chosen type of installation method.
5. Connect drum or plaster to the lifting tackles and make sure that the row of MPM magnets are facing away from hull.
6. Hoist the plaster to the suited starting position for plaster to cover the damaged area.
7. Turn the plaster until the row of MPMs click onto the hull, and the plaster is secured.
8. Roll the plaster until it is rolled out in full length and fastened to the hull. Inspect underwater during the horizontal application.
9. Inspect the plaster, use the T-tool to smoothen out any pockets of air or water between plaster and hull.
10. Secure the plaster using extra MAM-003 magnets.
11. Remove all installation equipment.

CONTENTS

1 pcs	1 500 × 3 000 mm Miko Polar Plaster
1 pcs	900 × 1250 mm Magnetic Miko Plaster®
20 pcs	MAM-003 Miko Anchor Magnets
20 pcs	MPM-001CS Miko Permanent Magnets
1 pcs	Installation/Storage Drum with Extension Rods
2 pcs	Telescopic Handling Poles for handling magnets, plaster and camera.
1 pcs	Guide Rail for horizontal installation
1 pcs	Underwater Camera and Video Monitor in Peli Case
1 pcs	Batyscope, analog underwater scope for manual location/inspection
1 pcs	Misc. Handling Ropes, Block and Tackle and Tools
1 pcs	Installation, user, and maintenance Manual
1 pcs	DNV Technical Report No. 530 10221/98 Qualification of Miko Plaster

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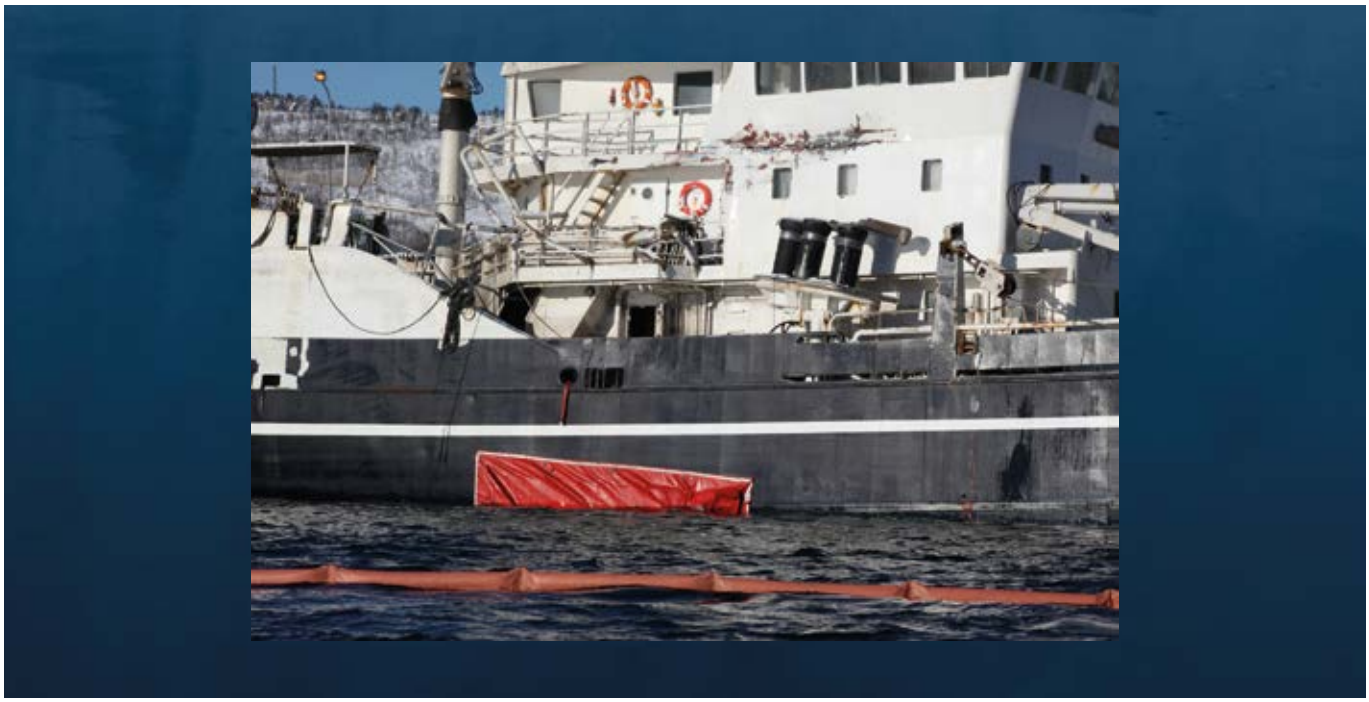
SALVAGE KIT

Used world-wide for salvage operations, the Salvage Kit is a proven concept for the temporary and quick repair of damage from groundings or collisions.



The FlexiShape Miko Plaster® included in the kit, is designed to overcome uneven steel surfaces, sharp edges and large areas of damage to the hull.

The aramid-reinforced patches are fixed to the hull using the self drilling screws supplied in the MikoFix®. Once the patch is installed, the vessel can be towed to safety while retaining oil on the inside and water on the outside.

Contents

1 pcs	500 × 1 000 mm FlexiShape Miko Plaster®
1 pcs	500 × 2 000 mm FlexiShape Miko Plaster®
1 pcs	1 000 × 3 000 mm FlexiShape Miko Plaster®
1 pcs	2 000 × 6 000 mm FlexiShape Miko Plaster®
1 pcs	6 000 × 8 000 mm FlexiShape Miko Plaster®
60 m	Aluminium Profiles
20 pcs	MAM-001 Miko Anchor Magnets
50 pcs	MPM-002 Miko Permanent Magnets
2 pcs	MHT-002 Miko Handling Tool for MPM-002
2 pcs	MikoFix® underwater drill system
100 pcs	Self drilling screws for MikoFix®
10 pcs	MHT-001 Handling Ropes

GROSS WEIGHT
550 KG (INCL. EURO PALLET)

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INSTALLATION PRINCIPLE

The FlexiShape Miko Plaster® is lowered into the water and positioned over the damaged area by divers. The MPM-002 Miko Permanent Magnets are used to hold it in position. The MikoFix® Underwater Drill System is used to screw the self drilling screws through the aluminium bars to secure the patch in place.

