

# PRODUCT CATALOGUE

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## OUR GLOBAL MARITIME PARTNER

Marichem Marigases is one of the leading companies in the international marine chemicals and gases industry, manufacturing and providing high quality marine chemicals, coatings, chemical equipment, gases and refrigerants, cutting and welding machinery, accessories and equipment, fire-rescue and safety services to the shipping industry. We offer a variety of products at more than 2,100 ports, supplied by a distribution network of 196 stock points, 24 hours a day, 7 days a week, 365 days a year. The efficient operation of our network is backed up by decades of experience from dedicated marine experts, operating according to ISO 14001 & ISO 45001 international quality systems, thus ensuring Marichem Marigases' commitment to the environmental responsibility, quality management, product efficiency, high - standard services and safety to the customers.

## TECHNICAL SUPPORT

The company also sustains a big network of service engineers, who offer the essential technical support in all major ports and elsewhere worldwide.

This particular service is crucial for the proper monitoring of the boiler water & cooling water treatment programs of the vessels, thus recently has developed a sophisticated electronic system, "Optimum", through which, chemical test results can be sent directly from the vessels to the central servers of the company.

## PEOPLE-CENTERED PHILOSOPHY

Since its start-up of operations, Marichem Marigases has steadily and faithfully observed a people-centered philosophy, with consistency, work ethic and respect towards the vessel, her crew, her operator and the environment being at the forefront. At the same time, Marichem Marigases is famous for its prompt and efficient services, which are considered to be one of our assets. The corporate philosophy is purely customer-centered, as we exist both thanks to and for the customer.

At Marichem Marigases, we believe it is a daily challenge and our mission to respond to the current needs of the international fleet and to be able to foresee its future requirements, through a strategy that focuses on the impeccable business operation of the group, which has led the company to evolve to a main player on the world stage of the global market.

## ENVIRONMENTAL CONSCIOUSNESS

The Worldwide Services of the company have been at the forefront of promoting environmental consciousness within the chemical industry, throughout all stages of production, starting from the raw materials, the manufacturing process of the products and their handling, through to the final disposal on board the vessel.

We continuously strive to meet the marine industry needs, whilst we decrease our environmental footprint.



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## CHEMICALS & CHEMICAL EQUIPMENT

We manufacture and supply high quality chemicals in accordance with ISO 9001, 14001 & 45001 international standards. Our wide range of non-hazardous for the marine environment products are available at more than 2,100 ports worldwide, 7 days a week, 24 hours a day. We are in continuous search of new, readily biodegradable raw materials and advanced technological methods, through which we can produce safe, naturally biodegradable products in compliance with the latest maritime and environmental regulations. Our unique products and services provide optimum performance, prompt, efficient and reliable results, making Marichem Marigases your ideal partner for successful shipping.

-  Boiler Water Treatment
-  Cooling Water Treatment
-  Evaporator Treatment
-  Fuel Oil Treatment
-  Tank Cleaners
-  Cargo Hold Cleaners
-  Bioactive Products
-  Maintenance Products
-  Coatings
-  Chemical Equipment
-  Dosing Systems
-  Boiler and Cooling Water Test Kits
-  Oil Test Kits & Sampling Equipment
-  Pollution Control Equipment



## CLEANING SYSTEMS

We offer a great variety of cleaning systems, designed to perform all kinds of cleaning tasks. Multi -purpose high pressure cleaning machines, cargo hold cleaning systems, portable ultrasonic cleaning units, airless paint sprayers, sand blasting sets and submersible pumps, along with their accompanying accessories are available for our customers to choose from, according to their fleet's needs. Our experienced technicians are on standby to assist with questions or troubleshooting at any given time. Maintenance inspections and repair of machines can also be provided upon customer request.

- High Pressure Cleaning Machines
- Cargo Hold Cleaning Systems
- Portable Ultrasonic Cleaning Units
- Airless Paint Sprayer Series
- Sand Blasting Set
- Submersible Pumps & Accessories



## GASES & REFRIGERANTS

We are one of the world's leading firms in marine gases, refrigerants, cutting and welding equipment, regulators and accessories, with one of the highest numbers of cylinders in circulation. Prompt deliveries onboard, timely stock replenishments and accurate cylinder stock management constitute only few of our assets. We put huge emphasis on cooperating with approved suppliers and refillers, in order to ensure our customers that both our cylinders and their content are in line with the internationally imposed maritime regulations. All cylinders are inspected by specialised professionals to verify they are properly maintained and remain in good working condition for safe exchanges and use onboard vessels.

- ◆ Gases and gas mixtures
- ◆ Gas welding machinery
- ◆ Gas welding and cutting equipment
- ◆ Gas welding and brazing consumables
- ◆ Refrigerants
- ◆ Refrigerant Recovery Systems
- ◆ Arc welding machinery
- ◆ Accessories for electric arc welding
- ◆ Arc welding electrodes
- ◆ Central gas distribution systems



### FIRE, RESCUE & SAFETY

Our F.R.S. Services are available at more than 1,500 ports around the globe. We offer annual inspections by Classification approved safety inspectors at the most competitive prices in the market and free of charge constant follow-up of the owner's entire fleet certificates. Our primary objective is to achieve ultimate customer satisfaction, through proactive service planning and dedicated technical support. Throughout the years, our experienced staff has engaged to abide by the latest SOLAS requirements, keeping up to date with all new regulations and guidelines, thus ensuring maximum conformity at minimum cost. Our services are approved by Classification Societies such as:

- American Bureau of Shipping
- Bureau Veritas
- Det Norske Veritas
- Germanischer Lloyd
- Lloyd's Register
- Nippon Kaiji Kyokai
- Polish Register
- Registro Italiano Navale
- United States Coast Guard





## SOFTWARE

We have launched a revolutionary software package called OPTIMUM in order to help our customers around the world navigate the optimal use of our various boiler and cooling water treatment products.

OPTIMUM is an easy-to-install and use software that ensures proper control of the water treatment on board. Its purpose is to graphically display and store the measurements inserted by the vessel's crew, while digitally transferring them to our technical centers for instant review and evaluation.

By installing this package on board vessels, our customers have access to immediate troubleshooting in case of non-satisfactory results and they also maintain the ability to keep records of the conducted tests in a digital form.

This way, any arising issues are dealt with rapidly and paper waste is reduced to the minimum.



# Marine Chemicals & Equipment

INNOVATION AND QUALITY



**MARICHEM®**



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
<b>BOILER WATER TREATMENT</b>			
Corrosion, scale deposit formation and sludge	<ul style="list-style-type: none"> <li>▶ B.W.T. NEW FORMULA</li> <li>▶ B.W.T. POWDER</li> </ul>	Low pressure/ auxiliary/exhaust gas system boilers	Protects against water hardness and sludge build up. Removes dissolved Oxygen and is used as an antifoaming agent
Corrosion, scale deposit formation and sludge	▶ OPTITREAT	All types of boilers	One product does it all: a multi-functional complete treatment. It contains condensate-protecting volatile amines
Corrosion in boilers	▶ ALKALINITY CONTROL	For all low pressure boilers	Neutralizes acidic conditions. Provides alkalinity stabilization
Scale deposit formation	▶ PHOSPHATE		Prevents salt corrosion through water hardness control
Oxygen saturation	<ul style="list-style-type: none"> <li>▶ OXYCONTROL</li> <li>▶ MARZINE PLUS</li> <li>▶ OXYBLOCK D</li> </ul>		Binds dissolved Oxygen. Reduces corrosion
Corrosion in feed water and condensate systems	▶ MARICHEM CCI		Neutralizes acidic conditions. Provides alkalinity stabilization. Reducing corrosion
Sludge and oil contamination	▶ BOILER SLUDGE CONDITIONER		Prevents the formation of adhesive compounds. Assists in sludge dispersion until removal
<b>COOLING WATER TREATMENT</b>			
Corrosion, scale and cavities	<ul style="list-style-type: none"> <li>▶ D.C.W.T. NON CHROMATE</li> <li>▶ D.C.W.T. POWDER</li> </ul>	Diesel engine and general cooling systems	Prevents corrosion. Controls the deposit formation and sludge build up
Corrosion and freezing issues in the cooling water systems	▶ ANTIFREEZE		Protects metal and alloys from corrosion
Microorganisms appearance in the cooling water systems	▶ MARICIL		Antifouling treatment for the prevention of growth of bacteria associated with cooling water systems



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
<b>SEA WATER TREATMENT</b>			
Biological fouling	▶ <b>CLOG-CONTROL</b>	Sea water cooling systems	Antifouling treatment for the prevention of marine growth and the termination of bacteria associated with sea water
<b>EVAPORATOR TREATMENT</b>			
Scale foaming and carry over	▶ <b>EVAPORATOR TREATMENT</b>	Fresh Water Generators. Sea Water Evaporators	Eliminates foam and carry-over elimination. Protects against scale forming salts on heat transfer surfaces
<b>FUEL OIL TREATMENT</b>			
Sludge build-up	▶ <b>F.O.T.</b> ▶ <b>F.O.T. NEW GENERATION</b>	Fuel Tanks Combustion Spaces - Diesel, Steam Boilers Diesel, Heavy Metals Elimination	Disperses deposits, sludge and dissolves water emulsions to a homogeneous state for combustion
Incomplete combustion	▶ <b>F.O.T. 10</b> ▶ <b>F.O.T. 10 NEW GENERATION</b>		Fuel quality enrichment while dispersing sludge into a combustible state
Sulfur -Vanadium slag deposits	▶ <b>F.O.T. C-100</b> ▶ <b>F.O.T. C-100 NEW GENERATION</b>		Treatment and reduction of any corrosive heavy metal fuel oil ashes, through improved combustion. Reduces smoke
Lower lubricity, caused from the use of low Sulphur fuel oils, can cause the fuel injection pump of the engine to fail and can increase wear of fuel pumps, valves and injector nozzles over an extended period of use	▶ <b>F.O.T.-LS</b> ▶ <b>F.O.T.-ULS</b>	Ultra Low Sulphur Fuel Oils	Provides superior lubricity properties to the Marine Fuel Oils. Prevents wear on contacting metal surfaces and their fail. Reduces significantly injector deposits. Protects fuels systems against corrosion and will not separate in the fuel tank
Microorganisms contaminating fuel storage tanks and systems	▶ <b>FUEL BIOCONTROL</b>	Additive to fuel storage tanks and fuel lines where microbes can cause contamination	Helps in the extermination of microorganisms and bacteria from the fuel oil

PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Water in oil emulsions	▶ <b>FUELBREAK</b>	Breaks the Water in Oil Emulsion and separates most of the water in settling tank and in the centrifuge. Prevents sludge formation in the tubes, filters blockage and facilitates the removal of metallic elements	Separates the quantities of water in marine fuel by breaking the water in oil emulsions
Wax formation in the fuel oil will degrade the flow characteristics of the fuel and can make it unpumpable	▶ <b>FUELFLOW PPR</b>	Suitable for all distillate fuels	Prevents the formation of wax structures. Fuel remains liquid and easy to handle/pump
Soot build-up	▶ <b>SOOT CLEANER</b> ▶ <b>SOOT CLEANER LIQUID</b>	Exhaust System	Removal of soot and fire scale deposits. Prevents acid scale formation, eliminates corrosion and decreases fuel consumption
<b>TANK CLEANING PRODUCTS</b>			
Fuel oil and crude oils	▶ <b>TANK CLEANER-A</b> ▶ <b>TANK CLEANER-S</b>	Fuel Oil Tanks Cargo Tanks Ballast Tanks	Emulsification of petroleum products residues. Degreasing
Heavy contamination of non-soluble organic compounds	▶ <b>MARICHEM T.T.C.</b>		High quality heavy duty degreasing of petroleum products, fats, oils, minerals and fuel sludge
Inert Gas Soot (IGS) in cargo tanks	▶ <b>IGS MARI-CLEANER</b>	Cargo Tanks	Inert Gas Soot (IGS) removal. Oil cleaning and metal degreasing.
Fatty acids deposits (found in various petroleum products)	▶ <b>TANK SHINE CLEANER</b>	Fuel Oil Tanks Cargo Tanks	Removal of fatty acids stains from epoxy-coated tanks