Once the patch is secured, and covers all of the damaged area, the water or oil can be pumped out from the inside. The FlexiShape Miko Plaster® is reinforced with several layers of aramid fabric –similar to the material used in bulletproof vests- to protect it from puncturing. When fastened, the plaster will follow the curvature of the hull without being damaged, and will enable the vessel to be re-floated and towed to safety.

A custom-sized patch can be supplied upon request. Miko Plaster® is locally manufactured in Norway and standard sizes can be delivered on site at short notice for urgent situations.

Grounded vessel

FlexiShape Miko Plaster®

View from inside

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YACHT SALVAGE KIT

Developed in association with Captain Nick Sloane, salvage master and member of the Lloyds Panel of Special Casualty Representatives, the Yacht Salvage Kit enables fast repair of hull damages from groundings or collisions on all hull types.

Collisions, groundings, explosions and valve failures all have the potential of uncontrolled water ingress. Miko Marine has developed a kit to keep your vessel afloat and prevent it from sinking.

The right patch is selected from the kit and rapidly deployed over the damaged area. Particularly intended for use on super yachts and smaller vessels. The kit contains Miko Marine's well proven and patented Miko Plaster® technology for keeping water on the outside and oil on the inside.

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Grounded vessel


FlexiShape Miko Plaster

The kit contains three FlexiShape Miko Plasters® of different sizes, used for larger damages following groundings or collisions on all hull types. The Plaster is lowered into the water and positioned over the damaged area by divers. The MikoFix® is applied to fix the self drilling screws trough the aluminium bars and secure the plaster in place.

The Magnetic Miko Plaster® is used for leaks, cracks, sealing off pipe inlets, sea chest cover etc. With a weight in water of 6,2 kg, the Miko Plaster® can easily be handled by one diver. The patch is applied directly over the leak and can simply be re-positioned if necessary. The seal is achieved by the water pressure coupled with the magnetic adhesion between the patch and steel surface. The MPM-002 Miko Permanent Magnets are placed on top of the patch to increase the seal and resistance to peeling that might be caused by towing or current speed.

Also included in the kit, is the MikoFix®. This is a compact and cordless underwater fastening system which is used to fasten and secure the patches to the hull (see: www.mikomarine.com/products/miko-fix/).

The content is well protected in three IP54-rated plastic containers.


View from inside


Vessel towed to safety

Case	Qty	Content	Weight	Dimension
1	1 pcs 1 pcs 12 pcs	1.0m x 6.0m FlexiShape Miko Plaster 1.0m x 3,0m FlexiShape Miko Plaster Aluminium flat bars (1.2m length each)	63 kg	1360×755×560 mm
2	1 pcs 1 pcs 12 pcs	0.9 × 1.25m Magnetic Miko Plaster 2.0m x 2,0m FlexiShape Miko Plaster Aluminium flat bars (1.2m length each)	64 kg	1360×755×560 mm
3	1 pcs 4 pcs 10 pcs 2 pcs 8 pcs	Complete MikoFix® kit, with self drilling screws MAM-001 Miko Anchor Magnet MPM-002 Miko Permanent Magnet MHT-002 Handling tool Handling ropes	65 kg	830×570×560 mm

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FLEXISHAPE MIKO PLASTER

The FlexiShape Miko Plaster® is intended for temporary and quick repair of hull damages from groundings or collisions. The MikoFix® fastening system and the corresponding self drilling screws allow for a full seal on all hull types.

The outer layer is a polyester-reinforced PVC matting, providing strength and durablility to the outside of the plaster. The inner layer is made of an aramid fabric, similar to the material used in bulletproof vests. This protects the patch from sharp edges on the damaged hull. The material is flexible to follow hull curvatures. The rubber strips along the edges help improve the seal when pressed against the hull surface by the self drilling screws in the MikoFix®.

The patches are produced in Norway and standard sizes can be delivered quickly to site in urgent situations. Standard sizes are available in the Salvage Kit together with supplementary tools for installation.

Customized patches are supplied in any shape and size.

CHARACTERISTICS

WEIGHT IN AIR
APPROXIMATELY 3,0 KG/M2

WEIGHT IN WATER
APPROXIMATELY NEUTRAL

MAX. TEMPERATURE
120 °C

STRETCH STRENGTH
8 500 N/5 CM

SHEAR STRENGTH
1 500 N (DIN 53356)

WELDING STRENGTH
1 500 N (DIN 53363)

Miko Marine AS Vollsveien 4b N-1366 Lysaker Norway
Website: mikomarine.com E-mail: info@mikomarine.com Telephone: +47 46 90 50 00

MIKOFIX

MikoFix® is a battery-powered fastening system for underwater drilling and fastening. The compact and versatile system can be used for a large variety of underwater tasks, including operations where hydraulics or pneumatics are normally required.

"MikoFix® is a safer, cheaper and more efficient alternative to underwater welding"

Professional Diver & Marina Owner
Ketil Svelland

Miko Marine AS Vollsveien 4b N-1366 Lysaker Norway
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USAGE

The intuitive system is easily positioned and secured to the drilling surface by the magnet. The drilling position can be adjusted accurately by rotating the drill around the center rod. The spring loaded screw holder ensures that the screw is secured in a perpendicular position during drilling.

When the drill is positioned as desired, pull the handle to feed, and press the On/Off trigger switch to start drilling. Use the magnet lever to release and reposition.
See the MikoFix® in use: http://www.mikomarine.com/products/miko-fix/

Content of Miko Fix®

The Miko Fix is supplied in an IP54-rated storage and transportation case.