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
<b>CARGO HOLDS CLEANING PRODUCTS</b>			
Coal and Vegetable & animal oil	<ul style="list-style-type: none"> <li>▶ <b>ALCACLEAN H.D.</b></li> <li>▶ <b>ALCACLEAN XF</b></li> </ul>	Cargo Holds	Removal of vegetable, animal, fish oil and fats. Elimination of bad odors. Removal of coal
Bauxite deposits	▶ <b>BAUXITE REMOVER</b>	Cargo Holds Storage Tanks	Removal of bauxite deposits and stains
Traces of Lead, Aromatic Hydrocarbon, Chloride and Sulfide deposits	▶ <b>BUFFERSOL</b>	Cargo Tanks and Metal Articles	Removal of Lead, Aromatic Hydrocarbon, Chloride and Sulfide deposits from Zinc-Silicate coated tank surfaces. Helps neutralize acidic and alkaline compounds
Cement Deposits	▶ <b>CEMENT REMOVER</b>	Dry Cargo Holds and Decks	Removal of cement deposits and/or dry cement stains
To improve the penetration of water-based cleaners	▶ <b>FOAM PLUS</b>	Additive to all water based cleaners for animal & vegetable oil removal, petcoke cleaning, etc	Prolongs and reinforces the action of water based tank cleaners and degreasers
Lime	▶ <b>LIME CLEANER</b>	Cargo holds	Removal of lime deposits.
Pet coke and coal deposits	▶ <b>MARICHEM P.C.S.</b>	Cargo Holds Storage Tanks	Removal of pet coke, coal and mineral deposits. Elimination of bad odors. Neutralization of acidic conditions
Iron Dust	▶ <b>IRON DUST CLEANER</b>	Cargo holds	Removal of iron dust and iron dust stains
<b>MAINTENANCE PRODUCTS</b>			
Oil deposits	<ul style="list-style-type: none"> <li>▶ <b>ELECTROCLEAN ECO QUICK</b></li> <li>▶ <b>ELECTROCLEAN ENVIRO</b></li> </ul>	Electrical equipment and parts	Cleaning and degreasing of electrical equipment at the desired evaporation rate
Various organic deposits	▶ <b>OIL &amp; GREASE REMOVER</b>	General on-board use	Removal of aromatic mineral oils, grease, fats, soot, asphalt and light carbon stains
Scale and corrosion	<ul style="list-style-type: none"> <li>▶ <b>DESCALER LIQUID 555</b></li> <li>▶ <b>DESCALER POWDER</b></li> </ul>	Boiler, steam generator, evaporator	Removal of rust and heavy deposits of water scale



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Petroleum sludge deposits	▶ <b>PURIFIER DISC CLEANER</b>	Purifier, separator discs	Removal of carbonaceous varnish deposits where lube and fuel accumulates
Oil & organic deposits	▶ <b>ACC NG</b> ▶ <b>AIR COOLER CLEANER</b> ▶ <b>AIR COOLER CLEANER L.T.</b>	Diesel engine air side coolers, turbo-chargers, intercooler filters	Removal of oils, greases, carbon deposits and soot
Carbon deposits	▶ <b>MARICHEM C.R.-LT</b>	Engine pistons, rings, valves, parts exposed to combustion	Removal of carbon and resins
Rust corrosion	▶ <b>RUST REMOVER</b> ▶ <b>RUST SHIELD PHOS</b>	Bulkheads, deck railings and other structural surfaces	Removal and control of rust. Prevention from further oxidation/corrosion
Weld slag, grinding dust, annealing scale. Aluminium cleaning	▶ <b>PICKLING LIQUID</b> ▶ <b>PASSIVATION LIQUID</b>	Tanks, pickling installations, stainless steel	Removal of weld slag, grinding dust, annealing scale that prevents the passivation of stainless steel
Heavy grease, sludge, fatty oil, fish oil, animal and vegetable oil	▶ <b>ALCACTIVE LIQUID PLUS</b> ▶ <b>MARICLEAN DG-25</b> ▶ <b>MARICLEAN-POL</b>	Engine rooms, decks, cargo holds and as a tank cleaner	Cleaning and elimination of grease, oil, sludge and grime. Applicable to plastic, rubber and epoxy compounds
Various organic deposits, hydrocarbon gas-freeing, deodorizing, general everyday cleaning	▶ <b>GENERAL CLEANING &amp; SOLVENT</b> ▶ <b>ALCACTIVE LIQUID</b>	Deck, cargo holds and general use	Heavy duty, general-purpose cleaners for the removal of oils, fats and acids. Odour elimination. Applicable to "gas-free" effect
Mud, Heavy Inorganic Deposits	▶ <b>MUD CONDITIONER</b>	Ballast Tanks	Mud dispersion allowing removal through deballasting
Marine ecological imbalance occurring with the introduction of foreign species of aquatic life in the ballast tank	▶ <b>BALLAST W.CH.A.</b>	Ballast Tanks	Chlorination of Ballast Water



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Oil Spill dispersion with environmental concern	▶ <b>MARICHEM OIL SPILL DISPERSANT</b>	At sea or on-board oil pollution where a 3rd generation type II and III quality protection is needed	Helps emulsification of oil spills into an easily biodegradable state
Oil spills	▶ <b>OIL SPILL EMULSIFIER</b>	At sea and onboard oil pollution	Cleaning of oil spills. Efficient dispersant of mineral oils, crude oils, fuel oils, lubricants, etc
Sewage clogging	▶ <b>BIOACTIVE DESCALER</b> ▶ <b>BIOACTIVE LIQUID</b> ▶ <b>BIOACTIVE POWDER</b> ▶ <b>BIOACTIVE TOILET CLEANER</b> ▶ <b>SANITATION A-CLEANER</b> ▶ <b>CHLORIDE TABLETS</b>	Sinks, toilets, showers, Sewage Tanks, Sewage lines etc	Removal-cleaning of sewage system from oils, fats and other organic compounds
Oil, grease, fuel, sludge and light carbon deposits	▶ <b>FILTER CLEANER</b> ▶ <b>FILTER CLEANER PLUS</b>	Metal and Ceramic Oil Filters	Efficient removal/cleaning of clogged oil and fuel filters.
Dirt, grease, mineral oils, fats and wax accumulates	▶ <b>LIQUID SOAP</b>	General Use	Cleaning and elimination of animal, vegetable oils, fats, waxes, bad odours. Appropriate for Gas-Freeing
Dirt, grease, fuel, oil	▶ <b>HAND CLEANER</b>	Hand Cleaning	Powerful and safe cleaning paste for engineers
Contamination of equipment, parts and filters	▶ <b>USC PLUS</b>	Ultrasonic Cleaning Applications	Powerful and safe cleaning
Grease, oil, carbon and other petroleum deposits	▶ <b>SOLBREAK</b> ▶ <b>SOLBREAK HFP</b>	Cargo Tanks, Deep Tanks, Bilges, Engine Rooms, etc	Removes oil, grease, light carbon deposits, petroleum accumulates, etc. Breaks the waste water emulsions into two phases, an organic and an aqueous
To improve the penetration of water-based cleaners	▶ <b>FOAM PLUS</b>	Additive to all water based cleaners for animal & vegetable oil removal, petcoke cleaning, etc	Prolongs and reinforces the action of water based tank cleaners and degreasers

PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Carbonaceous deposits	<ul style="list-style-type: none"> <li>▶ GARAGE CLEANER</li> <li>▶ DG SUPER ECO</li> </ul>	Ship's garage area, roof walls and hull side	Cleans/removes deposits resulting from car exhausts. Eliminates bad odours
Corrosion	▶ PENETRIN SPRAY	Machinery parts and tools	Penetrates and frees rusted and corroded parts
<b>COATINGS</b>			
Corrosion	▶ PLASTIC COATING	Maintenance Coating	Semi-hard water based coating
	▶ STRONG PLASTIC RESISTANT	Ballast Tanks, Fresh Water Tanks	Hard, two component, solvent based coating
	▶ MARICOTE ALOX	Ballast Tanks	Soft solvent based coating.
Protection against corrosive cargoes	▶ PRELOAD 300	Cargo Tanks	Forms a water soluble cargo hold barrier that can be removed very easily, even with the use of cold sea water
<b>CHEMICAL EQUIPMENT</b>			
Alkalinity of Water Samples	▶ WT ALKA TEST KIT	Boiler Water Treatment	Effectively counts the calcium carbonate salt content in boiler water systems so that appropriate treatment is applied
Chlorides Concentration in Water Samples	<ul style="list-style-type: none"> <li>▶ WT CHLORI TEST KIT</li> <li>▶ CHLORICOOOL WT TEST KIT</li> </ul>	Boiler Water Treatment, Cooling Water Treatment	Effectively counts the chloride ions concentration in boiler water systems and in cooling water engine systems, so as to check for the quality of the water
Nitrites concentration in water samples	▶ NITRITE TEST KIT	Cooling Water Treatment	Effectively counts the nitrite ions concentration on a periodic basis so as to ensure maximum conditions in cooling water engine system
Phosphate ions count in water samples	▶ WT PHOSP TEST KIT	Boiler Water Treatment	Effectively counts the concentration of phosphate ions in boiler water samples
Hardness in boiler water samples	▶ HARDNESS TEST KIT	Boiler Water Treatment	Effectively counts the hardness value in boiler water samples.



PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Oxygen Scavenger ions concentration in water samples	<ul style="list-style-type: none"> <li>▶ HYDRAZINE TEST KIT</li> <li>▶ WT SULFI TEST KIT</li> <li>▶ DEHA TEST KIT</li> </ul>	Boiler Water Treatment	Detection of the Oxygen scavenger concentration in water samples for all boiler water systems under treatment
Hydrogen ions concentration in water samples	<ul style="list-style-type: none"> <li>▶ pH MEASURING TAPE</li> </ul>	Boiler Water Cooling Water Fresh Water	Measuring of the pH value of fresh water samples in all water systems so as to evaluate the acid/base condition of the water
Conductivity value in water samples	<ul style="list-style-type: none"> <li>▶ CONDUCTIVITY TEST KIT</li> </ul>	Boiler Water Treatment	Measuring the conductivity value of boiler water samples
Concentration of Cooling water treatment additives	<ul style="list-style-type: none"> <li>▶ REFRACTOMETER</li> <li>▶ REFRACTOMETER EG/PG</li> </ul>	Cooling Water	Measuring the concentration of Cooling water treatment additives (Glyscorr G93, Ethylene Glycol)
Alkalinity in engine oil samples	<ul style="list-style-type: none"> <li>▶ MARICHEM T.B.N. TEST KIT</li> </ul>	Engine Oils	Efficiently tests the alkalinity value in all engine oils
Water in oil samples	<ul style="list-style-type: none"> <li>▶ MARICHEM W.I.O. TEST KIT</li> </ul>	Engine Oils, Gear Oils, Hydraulic Oils, etc	Effectively tests the content of water contaminant in oils
Separation of blending/mixing components in various tanks	<ul style="list-style-type: none"> <li>▶ COMPATIBILITY/STABILITY TEST KIT</li> </ul>	Determination of stability of residual fuels (as received) and compatibility of different fuels (remainder of stock)	Avoiding: separation of blending/mixing components in various tanks and centrifuge, blocked (fuel treatment) systems, power failure and delay
Accurate measurements of fuel oil and lube oil properties	<ul style="list-style-type: none"> <li>▶ PORT A LAB TEST KIT</li> </ul>	Fuel oil and lube oil	The test results are essential for effective fuel and lube oil management on board
Catalyst fines can reduce the quality of bunker causing very rapid wear on ship engines	<ul style="list-style-type: none"> <li>▶ CAT FINES CHECK TEST KIT</li> </ul>	Detection of hard abrasive particles in HFO that causing wear on ship engines	Accurate determination of the quality of bunker fuel and that of the clarified HFO in a separator
Fuel Sampling	<ul style="list-style-type: none"> <li>▶ BUNKER SAMPLER</li> </ul>	Ship's fuel receiving pipe line	Ensures safe fuel sampling during bunkering

PROBLEM	PRODUCT	APPLICATIONS	ACTIONS
Dosing of chemical products	<ul style="list-style-type: none"> <li>▶ DOSING SYSTEM MANUAL</li> <li>▶ DOSING SYSTEM ELECTRONIC</li> </ul>	To use with treatment products in order to accomplish controlled flow	Efficient dosing of the prescribed quantity of treatment chemicals where necessary, at a controlled flow rate
Application of chemicals, Scale & Rust, Cargo Hold Cleaning, Tank Cleaning	<ul style="list-style-type: none"> <li>▶ MHCS 200</li> <li>▶ MCM 200</li> <li>▶ TELESCOPIC POLE</li> <li>▶ WATER JET GUN</li> <li>▶ HP CLEANING MACHINES</li> <li>▶ MUC</li> <li>▶ SUBMERSIBLE PUMPS</li> </ul>	Cargo Hold Cleaning, Tank Cleaning, General Cleaning purposes, Descaling/Derusting	Chemicals' cargo hold applicators, Surface Water cleaning under high pressure, Water-sandblasting
Oil spills	▶ OIL CLEAN KIT	Oil Spills	Effectively cleans oil spills on board, at sea and at shore with the equipment as specified by OPA 90 regulation
Oil Spills	<ul style="list-style-type: none"> <li>▶ OIL SPILL ABSORBENTS</li> <li>▶ OIL BOOMS</li> </ul>		Effectively cleans oil spills on-board, at sea, at shore
Safety of the people on board during cleaning applications	▶ CHEMICAL PROTECTIVE EQUIPMENT	During cargo holds cleaning and tank cleaning	Effective cleaning taking all the precautionary measures for the people performing cargo holds cleaning and tank cleaning
Circulation and Transfer of chemicals	<ul style="list-style-type: none"> <li>▶ DOUBLE DIAPHRAGM PUMP</li> <li>▶ DRUM OIL PUMP</li> </ul>	General purpose chemicals' pumps	Wherever chemical transfer is required





**Division**  
**MARINE CHEMICALS & EQUIPMENT**

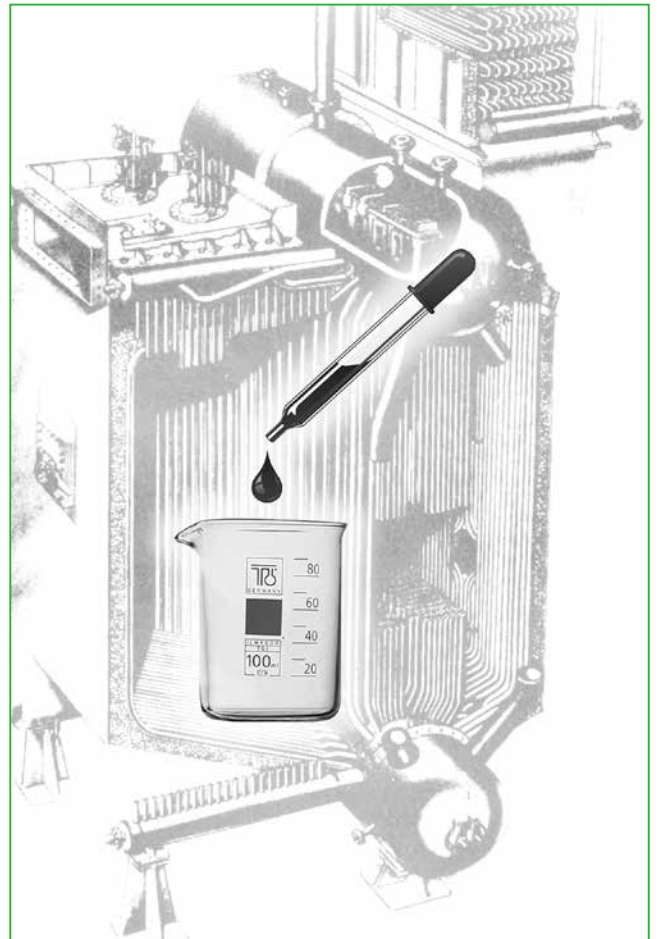
**Section A**  
**WATER TREATMENT**

**Part 1**  
**BOILER WATER TREATMENT**

**Part 2**  
**COOLING WATER TREATMENT**

**Part 3**  
**EVAPORATOR TREATMENT**

**Part 4**  
**SEA WATER TREATMENT**









## ALKALINITY CONTROL™

### DESCRIPTION

**ALKALINITY CONTROL** is a concentrated alkaline solution, designed to regulate boiler water Alkalinity. It prevents corrosion and assists in converting the hard scale deposits to soft, non-adherent sludge, making it easier to remove by bottom blowdown. Furthermore, it is used as a neutralizing agent against other products, acidic by nature.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Efficient in the prevention of corrosion.
- ◆ Ideal for salt-scale control.
- ◆ Can be combined with Phosphate.
- ◆ Easy to apply and use.
- ◆ Achieves optimum results regarding natural oils and fats.

### PHYSICAL PROPERTIES

**ALKALINITY CONTROL** is an exceptionally alkaline solution. This inorganic, non-volatile alkali attacks Aluminum, Zinc, Magnesium and Tin. There is no known effect on rubber and plastic.

When dissolved, with any proportion of water, heat may be released.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.26 gr/cm <sup>3</sup> at 20°C
pH value	: 13–14
Odor	: Odorless

### PACKAGING

Order Number	: 673001 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

Dosage is proportional to p-Alkalinity and/or pH. A proper level of treatment is maintained by testing for p-Alkalinity. For instance, a 100ml portion of **ALKALINITY CONTROL** in one ton of water raises alkalinity by 50–60ppm as CaCO<sub>3</sub>. Initially, use 150ml of **ALKALINITY CONTROL** per ton of water. Note that high-pressure boilers and water boilers should sustain a 100–150ppm as CaCO<sub>3</sub> concentration.

Daily test results should be taken into account prior to regulating treatment by either additional chemical dosage or surface blowdown.

#### B. Testing Procedure

1. Test water sample from the water boiler as described in the directions of **WT ALKA TEST KIT**.
2. Determine the present alkalinity value expressed as ppm CaCO<sub>3</sub>.
3. Consult the test result table, as shown in the **WT ALKA TEST KIT** manual, this will advise on dosage per ton needed, to reach the desired level of 100–150 ppm as CaCO<sub>3</sub>.
4. A control test for the alkalinity of the water should be conducted after 3–6 hours from the application.

#### C. Feeding Procedure

##### Low-Pressure Boilers (up to 28 bars)

Dissolve the desired volume of **ALKALINITY CONTROL** into 5 litres of feed-water, which should then be passed through the boiler feed water via chemical pump or hot well tank.

##### High-Pressure Boilers (28 to 60 bars)

Dissolve the desired volume of **ALKALINITY CONTROL** into 5 litres of feed-water, which then should be passed to the stream or water drum through the chemical pump.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Possibility of serious damage upon contact. Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Possibility of serious damage upon contact. Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek immediate medical attention.
<b>Inhalation</b>	Possibility of serious damage if inhaled. Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek immediate medical attention.
<b>If swallowed</b>	Possibility of serious damage if swallowed. Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## DESCRIPTION

**BOILER SLUDGE CONDITIONER** is a product to be used in situations where the boiler water is contaminated with oil.

This high performance product is applicable to both medium and low-pressure steam boilers in order to prevent sludge deposits.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Restricts the collection and formation of deposits on the internal surfaces.
- ◆ Drives to the coagulation of the oil droplets and their removal by blow-down.
- ◆ May be combined with other boiler water treatment products.
- ◆ Efficiently prevents the deposition of sludge.
- ◆ Easy to apply and use.

## PHYSICAL PROPERTIES

**BOILER SLUDGE CONDITIONER** is a white high molecular weight solution. It is hydrophilic and of low causticity.

Appearance/Color	: White, viscous liquid
Specific gravity	: 0.98 gr/cm <sup>3</sup> at 20°C
pH value	: 11
Odor	: Odorless

## PACKAGING

Order Number	: 673002 (30 ltrs)
Container	: Plastic jerrican

## BOILER SLUDGE CONDITIONER™

### APPLICATION AND USE

#### A. Dosing Procedure

Regularly, a volume of 100ml of the **BOILER SLUDGE CONDITIONER** should be dosed for every ton of water capacity, where oil contamination exists.

However, in systems where severe oil contamination exists, off-line cleaning is required before the product can be applied.

Thereafter, the application should be repeated daily, for a period of two weeks, until oil removal is complete.

#### B. Feeding Procedure

Feed directly to the boiler by using a bypass pot feeder or a suitable chemical injection pump.

For low-pressure boilers the solution may be dosed to the hot well or the condensate return tank.

Note that **BOILER SLUDGE CONDITIONER** can be applied as it is or dissolved with other boiler treatment products.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Possibility of serious damage upon contact. Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Possibility of serious damage upon contact. Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek immediate medical attention.
<b>Inhalation</b>	Possibility of serious damage if inhaled Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek immediate medical attention.
<b>If swallowed</b>	Possibility of serious damage if swallowed. Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

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**B.W.T. NEW FORMULA™****DESCRIPTION**

**B.W.T. NEW FORMULA** is an innovative product applied to all types of boiler systems for water treatment. It provides excess protection from the hard salts, sludge concentration and corrosion, whilst also removing dissolved Oxygen (even at low temperatures). Furthermore, it acts as an antifoam agent.

**ADVANTAGES AND CHARACTERISTICS**

One product does it all: a multi-functional completed treatment.

- ◆ Prevents Calcium corrosion through hardness control.
- ◆ Acts as an Oxygen scavenger in boiler water as well as a corrosion inhibitor by passivating metal surfaces in the boiler.
- ◆ Raises the pH level.
- ◆ Acts as an antifoam agent.
- ◆ Submerges suspended solids thus assisting to easy and sufficient blowdown.
- ◆ Should be used in conjunction with **MARICHEM C.C.I.**
- ◆ Cost effective, easy to handle and apply.

**PHYSICAL PROPERTIES**

**B.W.T. NEW FORMULA** is a liquid solution of alkaline compounds, Oxygen binders, corrosion inhibitors, sludge conditioners and antifoam agents.

Appearance/Color : White liquid  
 Specific gravity : 1.15–1.20 gr/cm<sup>3</sup> at 20°C  
 pH value range : 12.5–13.5  
 Odor : Odorless

**PACKAGING**

Order Number : 673003 (30 ltrs)  
 Container : Plastic jerrican

**APPLICATION AND USE****A. Dosing Procedure**

Initially, use 1litre of **B.W.T. NEW FORMULA** per ton of boiler water. Thereafter, a volume of 50–60ml per ton of boiler water should be used daily.