1 pcs	Cordless electric drill
1 pcs	Stainless steel drill stand
1 pcs	MAM-003S Miko Anchor Magnet
2 pcs	Screw Holder
100 pcs	Self drilling screws
1 pcs	Spare Battery
1 pcs	Spare Chuck
1 pcs	Pump to pressurize the drill
1 pcs	Battery Charger
1 pcs	User Manual

CHARACTERISTICS

MAX WATER DEPTH
50 M

CHUCK SIZE
13 MM

MAX. STEEL THICKNESS
22 MM

MAX. TORQUE
38 NM

BATTERY
18V 3AH

HOLDING FORCE
500 KG

FOOTPRINT (MAGNET)
155 X 115 MM

SUBMERGED WEIGHT
6 KG

NET WEIGHT
MAGNET: 3 KG
DRILL & JIG: 5.5 KG

GROSS WEIGHT
MAGNET: 10 KG
DRILL & JIG: 10 KG

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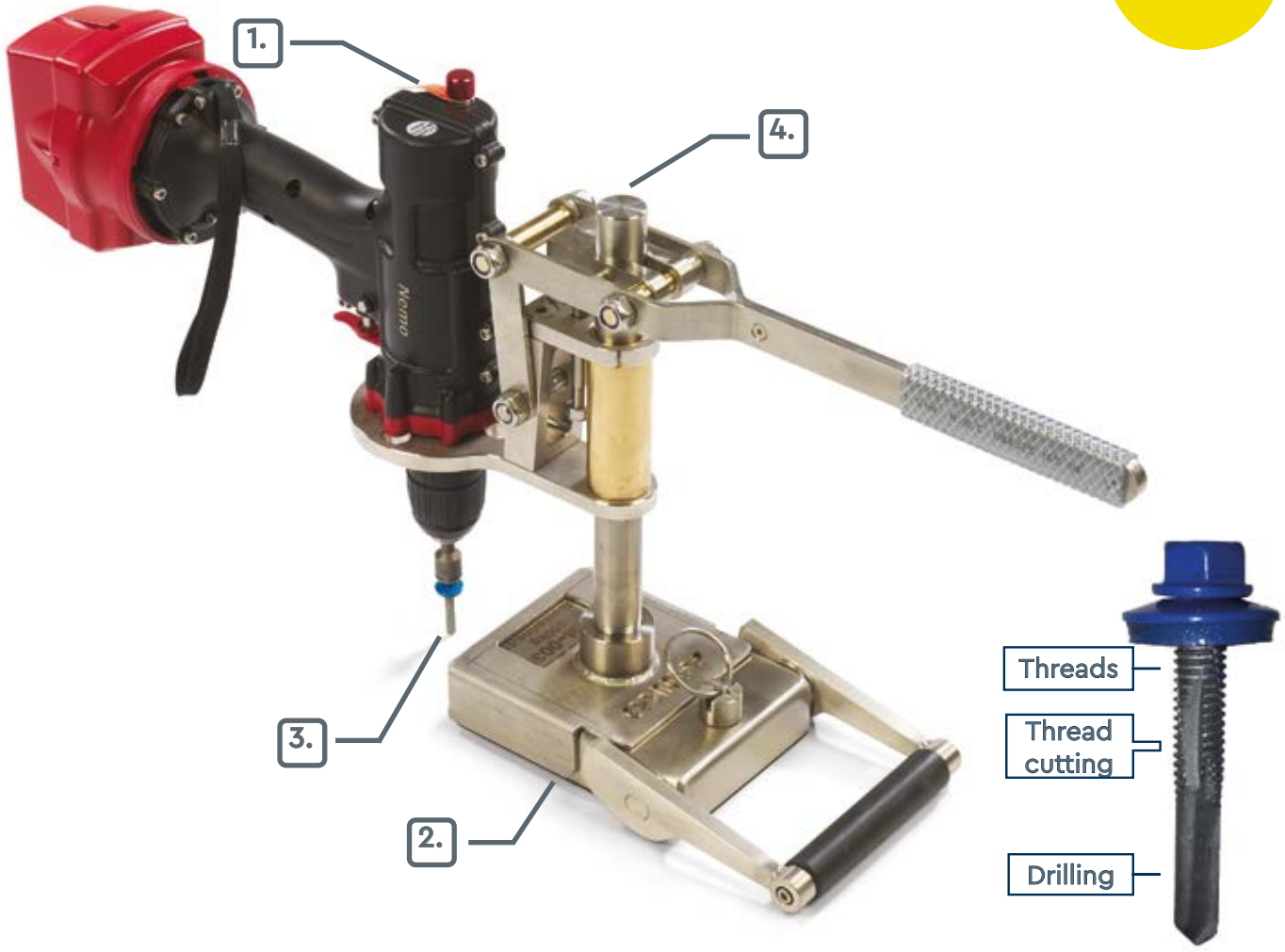

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Marine Salvage Tools

MOSKITO

OIL REMOVAL FROM SUNKEN SHIPS

In a safe, field proven, cost effective and predictable way

- LIGHTWEIGHT AND VERSATILE
- ROV OR DIVER ASSISTED
- 3 000 M DEPTH RAITING
- MAGNETIC ATTACHMENT
- ELECTRICALLY DRIVEN
- PRECISE AND ACCURATE

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The patented Moskito is a compact and versatile tool for oil removal from sunken or otherwise damaged vessels. It is based on an electromagnetic tripod, which enables it to attach to flat or curved surfaces without any hot work or penetration of the hull plate.

Moskito Unit

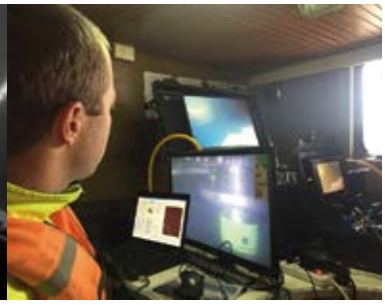
The Moskito is an electric, remotely operated hot tap tool developed for recovering hydrocarbons from sunken vessels. Using patented technology, three steps are combined in one machine and performed as one continuous and uninterrupted operation. This involves securing the machine to hull, drilling drain holes for inlet and outlet, and fastening valve and hose connection.

The entire process is performed and monitored from a surface laptop. ROV's or divers are only used to position the tool on the wreck, open and close the valve and connect hoses if required. The Moskito is secured to the hull using three powerful electromagnets. The tripod legs are controlled individually with high precision, allowing the operator to align the machine accurately on curved or uneven surfaces.

The light-weight umbilical is suitable for medium water depth, without the need for any tether management system. For greater depths, the Moskito can be run directly via the ROV.

Drill Unit

The Drill Unit is at the heart of the machine. The operator controls rotational speed and feed speed during the drilling process. The special drill bit design latches onto the shell plating immediately after penetration. When the Moskito is released from the hull, the Drill Unit remains firmly in place. The drill bit can be opened and closed by a valve and an ROV hose connection. Once the hose is connected to the Drill Unit, the valve can be opened and the oil is pumped to the surface.



MOSKITO CHARACTERISTICS

WEIGHT IN AIR
115 KG

L X W X H (WITHOUT CAGE)
830 X 600 X 500 MM

POWER REQUIREMENT
230 V AC
600 WATT

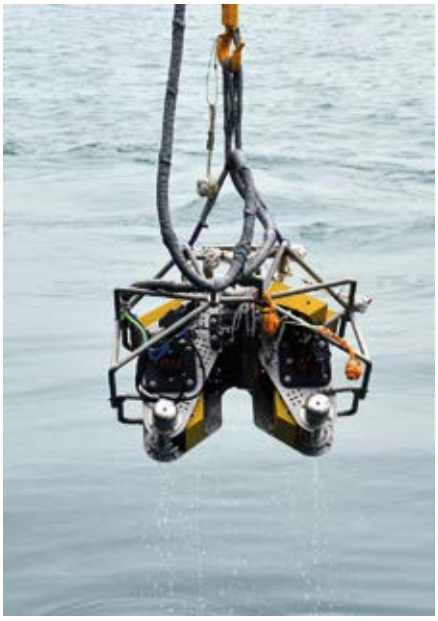
DRAIN HOLE DIAMETER
4 INCH

WEIGHT IN WATER
0 – 50 KG

DEPTH RATING
3 000 M

TYPICAL DRILLING FEED SPEED
0.5 MM/MIN

STEEL THICKNESS
UP TO 25 MM



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Pump Unit

Heavy oils, deep water, low temperatures and highly viscous fluids impose extreme demands on the pumping system. Miko's heavy-duty pumping spread utilizes a positive displacement pump submerged onto the wreck as close as possible to the tapping location. The pump can lift fluids of any viscosity, ranging from diesel to heavy fuel or crude oils.

The suction hose is equipped with a coupling that is stabbed onto the Drill Unit. The automatic latching system, along with the robust and simple release mechanism, makes the connection and disconnection an easy task for both divers and ROV.

The pump is run by an electric motor which is controlled through a frequency converter on the surface. The control panel gives direct feedback of the power consumption at any given moment. This enables the crew to maximise the pumping speed to the conditions at hand while the power consumption indicates whether the pump is lifting seawater or oil. The amount of water pumped is thereby kept to a minimum

The oil is pumped into a tank chosen specifically for the task, such as ISO tanks on deck, or the surface vessel's internal tanks. At extreme depths, submerged tanks may be considered.

Qualifications and references

The Moskito is developed with financial support from the Norwegian Coastal Administration and has successfully been used in oil removal operations in Chile, the Singapore Strait and off the Swedish coastline.

PUMP CHARACTERISTICS

WEIGHT IN AIR
330 KG

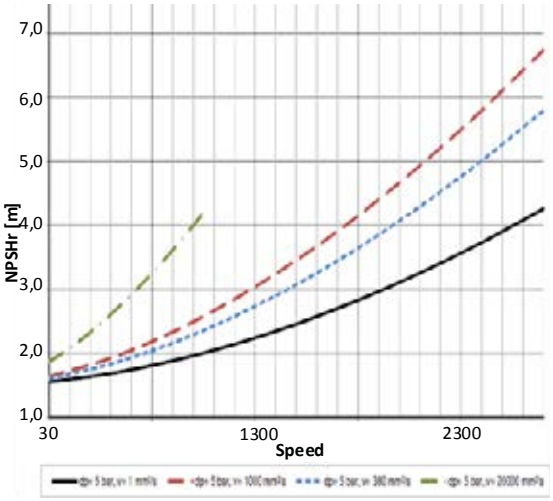
L X W X H
1350 X 800 X 800 MM

POWER REQUIREMENT
17.5 KW

WEIGHT IN WATER
0 KG

DEPTH RATING
300 M

MAX. FLOW
50 M3/H



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SHIP ARRESTOR

The ShipArrestor is a unique system for gaining control of a drifting vessel and is brought to the casualty with the speed of a helicopter.

It consists primarily of a Lasso, a Towline and a large Para Sea Anchor (PSA). The Lasso is deployed over the windlass of the casualty by the helicopter to establish the connection. The PSA is then dropped into the water, turning the bow up against the wind and significantly reducing roll motion and drift speed. The Towline connects the PSA to the Lasso and to the casualty.

The ShipArrestor also provides an established towline for the first arriving tug. The pick-up system allows the tug crew to retrieve the ShipArrestor directly from the water and use it to tow the casualty to safety.

Independent of crew aboard the casualty, the ShipArrestor can be used even if the ship is abandoned.
Once the connection is made, the system is fully autonomous.

The ShipArrestor concept has been developed by a consortium of European companies led by Miko Marine and funded by the European Union. It is manufactured by Coppins Sea Anchors Ltd, which is a world-leading producer and developer of sea anchor systems.