For optimum results, consult the **MARICHEM Ship's BWT Log Book** for boiler water treatment on a daily basis.

Note that the boiler water sample analyses must be conducted daily by using the **MARICHEM WT ALKA, WT PHOSP** and **WT SULFI TEST KITS**.

Daily test results should be taken into account prior to regulating treatment by either additional chemical dosage or surface blowdown.

**B. Feeding Procedure**

Once the dosing quantity is determined, **B.W.T. NEW FORMULA** must be introduced to the boiler's water, continuously, by a metering pump or by a more conventional method such as metallic container, plastic pail, etc.

**BWT NEW FORMULA p-Alkalinity vs. dosage**

p-Alkalinity (as ppm CaCO <sub>3</sub> )	0	10 - 30	40 - 70	80 - 90	100 - 150	Over 150
Dosage of BWT NEW FORMULA (ltrs/ton)	1	0.33	0.22	0.12	0	Blowdown



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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**B.W.T. POWDER™****DESCRIPTION**

**B.W.T. POWDER** is the equivalent powder product of **B.W.T. NEW FORMULA**.

It is applied to all types of boiler water systems, providing excess protection from the hard salts, sludge concentration and corrosion. Moreover, this competent product removes dissolved Oxygen and acts as an antifoaming agent.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ One product does it all: a multi-functional complete treatment.
- ◆ Prevents salt corrosion through hardness control.
- ◆ Acts as an Oxygen scavenger in boiler water.
- ◆ Raises the pH level.
- ◆ Acts as a corrosion inhibitor.
- ◆ Acts as an antifoaming agent.
- ◆ Submerges suspended solids thus assisting to easy and sufficient blow down.
- ◆ Efficiently protects boiler surfaces.
- ◆ Cost effective, easy to handle and apply.

**PHYSICAL PROPERTIES**

**B.W.T. POWDER** is a dry powder product consisting of alkaline compounds, Oxygen binder, corrosion inhibitors, sludge conditioners and antifoam agents.

Appearance/Color : White, dry powder  
 Specific gravity : 1.14–1.18 gr/cm<sup>3</sup> at 20°C  
 pH value (1% solution) : 12.5–13.0  
 Odor : Odorless

**PACKAGING**

Order Number : 672503 (25 kgrs)  
 Container : Steel drum

**APPLICATION AND USE****A. Dosing Procedure**

Initially, use 200grs of **B.W.T. POWDER** per ton of water. Thereafter, a regulated portion of a concentrated solution must be introduced daily or at least every 2 days, depending on the results of the relevant tests.

For optimum results, consult the **MARICHEM Ship's BWT Log Book** for boiler water treatment on a daily basis. Always remember that the desired quantity of **B.W.T. POWDER** should be dissolved in 1:10 proportion with hot water before applying to the hot well tank.

Note that the boiler water sample analyses must be conducted daily by using the **MARICHEM WT ALKA, WT PHOSP and WT SULFI TEST KITS**.

**B. Feeding Procedure**

Once the desired quantity of **B.W.T. POWDER** is determined, dissolve the powder as described above and feed the solution to the boiler's water through the hot well tank by means of a metering pump or a more conventional method, such as a metallic container, plastic pail, etc.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling. Precautionary measures for body protection are strongly recommended before use.

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**MARICHEM C.C.I.™**

## DESCRIPTION

MARICHEM C.C.I. is an alkaline liquid compound designed to act as a condensate corrosion inhibitor in the condensation return lines of the boiler and adjacent condensing surfaces. Acids formed in saturated steam are inhibited and neutralized in non corrosive state. This way, condensate travels back to the system neutralized from oxidized properties.

## CHARACTERISTICS, ADVANTAGES & APPLICATIONS

- ◆ Neutralizes acidic conditions throughout the condensate in feed water systems and steam transfer.
- ◆ Controls water pH in the range of 8.0–9.0.
- ◆ Can be boiled off with water into the steam pipes and due to its alkali properties, to protects directly from surface corrosion.
- ◆ Very stable, non water absorbent.
- ◆ Used in conjunction with BWT New Formula/ BWT Powder & Phosphate, Oxycontrol and Alkalinity Control.
- ◆ Cost effective, easy to apply and use.

## PHYSICAL PROPERTIES

MARICHEM C.C.I. is a concentrated, volatile alkaline solution that controls corrosion by neutralizing contaminants, such as carbonic acid which is formed by dissolved carbon dioxide in evaporating water.

Appearance/Color	: Clear, colorless liquid
Odor	: Ammonia-like
Specific gravity	: 1.02–1.06 gr/cm <sup>3</sup> at 20°C
pH value	: 11.5–13.5
Solubility	: Appreciable

## PACKAGING

Order Number	: 673006 (30 ltrs)
Container	: Plastic jerrican

## APPLICATION AND USE

### A. Dosing Procedure

MARICHEM C.C.I. must be applied daily at an indicated volume of 70–80ml per 1ton of boiler water.

Note that per day dosing is a must in order to keep the pH level under control.

### B. Feeding Procedure

MARICHEM C.C.I. must be fed, by means of a metering pump, in the boiler at any of the following points:

- Condensation pump discharge.
- Deaerator storage tank.
- Hot well tank.
- Condensation return tank.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## MARZINE-PLUS™

### DESCRIPTION

**MARZINE-PLUS** is a liquid, all volatile, activated Oxygen scavenger for use in low, medium and high pressure boilers.

**MARZINE-PLUS** eliminates dissolved Oxygen completely and rapidly, at lower temperatures, from boiler feed-water. At the same time it contains a catalyst that increases the reaction rate with dissolved Oxygen.

**MARZINE-PLUS** provides the required conditions for passivation of the metal surfaces through the formation of protective oxide films that will lead to the reduction of iron and copper deposits in the boiler.

Additionally, **MARZINE-PLUS** is applicable to all steam generating and water systems, when the neutralizing of dissolved carbon dioxide is required.

### CHARACTERISTICS, ADVANTAGES & APPLICATIONS

- ◆ Protects against Oxygen corrosion and can be used at low temperatures.
- ◆ Contains a catalyst that increases the reaction rate with Oxygen.
- ◆ Very efficient and rapid Oxygen scavenger.
- ◆ Can be used in combination with a number of other treatment products.
- ◆ Safe to use on any steam generators and steam boilers experiencing dissolved Oxygen saturation.
- ◆ Its use does not increase the number of total dissolved solids.
- ◆ Cost effective, easy to handle and apply..

### PHYSICAL PROPERTIES

**MARZINE-PLUS** is an all-volatile, liquid, catalyzed Oxygen scavenger for use in low, medium and high pressure boilers.

Appearance/Color	: Clear, colorless to light yellow liquid
Odor	: Odorless
Specific gravity	: 1.01–1.02 gr/cm <sup>3</sup> at 20°C
pH value	: 11.5–13.0

### PACKAGING

Order Number	: 673013 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

Initially, a volume of 150ml of **MARZINE-PLUS** per ton of water must be used, depending on operating pressure and on the system's layout. Thereafter, everyday testing of hydrazine in the boiler water, with the use of **MARICHEM HYDRAZINE TEST KIT**, will determine the daily dosage to maintain the concentration within the desired levels. A normal dosage is approximately 30ml per day per ton of water.

In case the system has not been properly passivated, then the initial dosage of **MARZINE-PLUS** may be higher in the first weeks, until system's stabilization is achieved.

#### B. Cleaning Procedure

To achieve optimal results, it is important to adjust the treated water and maintain boiler conditions by testing water samples on a daily basis or at the very least, every two days with the **MARICHEM HYDRAZINE TEST KIT**, depending on the adjustment period to maintain stable hydrazine concentrations in the boiler's water.

The water samples must always be taken from the same origin found in the middle of the boiler after blow down has occurred. Keep in mind that before testing, the water samples must be left to cool at room temperature, and then immediately the test must be performed. Thereafter, the results may be evaluated according to the **MARZINE-PLUS TESTING CHART** found below.

#### C. Feeding Procedure

**MARZINE-PLUS** must be fed into the boiler's feed pump suction line, after the feed pump recirculating valve, or into the hot well tank, continuously, by means of a metering pump. Other conventional ways may also be used. However, direct feeding to the boiler is strongly not recommended.



## MARZINE-PLUS TESTING CHART

Pressure Range	Hydrazine test result in ppm					ppm of Hydrazine
	0–0.05	0.05–0.10	0.10–0.15	0.15–0.20	> 0.20	
0–40 bar	Increase dosage by 25%	Increase dosage by 25%	Satisfactory	Satisfactory	Decrease dosage by 25%	0.10–0.20
41–60 bar	Increase dosage by 25%	Increase dosage by 25%	Satisfactory	Decrease dosage by 25%	Decrease dosage by 25%	0.10–0.15
> 60 bar	Increase dosage by 25%	Satisfactory	Decrease dosage by 25%	Decrease dosage by 25%	Decrease dosage by 25%	0.05–0.10

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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OPTITREAT™

## DESCRIPTION

**OPTITREAT** is an advanced liquid boiler water treatment product, formulated with polymer scale inhibitors, alkaline compounds, phosphates and condensate-protecting amines. In addition to combining alkalinity control, scale inhibitors, and deposit control, **OPTITREAT** provides protection from corrosion.

It efficiently treats Boiler/Steam Water in System lines and Condensate. It provides an excellent and very practical way of treatment, using only one product.

Scale, corrosion and foaming are the main problems in Marine Boilers, due to the fact that when the water evaporates, precipitation of salts occurs rapidly.

If these salts were not treated they could be turned into very hard scale deposits, which would reduce the system ability to produce steam. This can result in a low volume of steam, which can delay critical operations on the vessel where steam is used as the 'driving force', and will certainly increase the cost of heating, as more fuel would be required to produce the same result. If the boiler water is not treated properly, this would be rapidly resulting in the whole system deterioration due to corrosion.

**OPTITREAT** controls the problems described above by achieving the appropriate chemical concentrations and their correct monitoring will maintain the system in a good working condition.

When properly dosed it creates the required Alkalinity and Phosphate concentration levels to avoid the acidic "attack" and salts precipitation respectively. Furthermore, it releases into the system a volatile amine inhibitor that circulates with steam in the tube lines, protecting the steel metallic surfaces and condensate system from Carbonic Acid "attack".

Along with the use of **OPTITREAT** the application of an Oxygen scavenger is required to completely remove the Oxygen dissolved in water, as this is the main cause of corrosion in the system. **OPTITREAT** can be combined either with **MARZINE PLUS** or **OXYBLOCK D**, two unique products that are both excellent Oxygen scavengers for boiler water treatment programs.

## CHARACTERISTICS, ADVANTAGES & APPLICATIONS

- ◆ One product does it all: a multi-functional complete treatment.
- ◆ Suitable for all type of boilers.
- ◆ Contains condensate-protecting volatile amines.
- ◆ Acts as a corrosion inhibitor, by passivating metal surfaces and preventing scale build-up in the boiler tubes.
- ◆ Raises the pH value level.
- ◆ Acts as an antifoam agent.
- ◆ Submerges suspended solids thus assisting in easy and efficient blowdown.
- ◆ Promotes efficient heat transfer conditions.
- ◆ It can be coupled either with **MARZINE PLUS** or **OXYBLOCK D** Oxygen scavengers.
- ◆ Cost effective, easy to handle and apply.

## PHYSICAL PROPERTIES

**OPTITREAT** is a liquid solution formulated with synthetic polymers, alkaline compounds, phosphates, condensate-protecting amines and antifoaming agents.