Miko Marine is now a proud supplier of two ShipArrestor units to the Norwegian Coastal Administration.

PARA SEA ANCHORS
COPPINS
Oceans Ahead in Safety
Innovation Design & Control

Miko Marine AS Vollsveien 4b N-1366 Lysaker Norway
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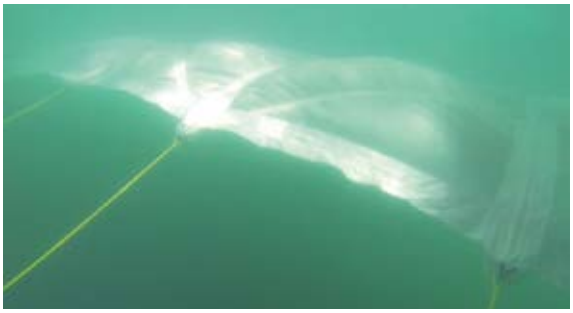
MIKO MARINE

During helicopter transport, the ShipArrestor is carried in two connected packages; a Connector and a Deployment Bag.
The Connector consists of a light-weight chain carried inside a pressurized hose (the Lasso) and a second chain (the Forerunner), which is attached to the outside of the hose. The Lasso is lowered around the windlass or similar strong-point on the deck of the vessel. The Forerunner is designed to pass over the gunwale of the vessel without being damaged by chafing.
The Deployment Bag is an aerodynamic container for the Towline, Para Sea Anchor and Pickup System, and is suspended above the connector.
When the Deployment Bag hits the water, the Para Sea Anchor will open and turn the bow of the vessel up into the wind. This will reduce the drift rate by up to 50% and almost eliminate any rolling motion.

As a result, valuable time is created for a tug to arrive before the casualty hits the shore, while the wave-induced stresses on the structure are significantly reduced. When the tug arrives, the crew can use the Pickup System to retrieve the line from the water and use the ShipArrestor to tow the casualty to safety.



CHARACTERISTICS

TOTAL WEIGHT
APPROX. 1 000 KG

MAX FLYING SPEED
80 KTS

MIN. BREAK LOAD
100 TONNES

LASSO Ø
6 M

PSA Ø
27 M (IN DEPLOYED)

LENGTH OF TOWLINE
200 M

REDUCTION OF DRIFT SPEED
UP TO 50 %

LENGTH OF FORERUNNER
20 M

LENGTH OF PICKUP LINE
150 M

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PIPE SEALER KIT

The Miko Pipe Sealer Kit is a light and rapidly deployed tool for stopping high-pressure leakages in pipes.

Consisting of four differently dimensioned rubber ratchet straps, the Miko Pipe Sealer Kit is able to cover and seal a wide range of pipe dimensions.

The kit is quick and easy to operate:
- Fit the strap loosely around the pipe next to the leak.
- Pull it sideways so that the rubber patch covers the leak.
- Tighten the ratchet until the leak stops.

The Pipe Sealer Kit, combined with the Tank Sealer Kit, institutes a comprehensive preparedness for oil spill prevention at any tank farm or processing plant.

Contents

1 pcs	50 mm strap, 8 mm rubber thickness, 2.0 m length
1 pcs	50 mm strap, 3 mm rubber thickness, 2.0 m length
1 pcs	35 mm strap, 3 mm rubber thickness, 1.5 m length
1 pcs	25 mm strap, 3 mm rubber thickness, 1.0 m length

PIPE DIA. CAPACITY
2" – 20"

GROSS WEIGHT
5.5 KG

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TANK SEALER KIT

The Tank Sealer Kit is a quick, easy and flexible first barrier against leakages on storage tanks.

The two sizes of Miko Plaster® included in the kit are fitted with a neoprene sheet in the centre and magnetic nitrile rubber along the edges. The magnetic rubber will adhere to the steel surface of the tank while the soft neoprene centre will seal against the damage.
External anchor magnets (MAM-003 and MAM-Light) are applied to the outside of the neoprene centre to compress the patch against the damaged area and limit the leakage.

The equipment can be used both above and below the waterline.

Contents

1 pcs	750 × 750 mm Neprene Miko Plaster®
1 pcs	750 × 1050 mm Neoprene Miko Plaster®
2 pcs	MAM-003 Miko Anchor Magnets
4 pcs	MAM-Light Miko Anchor Magnets
1 pcs	IP54-rated storage and transport case

GROSS WEIGHT
56 KG

CASE DIMENSIONS
785 X 525 X 450 MM

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INSTALLATION PRINCIPLE

The Neoprene Miko Plaster® is applied to the damaged area, while directing the spray away from the user. One MAM-003 Miko Anchor Magnet is placed on the centre of the patch to strangle the leak. The magnet may have to be re-positioned to reduce the leak further.

The kit includes two MAM-003 as well as four MAM-Light that are used as needed to achieve a best possible seal.

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MAM-00X

MAM-00X is the strongest Miko Anchor Magnet with a holding force of 2 000 kg*. Applications might include the temporary fastening of oil booms, large fenders or mooring lines to ship sides and other steel structures.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications.

The magnetic component consists of neodymium which is coated with epoxy to improve its corrosion resistance in sea water.
The magnet is equipped with a breaking lever for easy release and safe operation.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight. MAM-00X is also shipped with a keeper disk for further shielding.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
2000 KG*

FOOTPRINT
319 X 180 MM

NET WEIGHT
18 KG

GROSS WEIGHT (BOX)
31 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

Miko Marine AS Vollsveien 4b N-1366 Lysaker Norway
Website: mikomarine.com E-mail: info@mikomarine.com Telephone: +47 46 90 50 00

MAM-001

MAM-001 has a holding force of 150 kg* and can be used to fasten equipment such as Miko Plasters®, diving equipment, guide wires or anchor points for divers to ship sides or other steel structures.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications.The magnetic component consists of neodymium which is coated with epoxy to improve its corrosion resistance in sea water. The magnet is equipped with a mooring lug and breaking lever for easy release and safe operation. The bottom is fitted with a rubber filling for increased friction and improved usability.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight.

MAM-001 is also available in a watertight plastic case with built-in magnetic shielding.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

Case is optional

SPECIFICATIONS

HOLDING FORCE
150 KG*

FOOTPRINT
155 X 115 MM

NET WEIGHT
3 KG

GROSS WEIGHT (BOX)
7 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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MAM-003

MAM-003 has a holding force of 450 kg* and can be used to fasten large devices such as oil booms or any type of heavy diving equipment to ship sides and other steel structures.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications.

The magnetic component consists of Neodymium which is coated with epoxy to improve its corrosion resistance in sea water. The magnet is equipped with a mooring lug and breaking lever for easy release and safe operation. The bottom is fitted with a rubber filling for increased friction and improved usability.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight.

MAM-003 is also available in a watertight plastic case with built-in magnetic shielding.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

Case is optional

SPECIFICATIONS

HOLDING FORCE
450 KG*

FOOTPRINT
155 X 115 MM

NET WEIGHT
3 KG

GROSS WEIGHT (BOX)
7 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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MAM-003S

MAM-003S has a holding force of 500 kg* and the magnetic component is encapsulated in a stainless steel housing to further improve its corrosion resistance and durability for longer periods of sea water exposure.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications. The MAM-003S can be used to fasten and secure tools and equipment to ship sides, and other steel structures. On account of the stainless steel housing, the magnet is also able to stay fastened for longer periods of time. The MAM-003S is equipped with a mooring lug and breaking lever for easy release and safe operation. The bottom is fitted with a rubber filling for increased friction and improved usability.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight.

MAM-003S is also available in a watertight plastic case with built-in magnetic shielding.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

Case is optional

SPECIFICATIONS

AHOLDING FORCE
500 KG*

FOOTPRINT
155 X 115 MM

NET WEIGHT
4 KG

GROSS WEIGHT (BOX)
7 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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MMC-001/003

The Miko Magnet Case 001/003 is a robust and watertight container for safe handling of Miko Anchor Magnet models MAM-001, MAM-003 and MAM-003S.

The Miko Anchor Magnets are made specifically to be used in harsh environments, and in a wide variety of operations. For this reason Miko provides the MMC-001/003 for safe storage and easy handling. With an IP67 ingress protection rating, the case provides complete protection against dust and can be immersed in water for short periods. The interior is fitted with several layers of shock absorption material, allowing for rough handling, while still keeping the magnet protected.

In addition, the case has built-in insulation of the magnetic field, clearing it for air freight without a dangerous goods declaration.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

INGRESS PROTECTION RATING
IP 67

DIMENSIONS (L, B, H)
33 X 29 X 22 CM

WEIGHT (EMPTY)
6 KG

WEIGHT (WITH MAGNET)
10 KG

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MAM-005

MAM-005 has a holding force of 1 000 kg* and can be used for heavy duty applications such as fastening oil booms, fenders or temporary mooring to ship sides and other steel structures.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications.
The magnetic component consists of neodymium which is coated with epoxy to improve its corrosion resistance in sea water.
The magnet is equipped with a breaking lever for easy release and safe operation.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight. MAM-005 is also shipped with a keeper disk for further shielding.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
1000 KG*

FOOTPRINT
282 X 183 MM

NET WEIGHT
8 KG

GROSS WEIGHT (BOX)
21 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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MAM-LIGHT

MAM-Light is the most compact Miko Anchor Magnet, yet it has a holding force equivalent to the weight of an adult man. Thanks to its handy size and minimal weight, this magnet is easily handled by divers in any situation.

The Miko Anchor Magnets form a series of powerful and robust underwater fixing points. With holding forces ranging from 90 kg to 2 000 kg, these magnets are used worldwide for a wide range of applications. The magnetic component consists of neodymium which is coated with epoxy to improve its corrosion resistance in sea water. The magnet is equipped with a breaking lever for easy release and safe operation.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
90 KG*

FOOTPRINT
150 X 50 MM

NET WEIGHT
1 KG

GROSS WEIGHT (BOX)
4 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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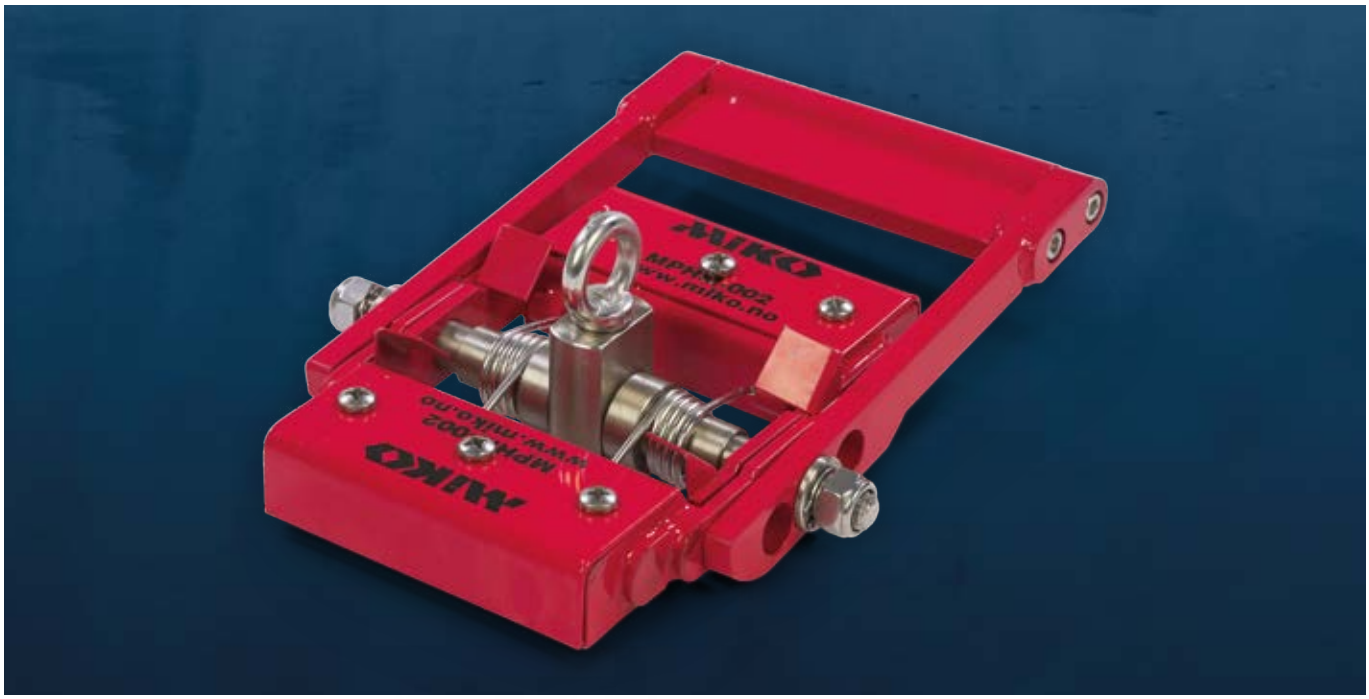
MPHM-002