Appearance/Color	: Colorless liquid
Specific gravity	: 1.04 - 1.08 gr/cm <sup>3</sup> at 20°C
pH value	: 12.5 - 14.0
Odor	: Odorless

## PACKAGING

Order Number	: 673018 (30 ltrs)
Container	: Plastic jerrican

## APPLICATION AND USE

### A. Dosing Procedure

Initially, use 1-2 liters of **OPTITREAT** per ton of water. This dosage in distilled water, when heated, could create 100-200ppm of CaCO<sub>3</sub> as P-Alkalinity value (Table 1) and 15-25ppm of Phosphate ions concentration.

Thereafter, monitoring of the P-Alkalinity value must be performed using **WT ALKA TEST KIT** in order to control the product's dosage.

Monitoring of the pH value in the condensate is necessary, as a pH value in the range of 8.0 - 9.0 indicates that efficient treatment of the Carbonic Acid has been done.



The application of **OPTITREAT** in a well treated feedwater could result to a conductivity maximum value of about 800 microS/cm.

For optimum results, consult the **MARICHEM Ship's BWT Log Book** for boiler water treatment.

For details on the testing procedure, refer to **OPTITREAT** and **OXYBLOCK D** dosing chart or refer to **OPTITREAT** and **MARZINE PLUS** dosing chart, depending on the BWT program used on board the vessel.

Daily test results should be taken into account prior to regulating treatment by either additional chemical dosage or surface blowdown.

## B. Feeding Procedure

Once the dosing quantity is determined, **OPTITREAT** must be introduced to the boiler's water, continuously, using **Marichem's dosing system** or by using gravity feed flow meter, but this is not requested as volatiles can be lost when circulated water returns to the hot-well or cascade tank.

**TABLE 1: p-Alkalinity value vs OPTITREAT dosage rate**

p-Alkalinity value as ppm CaCO <sub>3</sub>	0 - 50	50 - 100	100 - 200	200 - 300	Over 300
Dosage of OPTITREAT (lt per ton of boiler water)	2	1	Satisfactory	Blowdown	Blowdown

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**OXYBLOCK D™****DESCRIPTION**

**OXYBLOCK D** is a water-based solution of specific volatile amines along with a proper catalyst; this excellent chemical combination efficiently removes the dissolved Oxygen from the boilers and steam generator systems. Its stability in high pressures makes it applicable in any kind of marine boilers, low, medium and high pressure.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ Efficiently and quickly removes the dissolved Oxygen from the boiler's feedwater.
- ◆ It is a volatile Oxygen scavenger; due to its high volatility circulates with the steam and passivates the metallic surfaces.
- ◆ It does not create dissolved solids.
- ◆ It is safer in use than Hydrazine based products.
- ◆ It is stable in high pressures and that makes it applicable in any type of marine boilers.
- ◆ Cost effective, easy to handle and apply.

**PHYSICAL PROPERTIES**

**OXYBLOCK D** is a catalysed liquid solution of diethylhydroxylamine (DEHA).

Appearance/Color	: light yellow liquid
Specific gravity	: 0.98 - 1.00 gr/cm <sup>3</sup> at 20°C
pH value	: 10.0 - 11.0
Odor	: Odorless

**PACKAGING**

Order Number	: 673017 (30 ltrs)
Container	: Plastic jerrican

**APPLICATION AND USE****Dosing & Feeding Procedure**

The product should be applied by a dosimetric pump in a by-pass cross flow just before the boiler's section and separately by other water treatment products. Avoid the application of product by gravity or directly to the feed water tank as the atmospheric Oxygen reacts with **OXYBLOCK D** and decreases its active content.

For best results we suggest you to maintain a feed-water temperature of 80-90°C. This will have a positive effect in product's application as the water heated releases most of its dissolved Oxygen content.

On the other hand product could act quickly at high temperatures.

The dosage depends on many factors such as the feedwater's dissolved Oxygen quantity, the feed water temperature even on the metallic surfaces condition.

At the beginning we suggest the application of 100-150ml of **OXYBLOCK D** per day. This dosage should be regulated according to the metallic surfaces condition and the residual content of DEHA in the condensate system.

In the untreated DEHA systems the tests should be done on a daily basis in condensate system samples using the Marichem DEHA test kit. A residual concentration of DEHA between 0.15ppm-0.25 ppm should be maintained. You may be advised by following directions of dosage control in the condensate.

Initial Dosage: 150ml/day in DEHA untreated Boiler systems.

DEHA residual in the Condensate System: 0.15-0.25ppm.

Maintenance dosage: 100-200ml/day depending on condensate DEHA concentration value.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**OXYCONTROL™**

## DESCRIPTION

**OXYCONTROL** is a liquid catalyst compound which reacts instantly with dissolved Oxygen in water thus protecting the boiler from Oxygen corrosion. The highly efficient results achieved, are based on its reaction time and its ability to bind, to absorb and to counteract the dissolved Oxygen, even at low temperatures.

Additionally, **OXYCONTROL** is applicable to all steam generating and water systems, when the neutralizing of dissolved carbon dioxide is required.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Protects against Oxygen corrosion and can be used at low temperatures.
- ◆ Very efficient and rapid Oxygen scavenger.
- ◆ Can be used in combination with a number of other treatment products.
- ◆ Safe to use on any steam generators and steam boilers experiencing dissolved Oxygen saturation.
- ◆ Cost effective, easy to handle and apply.

## PHYSICAL PROPERTIES

**OXYCONTROL** is a concentrated liquid sulfite compound with a specialized catalyst for Oxygen binding.

Appearance/Color	: Clear, colorless liquid
Odor	: Odorless
Specific gravity	: 1.08–1.10 gr/cm <sup>3</sup> at 20°C
pH value	: 9.0–10.0

## PACKAGING

Order Number	: 673008 (30 ltrs)
Container	: Plastic jerrican

## APPLICATION AND USE

### A. Dosing Procedure

Initially, a volume of 1.2litres per ton of the boiler's water must be used for a period of 48 hours. Thereafter, a dose of 300ml per ton of make-up water is sufficient to use on a daily basis. However, daily test results should be taken into account prior to regulating treatment.

### B. Sampling and Testing

To achieve optimal results, it is important to adjust the treated water and maintain boiler conditions by testing water samples on a daily basis or at the very least, every three days with the **MARICHEM WT SULFI TEST KIT**, depending on the adjustment period to maintain stable sulfite concentrations in the boiler's water.

The water samples must always be taken from the same location, as provided from the boiler manufacturer. Sound practice suggests sample to be cooled via a sample cooler. Thereafter, the results may be evaluated according to the **OXYCONTROL TESTING CHART** found below.

### C. Feeding Procedure

**OXYCONTROL** must be fed into the boiler's feed pump suction line or into the hot well tank, continuously, by means of a metering pump. Other conventional ways may also be used. However, direct feeding to the boiler is strongly not recommended.

## OXYCONTROL TESTING CHART

Boiler Pressure	OXYCONTROL Range in ppm as Sulfite ions		
	0–450 PSI	0–20	20–30
450–850 PSI	0–10	10–15	15 and over
Results	Increase Dosage 25%	Satisfactory Daily Rate	Decrease Dosage 25%


**MARICHEM®**

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

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## PHOSPHATE™

### DESCRIPTION

**PHOSPHATE** is a highly soluble, powder compound significantly effective for the reduction of hardness and scale control in all types of boilers. The specific purpose is to allow the removal of all Calcium hard salts by blow down to a non-adherent soft sludge, whilst maintaining a natural level of phosphate concentration in the boiler water. This way proper hardness regulation is assured.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Highly soluble, unlike ordinary sodium phosphates where solubility can be compromised in high temperatures.
- ◆ Maintains a regular phosphate balance, resulting in efficient hardness control.
- ◆ Removes calcium hardness by blow down.
- ◆ Cost effective, easy to apply and use.

### PHYSICAL PROPERTIES

**PHOSPHATE** is a dry powder product, which contains a selected Sodium phosphate derivative especially formulated to provide efficient hardness control.

Appearance/Color	: White, thin granulated powder
Solubility in water	: Completely soluble
Specific gravity	: 1.35–1.75 gr/cm <sup>3</sup> at 20°C

### PACKAGING

Order Number	: 672509 (25 kgrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

Initially, for an average boiler of 10tons water capacity, a quantity of 350–650grs must be used.

It is important to note that no more than 100–250grs of **PHOSPHATE** per 10tons water capacity will ever be required on a daily basis, especially when the boiler operates with distilled water make-up. However, daily test results should be taken into account prior to regulating treatment.

#### B. Sampling and Testing

Water samples must be drawn and tested periodically, using the **MARICHEM WT PHOSP TEST KIT**. To determine if use of **PHOSPHATE** is required, please consult evaluation chart and dosing procedure below.

Each sample should be taken every 24 hours from the special sampling valve.

If this is not possible, the samples should be taken from a point which can provide a representative sample of the entire system. Keep in mind, that this same point must be used for the regular testing, thereafter.

#### C. Feeding Procedure

Once the quantity of **PHOSPHATE** necessary to apply has been determined, the engineer must dissolve it in hot water at a ratio of 1/20 (1 part of **PHOSPHATE** to 20 parts of water).

Afterwards, feed to the boiler via a by-pass feeder or a chemical pressure feed pump.

In the situation where several boilers are involved, separate feed lines must be installed for each one in order to ensure that every boiler receives the right quantity for treatment.



## TEST RESULTS EVALUATION CHART

Concentration of Phosphate ions ( $\text{PO}_4^{-3}$ )				
TEST RESULT	0–10 ppm	10–20 ppm	20–40 ppm	Over 40 ppm
Quantity of PHOSPHATE to be added	30gr/tn of water	15gr/tn of water	Satisfactory	Blowdown

## NOTE

- ◆ For sample results less than 20ppm Phosphate ions concentration, supply the system with the prescribed dosage as in the chart above.
- ◆ For sample results greater than 40ppm Phosphate concentration, perform blowdown and supply with the initial dosage prescribed below.

## INITIAL DOSAGE

**PHOSPHATE:** 350–650grs/10 tons of fresh water.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**Division**  
MARINE CHEMICALS & EQUIPMENT

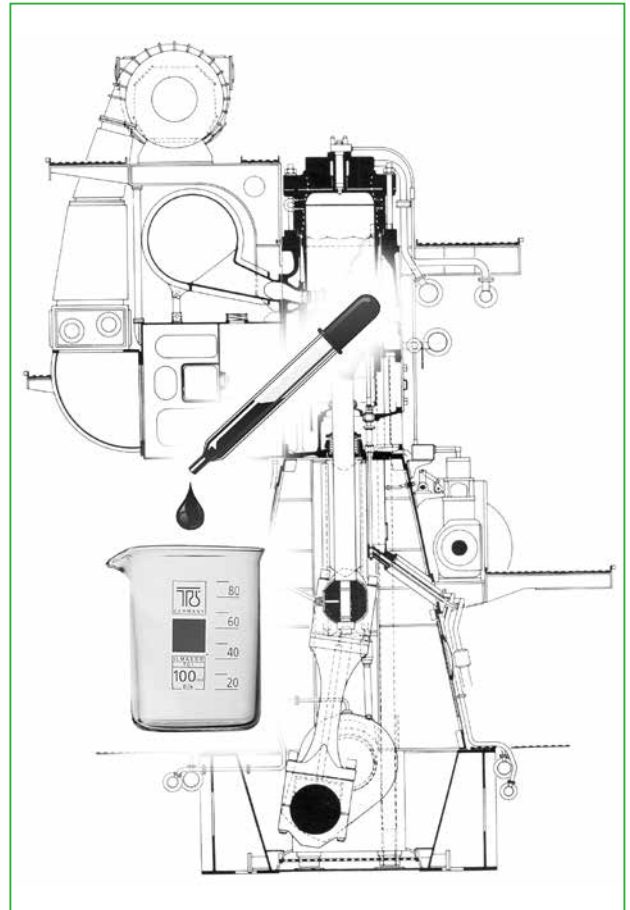
**Section A**  
WATER TREATMENT

**Part 1**  
BOILER WATER TREATMENT

**Part 2**  
COOLING WATER TREATMENT

**Part 3**  
EVAPORATOR TREATMENT

**Part 4**  
SEA WATER TREATMENT







## D.C.W.T. NON CHROMATE™

### DESCRIPTION

**DIESEL COOLING WATER TREATMENT NON CHROMATE** is a concentrated liquid product used as a corrosion inhibitor and scale controller for the treatment of cooling water in closed systems. It is suitable for use in all diesel engines systems, as well as any other closed water cooling or heating systems.