The Miko Pipe-Holding Magnet is a strong and versatile tool, designed to attach to pipes with a diameter ranging from 8" to 42".



The magnetic component consists of neodymium which is coated with epoxy to improve its corrosion resistance in sea water.
With a holding force of 150 kg*, the magnet can be used for fastening diving equipment, guide wires or anchor points for divers to pipes or other cylindrical steel structures.

The magnet is equipped with a mooring lug and breaking lever for easy release and safe operation.

All Miko magnets are shipped in a double-skin steel box to isolate the magnetic field and to prepare them for air freight.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
150 KG*

FOOTPRINT (FLAT)
188 X 120 MM

PIPE DIAMETER CAPACITY
8" – 42"

NET WEIGHT
5 KG

GROSS WEIGHT (BOX)
12 KG

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel pipe of minimum wall thickness 10 mm.

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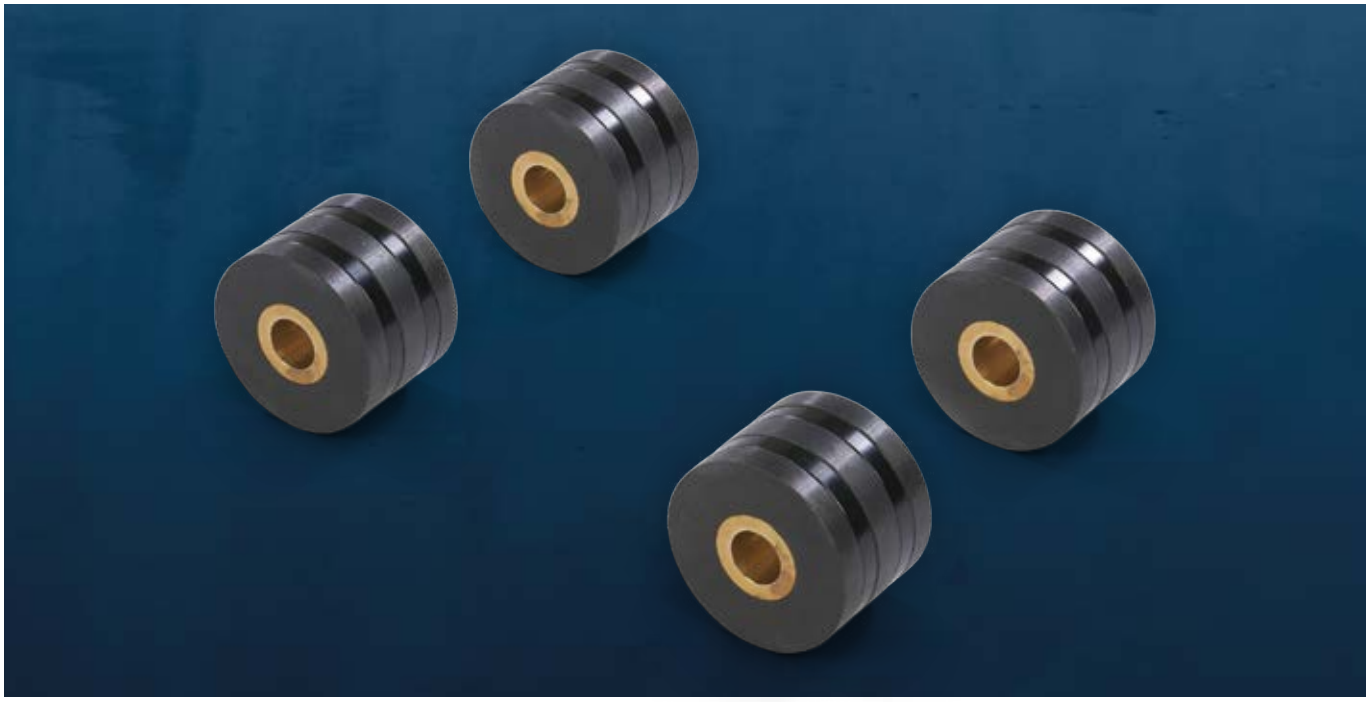
MMW-001

The Miko Magnetic Wheel is a powerful magnet to be used on vessels and structures above and below the waterline. The hollow cylinder allows for a shaft to be fastened in the centre.



The magnetic component consists of neodymium and is coated with epoxy to improve its corrosion resistance in sea water.
All Miko magnets are shipped in a double-skin steel box to shield off the magnetic field and prepare it for air freight.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
80 KG*

OUTER Ø
54 MM

INNER Ø
15 MM

LENGTH
39 MM

GROSS WEIGHT (BOX)
7 KG

QUANTITY IN BOX
4 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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MPM SERIES

These compact and powerful Miko Permanent Magnets are used for a wide range of underwater applications.