**D.C.W.T. NON CHROMATE** is a complex mixture of corrosion and scale inhibitors, antifoaming agents and pH adjusters.

A corrosion inhibitor is any substance which effectively decreases the corrosion rate when added to an environment. The corrosion inhibitors comprising **D.C.W.T. NON CHROMATE** form a protective oxide film on the metal surfaces. These inhibitors are to be used in economical concentrations, and the protective film formed, which can be repaired if damaged, is maintained by the correct level of dosed treatment in the system. Corrosion in a closed water system is the result of, acidic conditions, oxidation caused by exposure of metal surfaces to air, which is caused by excess foam within the system and the electrolytic action of different metals which are common within the system.

In marine cooling systems corrosion in the form of pitting, which is caused by the above mentioned parameters allows for the build up of scale, which leads to a reduction in the cooling properties of the system and potentially overheating of the engine.

A system that is contaminated by scale, formed due to the salts from within the fresh water used in the system or oil due to a leakage from the engine, need to be efficiently removed to ensure protection of the metals surfaces.

### ADVANTAGES & CHARACTERISTICS

- ◆ Prevents corrosion and scale formation.
- ◆ Prevents acid attack.
- ◆ A chromate-free product.
- ◆ It is not an oil compound and does not create foaming.
- ◆ Protects various metal surfaces and is compatible with non-metals.
- ◆ Increases the engine's efficiency.
- ◆ Prevents scale overheating and maintains regular heat transfer.
- ◆ Has no effect on rubber and plastic compounds, hoses.

- ◆ Compatible with glycol-based antifreeze and sealing products.
- ◆ Cost effective, easy to handle and apply.

### PHYSICAL PROPERTIES

**D.C.W.T. NON CHROMATE** is a non-Chromate, Nitrite-based liquid compound consisting of corrosion and scale inhibitors, antifoam agents and pH adjusters.

Appearance/Color	: Clear, pale/yellow liquid
Specific gravity	: 1.10–1.20 gr/cm <sup>3</sup> at 20°C
pH value	: 11.0–12.5
Odor	: Odorless
Solubility in water	: Soluble

### PACKAGING

Order Number	: 673004 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

Initially, a volume proportion of 7litres of **D.C.W.T. NON CHROMATE** per ton of distilled or fresh water must be used. However, appropriate dosing can and must be determined, after the testing of water samples, using the **MARICHEM NITRITE TEST KIT**.

For optimum results, a nitrite concentration of 1,200 to 3,600ppm in the cooling system is recommended.

The following dosage rates (as appearing in Table 1) should be applied anytime the Nitrite concentration is not within the satisfactory levels.

#### B. Feeding Procedure

After the volume of **D.C.W.T. NON CHROMATE** to be dosed is determined and while the cooling system is in operation; feed the solution into the expansion tank or in any cross flow of the cooling system to ensure circulation. Moreover, proper distribution of the solution must be accomplished and a protective film is created. Only then is the treatment complete. After the application and while the cooling water system is in operation, let the solution circulate for approximately 2 hours. Then, test the Nitrite concentration in the water using the **MARICHEM NITRITE TEST KIT**. Repeat the testing procedure and make up with **D.C.W.T. NON CHROMATE** solution in order to stabilize the Nitrite concentration in the water due to losses/leakage of



the system. For optimum results a nitrite ions concentration of 1,200–3,600ppm in the cooling system is recommended. The engineer has to make sure that a proper distribution of the solution is accomplished and that a protective film is created.

For a better level of corrosion protection in the system, the use of **CHLORICOOOL WT TEST KIT** is suggested, for measuring the chloride ions concentration. The chloride ions concentration must be maintained below the level of 60ppm. The concentration of chloride ions could be controlled by partial drain and make up with fresh water.

Moreover, the pH value must be checked within certain intervals. The satisfactory pH value level is 8.5–10. The desired corrosion and scale inhibition can be achieved within that range.

## APPROVALS AND CERTIFICATIONS

**D.C.W.T. NON CHROMATE** is approved by the following Engine manufacturers:

**WARTSILA NSD**

**ALSTOMENGINES**

**MaK/CAT DIESEL ENGINES**

**MAN B&W DIESEL ENGINES**

**TABLE 1: Nitrite ions (NO<sub>2</sub><sup>-</sup>) concentration in ppm & requested D.C.W.T. NON CHROMATE dosage**

Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm as appearing in the Nitrite test kit, in a dilution of the cooling water	1–5	5–10	10–15	15–20	20–60	Over 60
Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm in the cooling water	0–300	300–600	600–900	900–1,200	1,200–3,600	Over 3,600
D.C.W.T. NON CHROMATE dosage per ton of water	6 litres	4 litres	2 litres	1 litre	Satisfactory	Partial Drain required

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



**D.C.W.T. POWDER™****DESCRIPTION**

**DIESEL COOLING WATER TREATMENT POWDER** is a solid mixture of specific corrosion and scale inhibitors, applied for the prevention of corrosion and scale to all marine diesel engines for the treatment of the cooling water. It is the equivalent powder product of **D.C.W.T. NON CHROMATE**.

Furthermore, it can be applied to other cooling and heating closed re-circulating water systems in order to prevent rust and scale development. The application of **D.C.W.T. POWDER** adjusts the pH value in a range where the desired protection of the metallic surfaces is achieved. Treatment of the cooling water with **D.C.W.T. POWDER**, in relation to the quantity involved is highly effective, offering a decisive cost advantage.

**ADVANTAGES & CHARACTERISTICS**

- ◆ Prevents corrosion and scale formation.
- ◆ Prevents acid attack.
- ◆ A chromate-free product.
- ◆ It is not an oil compound and does not create foaming.
- ◆ Protects various metal surfaces and is compatible with non-metals.
- ◆ Increases the engine's efficiency.
- ◆ Prevents scale overheating and maintains regular heat transfer.
- ◆ Has no effect on rubber and plastic compounds, hoses.
- ◆ Compatible with glycol-based antifreeze and sealing products.
- ◆ Cost effective, easy to handle and apply.

**PHYSICAL PROPERTIES**

**D.C.W.T. POWDER** is a non-Chromate, Nitrite-based powder compound with a deposit modifier, pH stabilized.

**Appearance/Color** : Light yellow, crystalline granulated powder

**Specific gravity** : 1.15–1.20 gr/cm<sup>3</sup> at 20°C

**pH value (1% solution)**: 8.5–10.0

**Odor** : Odorless

**Solubility** : Soluble in water

**PACKAGING**

**Order Number** : 672504 (25 kgrs)

**Container** : Steel drum

**APPLICATION AND USE****A. Dosing procedure**

Initially, a quantity of 3kgrs per ton of distilled or fresh water must be used.

However, correct dosing can and must be determined, after the testing of water samples, using the **MARICHEM NITRITE TEST KIT**.

For optimum results, a nitrite concentration of 1,200–3,600ppm in the cooling system is recommended.

The following dosage rates (as appearing in Table 1) should be applied anytime the Nitrite concentration is not within the satisfactory levels.

**B. Feeding Procedure**

After the quantity of **D.C.W.T. POWDER** to be dosed is determined and before the introduction of the product into the system, it must be dissolved in sufficient volume of water until the dissolution of the powder is complete.

Thereafter, feed the solution into the expansion tank or through a metering pump, these are responsible for the circulation of the solution into the cooling water system.

Moreover, the engineer has to make sure that a proper distribution of the solution is accomplished and that a protective film is created. Only then the treatment is complete.

After the application and while the cooling water system is in operation, let the solution circulate for approximately 2 hours. Then, test the Nitrite concentration in the water using the **MARICHEM NITRITE TEST KIT**. Repeat the testing procedure and make up with **D.C.W.T. POWDER** solution in order to stabilize the Nitrite concentration in the water due to losses/leakage of the system.

For optimum results a nitrite ions concentration of 1,200–3,600ppm in the cooling system is recommended. The engineer has to make sure that a proper distribution of the solution is accomplished and that a protective film is created.

For a better level of corrosion protection in the system, the use of **CHLORICOOOL WT TEST KIT** is suggested, for



measuring the chloride ions concentration. The chloride ions concentration must be maintained below the level of 60ppm. The concentration of chloride ions could be controlled by partial drain and make up with fresh water.

Moreover, the pH value must be checked within certain intervals. The satisfactory pH value level is 8.5–10. The desired corrosion and scale inhibition can be achieved within that range.

## APPROVALS AND CERTIFICATIONS

D.C.W.T. POWDER is approved by the following Engine manufacturers:

WARTSILA NSD

ALSTOM ENGINES

**TABLE 1: Nitrite ions (NO<sub>2</sub><sup>-</sup>) concentration in ppm & requested D.C.W.T. POWDER dosage**

Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm as appearing in the Nitrite test kit, in a dilution of the cooling water	1–5	5–10	10–15	15–20	20–60	Over 60
Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm in the cooling water	0–300	300–600	600–900	900–1200	1,200–3600	Over 3,600
D.C.W.T. POWDER dosage per ton of water	2.5 kgrs	2 kgrs	1.5 kgrs	1 kgr	Satisfactory	Partial Drain required

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



MARICIL™

## DESCRIPTION

**MARICIL** is a biodegradable bactericide that kills and inhibits the growth of micro-organisms such as bacteria, fungi and algae in water based systems.

It is a slimicide for industrial water treatment and pulp/paper industry that prevents odor problems and microbiological corrosion.

**MARICIL** is a highly effective antimicrobial at very low concentrations.

The active ingredients are 5-Chloro-2-(methyl)-4-isothiazolin 3-one and 2-Methyl 4-isothiazolin 3-one.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively inhibits the growth of microorganisms.
- ◆ pH value and temperature stable product.
- ◆ Efficiently removes microbiological corrosion.
- ◆ It has antimicrobial properties at very low concentrations.
- ◆ Prevents odor problems.
- ◆ Totally miscible in water.
- ◆ Cost effective, easy to apply and use.

## PHYSICAL PROPERTIES

**MARICIL** consists of specific amine biocides and is a non toxic, non-corrosive and fully biodegradable product.

Appearance/Color	: Clear Liquid
Color	: Pale green
Odor	: Stinging
Specific Gravity	: 0.95 gr/cm <sup>3</sup> at 20°C
Flash Point	: None

## PACKAGING

Order Number	: 672026 (20 ltrs)
Container	: Plastic jerrican

## APPLICATION AND USE

### Dosing Procedure

The requested dosage is 0.6 ltr/ton of water for dosing

every second day, until observed on-board, that nitrites given from **D.C.W.T. NON CHROMATE** are not destroyed and remain active in the system for protection and maintenance.

For prevention of bacteria growth in the system the requested dosage is 0.1-0.2 ltr/ton of water.

## IMPORTANT INFORMATION

Water hardness can enhance **MARICIL** stability.

Reducing agents, amines and amine derivatives, or some fillers can react with **MARICIL**.



**MARICHEM®**

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

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**ANTIFREEZE™****DESCRIPTION**

**ANTIFREEZE** has been formulated using Monoethylene Glycol and synergistic corrosion inhibitors to protect metals and alloys found in cooling systems.

**ANTIFREEZE** provides excellent corrosion protection and acts as engine coolant in different kind of metals as steel, bronze, copper, brass and cast. It is appropriate for all kind of closed cooling engine systems.

**ADVANTAGES & CHARACTERISTICS**

- ◆ It protects metals and alloys found in cooling systems.
- ◆ Imparts excellent corrosion and antifreeze protection.
- ◆ Concentrated product that can be easily diluted.
- ◆ It is fully compatible with **DCWT Non Chromate** and **DCWT Powder**.
- ◆ No known effect on hoses, gaskets and seals.
- ◆ Cost effective, easy to apply and use.

**PHYSICAL PROPERTIES**

**ANTIFREEZE** is a Monoethylene Glycol-based concentrated corrosion inhibitor having the following properties:

<b>Appearance/Color</b>	: Blue-colored liquid.
<b>Specific gravity</b>	: 1.10 – 1.12 gr/cm <sup>3</sup> at 20°C
<b>Solubility</b>	: Completely soluble in water
<b>pH value</b>	: 9.7 – 10.7

**PACKAGING**

Order Number	: 833042 (30 ltrs)
Container	: Plastic jerrican

**APPLICATION AND USE****Dosing procedure**

For a freezing point depression apply the following percentage dosage of **ANTIFREEZE**.

Percentage Dosage of ANTIFREEZE							
Protection at Temperature (in degrees Celsius)	0	- 3	- 8	- 14	- 22	- 34	- 50
% Dosage of ANTIFREEZE in water	0	12	24	36	48	62	75



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## REFRACTOMETER (EG/PG)™

### DESCRIPTION

The **Refractometer (EG/PG)** is a measuring instrument for determining the refractive index of transparent substances in the liquid or the solid state. It is used to observe the behavior of light as it passes from a prism with known properties to the substance being tested.

Use of the **Refractometer (EG/PG)** for other purposes is contrary to its intended use and may be hazardous. The manufacturer shall not be liable for any damages caused by improper use.

### CONTENTS

After unpacking and before using the device for the first time, check that all listed parts have been supplied. Replace damaged or faulty parts immediately and do not put them into operation.

- ◆ Refractometer
- ◆ Storage box
- ◆ Pipette
- ◆ Adjustment tool
- ◆ Cleaning cloth
- ◆ Calibration liquid (Distilled water)

### BEFORE THE FIRST USE

Remove the protective film (if present) from the prism surface [2] and check that the rubber eye – cup [4] is fitted correctly.

### USE/MEASUREMENT

The Refractometer can be used to quickly and accurately determine the refractive index of transparent substances, liquid or solid ones. To ensure correct measurement, the measuring device should be adjusted before measurements are carried out. Please make sure your hands are dry before handling the measuring device.

### ZERO POINT CALIBRATION

- ◆ Hold up the Refractometer against a sufficiently bright light source and look through the eyepiece [5], holding the rubber eyeshade [4] closely against your eye/glasses.
- ◆ Rotate the eyepiece [5] to adjust it for your eyesight, until you can see the scale sharply.

- ◆ Open the prism cover [1].
- ◆ Thoroughly clean the prism [2] and the underside of the prism cover [1] using a soft cloth or soft paper (with alcohol if necessary) and wipe dry.
- ◆ Now apply a few drops of the calibration liquid [10] onto the prism surface [2].
- ◆ Close the prism cover [1]. The amount of liquid should be sufficient to moisten most of the prism surface. There should not be any air bubbles between the measuring prism [2] and prism cover [1].
- ◆ Wait about 30 seconds to allow the temperature of the fluid and prism to equalize.
- ◆ Look through the eyepiece [4], while pointing the refractometer's prism surface [2] at a bright light source.
- ◆ Through the eyepiece [4], you will see a bright and a blue field. The boundary line between them shows the measured value on the scale which is also visible through the eyepiece [4].
- ◆ Use the supplied adjustment tool [11] to turn the adjustment screw [3] behind the prism surface [2] (under the rubber cap), and adjust the scale so that the measuring device is optimally set up by moving the boundary line upwards or downwards.
- ◆ Calibration value: 0 °C EG / PG
- ◆ Repeat step 4 (cleaning).

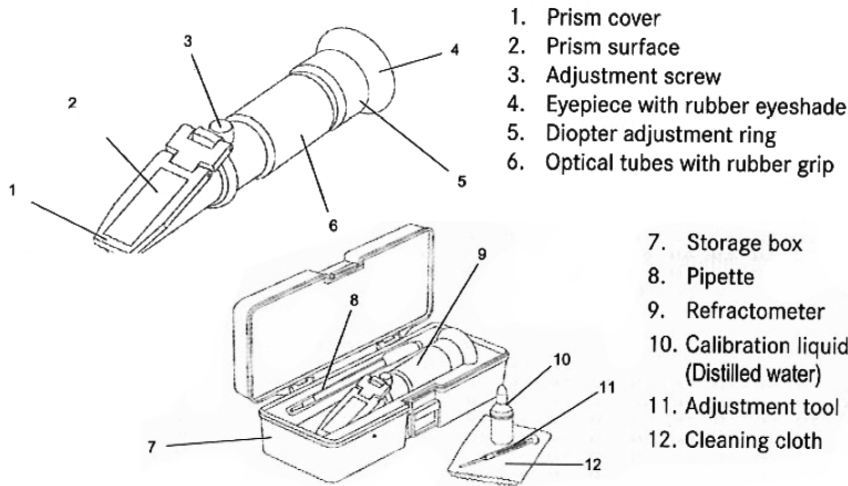
### ADDITIONAL ADVICE

It is important that the samples being measured are representative samples. For samples that evaporate easily, measurements should be carried out quickly. The samples should be at the same temperature as the measuring instrument in order to achieve an accurate result.

### TESTING PROCEDURE

- ◆ Open the prism cover [1] and use the supplied pipette [8] to apply a few drops of the sample liquid [8] onto the prism surface [2], then close the prism cover [1]. Spread the liquid evenly by pressing down on the prism cover [1] and eliminate any air bubbles present.
- ◆ Close the prism cover [1] and view the measurement scale through the eyepiece [4]. Point the prism surface [2] of the Refractometer at a bright light source while doing this.





- ◆ Rotate the adjustment ring [5] on the eyepiece [4] to adjust the focus.
- ◆ The boundary line will move on the measurement scale depending on the antifreeze concentration. This light/dark boundary on the antifreeze scale directly indicates the freezing point of the antifreeze mixture in °C. The figures show the measured value for propylene and the measured value for ethylene. If the antifreeze used is not known or it is a mixture of both, the propylene scale must always be used. Only then can sufficient coolant antifreeze protection be reliably guaranteed.
- ◆ The measurement result is not influenced by the temperature of the coolant.

- 7. Storage box
- 8. Pipette
- 9. Refractometer
- 10. Calibration liquid (Distilled water)
- 11. Adjustment tool
- 12. Cleaning cloth

- ◆ Carefully clean the supplied pipette [8] and the Refractometer after carrying out the measurement.

**PACKAGING**

Order Number : 700148  
 Container : Carton Box

**TEST RESULTS EVALUATION**

By using the Table 1 the concentration of Ethylene Glycol / Propylene Glycol can be calculated, when using the Refractometer (EG/PG).

**TABLE 1: Calculation table for Ethylene Glycol / Propylene Glycol**

Reading on hand Refractometer (°C)	wt. % Ethylene Glycol	wt. % Propylene Glycol
-50	58	63
-45	55	60
-40	52	57
-30	45	50
-20	36	41
-15	29	34
-10	22	26
-5	14	17
0	0	0

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# MARICHEM

**Division**  
MARINE CHEMICALS & EQUIPMENT

**Section A**  
WATER TREATMENT

**Part 1**  
BOILER WATER TREATMENT

**Part 2**  
COOLING WATER TREATMENT

**Part 3**  
EVAPORATOR TREATMENT

**Part 4**  
SEA WATER TREATMENT







## EVAPORATOR TREATMENT™

### DESCRIPTION

**EVAPORATOR TREATMENT** is a concentrated chemical compound consisting of polymer electrolytes and antifoam additives. It is used in evaporators in order to prevent scale build-up. Furthermore, acts as an antifoam agent.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Can be applied to all evaporators.
- ◆ Improves the quality of distilled water.
- ◆ Protects against scale formation.
- ◆ Acts as a foam eliminator.
- ◆ Easy to apply and use.
- ◆ Cost effective due to its concentrated state.

### PHYSICAL PROPERTIES

**EVAPORATOR TREATMENT** is a homogeneous, incombustible, non-corrosive and of a low molecular weight product. It is stable at high temperatures whilst acting as an efficacious diffuser.

It is important to note that **EVAPORATOR TREATMENT** does not contain Ammonia or Phosphate.

Appearance/Color	: Colorless, limpid liquid
Odor	: Soft
Specific gravity	: 1.08–1.14 gr/cm <sup>3</sup> at 20°C
pH value	: 11.2–13.2
Thermal Firmness	: 250°C

### PACKAGING

Order Number	: 673005 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**EVAPORATOR TREATMENT** should be applied in a proportion of 15–35ml/ton of distilled water. In the presence of scale deposits the volume of the product should be doubled to 30–70ml/ton of distilled water. If the problem of scale deposits is greater than anticipated, the volume of Evaporator Treatment must be increased according to the operator's estimations.

#### B. Feeding Procedure

**EVAPORATOR TREATMENT** must be introduced by means of a dosing system with a flow meter, through the vacant side of the evaporator.

Note that in order to reach maximum results in distilled water production, the evaporator must be chemically cleaned approximately every 1–1.5 months.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

** Read the Material Safety Data Sheet before using this product.**

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# MARICHEM

**Division**  
MARINE CHEMICALS & EQUIPMENT

**Section A**  
WATER TREATMENT

**Part 1**  
BOILER WATER TREATMENT

**Part 2**  
COOLING WATER TREATMENT

**Part 3**  
EVAPORATOR TREATMENT

**Part 4**  
SEA WATER TREATMENT





**CLOG-CONTROL™****DESCRIPTION**

**CLOG-CONTROL** is a highly effective, amine-based biocide, used for treating and inhibiting the growth of living organisms both micro and macro which cause the problems of biological fouling, within sea cooling water systems.

Biological fouling is the formation of a bio-film on the internal surfaces of the cooling system that are in contact with water. This bio-film consists of a layer of micro-organisms such as bacteria, fungi, yeast and algae. In case that there is no control of the biological fouling, the bio-film that results from such growth can plug the pump equipment, block pipelines and coat heat transfer surfaces with layers of slime. Biological fouling of the cooling system leads to improper operation and the reduction in the efficiency of the affected equipment.

**CLOG-CONTROL** consists of specific amine biocides, which prevent and inhibit the living micro organisms such as, bacteria, fungi and macro organisms such as barnacles, mussels and clams. At the same time it protects the seawater systems from corrosion.

**CLOG-CONTROL** can be used in a wide range of applications on board and is suitable for use in all seawater cooling lines, seawater intakes, trimming tanks, ballast tanks etc.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ Effectively prevents the formation of marine bio-film in seawater systems and inhibits the growth of living micro and macro-organisms.
- ◆ Protects the system from seawater corrosion, leaving an amine protective film on the metal surfaces.
- ◆ Removes the bio-film, caused by micro-organisms, on heat exchangers, which acts as insulating barrier therefore increasing the thermal conductivity.
- ◆ Does not consist of strong oxidant materials such as Chlorine and Bromine biocides.
- ◆ Maintains heat transfer in the system.
- ◆ Non toxic, non-corrosive and fully biodegradable.
- ◆ No known effect on rubber or plastic compounds.
- ◆ Cost effective, easy to apply and use.