The MPM-series magnets are made up of Neodymium, giving them each a 60kg holding force. In addition, the magnets are epoxy-coated for corrosion resistance in sea water. Each individual magnet is packed in a custom storage and handling case with a pin-lock mechanism, allowing for safe and practical handling. Each type is delivered in boxes of 10 pcs, packed in a double-skin container to isolate the magnetic field and prepare the magnets for air freight.

Read "IMPORTANT NOTES ABOUT MIKO MAGNETS" enclosed in each box before use.

SPECIFICATIONS

HOLDING FORCE
60 KG*

FOOTPRINT
40 X 50 MM

NET WEIGHT
0.3 KG

GROSS WEIGHT (BOX)
7 KG

HEIGHT
20 MM

QUANTITY IN BOX
10 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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ROV MAGNET

The switchable Miko ROV magnet has a fully mechanical on/off function and a holding force of 750 kg when activated.

By virtue of the modular design, the magnet can be tailored to any application. The handles can be replaced to fit all common types of manipulator claws, while the bracket can be replaced by job-specific equipment, such as a camera or a torch. The magnet is deactivated by pushing the handles together – and activated when the ROV releases its grip. This allows for the gentle handling of painted subsea installations, fragile wrecks and other underwater steel structures. The stainless steel housing, combined with a high quality pressure compensator, provides corrosion resistance and full ocean depth rating.

Typical areas of usage are:
- Stabilizing ROVs (welding inspections etc.)
- Temporary storage of ROV tools
- Fixing points for lights and/or cameras

Miko offers fast delivery time on custom solutions (standardized interface).The magnet is shipped in a pelicase suitable for air freight.

SPECIFICATIONS

HOLDING FORCE
750 KG*

FOOTPRINT
200 X 312 MM

WEIGHT IN AIR
24 KG

WEIGHT IN WATER
19 KG

DEPTH RATING
FULL OCEAN DEPTH

QUANTITY IN BOX
1 PCS

*Refers to the perpendicular holding force when applied directly onto a clean mild steel plate of minimum thickness 30 mm.

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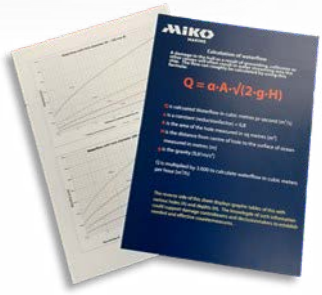
MiKO MARINE

Miko Salvage Bag ®

Miko Salvage Bag® is a complete damage control kit developed to counter water ingress from damaged hull, deck, bulkheads,openings and pipelines. The kit consists of heavy duty polyester coated para-aramide inflatable bags in various sizes for different situations.

The Miko Salvage Bag® is tested in several Damage Repair Instructional Units and on board vessels with approving results. The contents in the Miko Salvage Bag® and their usability is the result of dialogue with expert user groups from several nations throughout the development process. The seal is achieved by the ability of the bags to form in relation to the damaged structure during pressurization.



The Miko Salvage Bag® is a ready-to-go kit for damage control parties.

The Miko Salvage Bag® is a 100% Miko Marine product.

CHARACTERISTICS

Bag measures (L x W x H):
90 x 35 x 24 cm

Weight
19 kg

Contents

1pc Storage and Carrying Bag with shoulder straps

6 Salvage Bags: 1pc 7cm diameter w/pointed tip, 1pc 12cm w/pointed tip, 2pcs 18cm w/pointed tip, 2pcs 18cm square. All bags w/valve, hook, frictionstrip and marker-light

1pc 3L/300bar air bottle in harness w/ regulator, overpressure valve and adapter
1pc Carrying handle w/carabine hooks
1 set jackstay w/ hook for bulkhead or deckhead mounting of kit during operation
12pcs stiffening rods
1pc telescopic pole
1sheet with formula and Diagram for calculation of water ingress

CONTACT

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Miko Hatch Sealer Bag

Miko Hatch Sealer Bag (MHSB) has been designed as a tool for rapid and effective sealing of hatches, trunks and manholes that are damaged or left open with or without hoses and cables running through the opening.

The MHSB is a versatile, flexible special reinforced reinflatable plastic coated bag, with double para-aramid layers covering the inner air lung. The MHSB has proven to be effective in many different situations onboard and on land, when there are urgent needs for sealing of large openings.

The Miko Hatch Sealer Bag is equipped with friction band on both side, two handles at the top, turnable air valve and pressure reliefe valve. The bag is also equipped with a watertight ligth to ensure the location of the bag in poor visibility or fully submerged

The bag will during inflation form a cylindrical shape adapted to obstructions. The sealing effect starts and increases when compressing air is supplied. Full effect is to be expected when the pressure is approximately 0,2-0,4 bar. The pressure relief (safety) valve will open at 1.0 bar.

The bag can be operated with the air supply system in the Miko Salvage Bag or by other sources of air supply i.e. standard SCBA cylinders, when Miko air supply hose and regulator is connected.

CHARACTERISTICS

Bag measures (D x L)
ø65 x 100cm

CONTACT

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Miko Pipeline Sealing Bag

Miko Pipeline Sealing Bag (MPSB) are ø4 cm and ø7 cm bags, that has been designed for rapid and effective sealing of broken pipelines, open pipeline outlets/inlets or small holes/ruptures, that have to be sealed off quickly

The MPSB's are flexible special reinforced reinflatable plastic coated para-aramide leakstop-bags, equipped with friction band, turnable air valve and a waterthight light.

The bags will during inflation form a cylindrical shape adapted to obstructions. Sealing effect is to be expected within seconds - when the internal pressure is approximately 0,5-0,7 bar.

The bag can be operated with the air supply system in the Miko Salvage Bag or with other air standard cylinders, if a Miko air supply hose and regulator is used.

CHARACTERISTICS

Bag measures (D x L)
ø4

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