**PHYSICAL PROPERTIES**

**CLOG-CONTROL** consists of specific amine biocides and is a non toxic, non-corrosive and fully biodegradable product.

<b>Appearance/Color</b>	: Clear Liquid/Colorless
<b>Odor</b>	: Slight amine like
<b>Specific Gravity</b>	: 0.99–1.01 gr/cm <sup>3</sup> at 20°C
<b>Solubility</b>	: Complete soluble in water
<b>pH value</b>	: 10.00–12.00

**PACKAGING**

Order Number	: 673014 (30 ltrs)
Container	: Plastic jerrican

**APPLICATION AND USE****A. Dosing Procedure**

The quantity of **CLOG-CONTROL** to be used is proportional to the rate of seawater flow, the desired treatment levels and the degree of contamination of the system to be treated. The recommended dosage for a sea water cooling system is 0.4 litres of **CLOG-CONTROL** per 100 tons of seawater flow for a period of one hour. This procedure must be repeated every 48 hours.

The product should be dosed using the **MARICHEM ELECTRONIC DOSING SYSTEM** or **MARICHEM MANUAL DOSING SYSTEM**. The dosage must be applied in a cross flow between the seawater suction pump and the system heat exchange. However, the dosage can be adjusted to suit the rate of the seawater flow. The proposed dosage should effectively remove the marine bio-film and completely treat the marine biological growth.

**B. Feeding Procedure**

**CLOG-CONTROL** can also be applied in the fresh water cooling systems when bio-fouling problems are encountered. It can act in combination with **D.C.W.T. NON CHROMATE** or **D.C.W.T. POWDER**.

In the fresh water cooling system the suggested dosage for application is 0.8lt per 10tons of circulating water. This quantity could effectively treat the biological fouling during water circulation. The dosage could be applied in the feed water tank or in a cross flow between the suction pump and the fresh water cooling system.



► **CLOG-CONTROL** should not be applied for potable water applications.

► **IMPORTANT NOTICE**

**CLOG-CONTROL** should not be fed to a system while the sea water is being drawn as makeup for an evaporator or water maker. Either isolate the evaporator or shut it down while **CLOG-CONTROL** is being dosed and for at least 30 minutes afterward.

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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# MARICHEM

Division  
MARINE CHEMICALS & EQUIPMENT

Section B  
**FUEL TREATMENT**







## FUEL OIL TREATMENT™

### DESCRIPTION

**FUEL OIL TREATMENT** is a fuel oil additive specifically designed to act as a water emulsifier and also to disperse and dissolve sludge in all types of fuel grades. This way, fuel blends gain a homogeneous nature while compatibility problems are reduced.

### ADVANTAGES & CHARACTERISTICS

- ◆ Disperses and dissolves sludge based hydrocarbons.
- ◆ Breaks water emulsions resulting in the efficient separation from oil when centrifuged.
- ◆ Prevents sludge formation and carbonaceous deposits.
- ◆ Maintains homogeneity and stabilization of the fuel, this improves combustion.
- ◆ Can be used as a degreasing agent when required.
- ◆ Absolutely soluble in the fuel.
- ◆ Has anticorrosive properties and is highly stable.
- ◆ Cost effective, easy to handle and use.

### PHYSICAL PROPERTIES

**FUEL OIL TREATMENT** is a liquid mixture of solvents, dispersants and emulsifying agents that results in a maximum performance of the treated fuel oil.

Appearance/Color	: Clear, red liquid
Specific gravity	: 0.85gr/cm <sup>3</sup> at 20°C
Flash Point	: >40°C
Odor	: Strong Aromatic : Solvent Odor

### PACKAGING

Order Number	: 562501 (25 ltrs) : 562101 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity suggested for fuel oil treatment is a proportion of 1 litre of F.O.T. for 4–8 cubic meters of fuel.

#### B. Feeding Procedure

After the quantity of F.O.T. has been determined, it must be added to the main storage tanks before fuel loading or to the deep tanks through to the entire fuel system.

### IMPORTANT INFORMATION

#### A. Emulsion Formation and F.O.T.

In general, heavy oils form stable emulsions with water, a lot easier than light oils with water; these stable emulsions are difficult to break.

Moreover, heavy bunker oils are contaminated with traces of water and when these are combined with condensation moisture and heavier hydrocarbons, they form emulsions.

As a result, these emulsions increase the degree of sludge formation in the fuel tank and they also cause problems to the burners during combustion.

Another difficulty are the separations, at low temperatures, between high molecular constituents (such as paraffin) when various types of fuels are blended.

F.O.T. is specifically engineered to encounter and treat 100% of the above mentioned anomalies.

#### B. Atomization and F.O.T.

F.O.T. contains surface-active agents, which reduce the limit of surface tension between oil and air, consequently; this results in fine atomization within the burner.

This way, we have a more even fuel distribution throughout the burner, thus achieving a better fuel utilization, through complete combustion. Therefore, energy is preserved by the saving of fuel.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## F.O.T. NEW GENERATION™

### DESCRIPTION

**F.O.T. NEW GENERATION** is a concentrated fuel oil additive specifically designed to facilitate the handling and burning of all types of heavy fuel to disperse asphaltenes found in sludge and further dissolve the sludge, suspending high fuel particles into solution. In this way, fuel blends gain a homogeneous nature while compatibility and stability problems are highly reduced.

**F.O.T. NEW GENERATION** is the best product offered in the market for oxidation stability requirements introduced for distillate fuel grades as per ISO 8217:2010 (or later) marine fuel specification.

**F.O.T. NEW GENERATION** is a very cost effective product due to the very low dosage needed, yielding from its concentrated nature.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Acts as an asphaltene dispersant
- ◆ Dissolves sludge based high fuel particles.
- ◆ Prevents sludge formation and carbonaceous deposits in tanks.
- ◆ Maintains homogeneity and stabilization of the fuel.
- ◆ Leads to improved combustion of the fuel oils.
- ◆ Absolutely compatible with the various types of heavy fuels.
- ◆ Highly reduces tank cleaning costs.
- ◆ Prevents fuel oxidation/instability in tanks.
- ◆ Has anticorrosive properties and is highly stable.
- ◆ Cost effective due to the very low dosage needed, yielding from its concentrated nature.
- ◆ Easy to handle and use.

### PHYSICAL PROPERTIES

**F.O.T. NEW GENERATION** is an organic-based fuel oil additive consisting of solvents, dispersants, polymers, corrosion inhibitors and surface-active agents that result in a maximum performance of the treated fuel oil.

Appearance/Color	: Clear, yellow-orange liquid
Specific gravity	: 0.91 gr/cm <sup>3</sup> at 20°C
Flash Point	: 70°C
Odor	: Aromatic Solvent Odor

### PACKAGING

Order Number	: 562511 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity suggested for fuel oil treatment is a proportion of 1 litre of **F.O.T. NEW GENERATION** for 16-20 cubic meters of fuel.

#### B. Feeding Procedure

After the quantity of **F.O.T. NEW GENERATION** has been determined, it must be added to the main storage tanks before fuel bunkering or to the deep tanks through the entire fuel system.

#### ► IMPORTANT INFORMATION

#### Atomization and F.O.T.

**F.O.T. NEW GENERATION** contains surface-active agents, which reduce the limit of surface tension between oil and air while they disperse the water residual and turn fuel into fine droplets within the burner. As a result, a greater distribution of fuel quantity throughout the burner is created, thus achieving a better fuel utilization, through complete combustion. Therefore, energy is preserved by the saving of fuel.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**F.O.T. 10™**

## DESCRIPTION

F.O.T. 10 is a concentrated liquid mixture of organic components, which can be added to all marine fuel grades; it acts as a catalyst in order to improve combustion.

## ADVANTAGES AND CHARACTERISTICS

- ◆ 100% oil-soluble.
- ◆ Reduces the ignition point of fuel.
- ◆ Prevents and disperses sludge formations thus increasing fuel flow and homogeneity.
- ◆ Reduces smoke emissions, soot development and carbon/ash deposits.
- ◆ Eliminates acid corrosion by inhibiting gaseous acids.
- ◆ Minimizes fuel consumption due to its upgrading action to the fuel's quality.
- ◆ Can be used with a range of other products.
- ◆ Cost effective, easy to apply and use.
- ◆ Overall, it provides improved fuel atomization and increased combustion efficiency, whilst protecting the internal combustion parts of the engine that are coming into contact with the fuel

## PHYSICAL PROPERTIES

F.O.T. 10 is a 100% ash-less, non-abrasive liquid compound containing no metal complexes.

Appearance/Color	: Clear, brown liquid
Specific gravity	: 0.85 gr/cm <sup>3</sup> at 20°C
Flash Point	: >40°C
Odor	: Strong Aromatic Solvent Odor

## PACKAGING

Order Number	: 562502 (25 ltrs) 562102 (210 ltrs)
Container	: Steel drum

## APPLICATION AND USE

### A. Dosing Procedure

The quantity of F.O.T. 10 suggested for treatment is 1 litre per 4–6 cubic meters of fuel.

This proportion can vary though, it can vary according to the quantity of the fuel to be treated and the operation handling procedures in progress. However, these variances can be adjusted against the test results obtained and the operator's experience.

### B. Feeding Procedure

F.O.T. 10 must be applied to the system in question, by continuous feeding into the fuel line or into the settling tank. In any case, the use of a metering pump is recommended; it provides the advantage of appropriate dispersion under standard treatment conditions.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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## F.O.T. 10 NEW GENERATION™

### DESCRIPTION

**F.O.T. 10 NEW GENERATION** is a concentrated liquid blend of organic components, which can be added to all marine heavy fuel grades. It acts as a catalyst in order both to improve combustion and maximize the fuel energy release while at the same time it keeps the fuel oil both stable and homogeneous.

**F.O.T. 10 NEW GENERATION** catalytically reduces the amount of exhaust particulates as it inhibits the formation of toxic Nitrogen Oxides and Carbon Monoxide which are emitted in the atmosphere. This results to a decrease in the fuel consumption by increasing the engine performance.

Furthermore, it is a very cost effective product due to the very low dosage needed, yielding from its concentrated nature.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Reduces the ignition point of fuel.
- ◆ Prevents and disperses sludge formations thus increasing fuel fluidity and homogeneity.
- ◆ Reduces smoke emissions, soot development and carbon/ash deposits.
- ◆ Reduces toxic Nitrogen Oxides and Carbon Monoxide emissions.
- ◆ Maximizes the fuel energy release.
- ◆ Minimizes fuel consumption due to its upgrading action to the fuel quality.
- ◆ Cost effective due to the very low dosage needed, yielding from its concentrated nature.
- ◆ Easy to handle and use.
- ◆ Overall, it provides improved fuel atomization and increased combustion efficiency, whilst protecting the internal combustion parts of the engine which comes into contact with the fuel.

### PHYSICAL PROPERTIES

**F.O.T. 10 NEW GENERATION** is a concentrated liquid mixture of polymers, fuel detergents and organometallic compounds in proper solvents acting as a catalyst, dispersant and smoke reducer for improving fuel combustion.

Appearance/Color	: Clear, dark brown liquid
Specific gravity	: 0.96 - 1.01 gr/cm <sup>3</sup> at 20°C
Flash Point	: 62°C
Odor	: Aromatic Solvent Odor

### PACKAGING

Order Number	: 562512 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **F.O.T. 10 NEW GENERATION** suggested for treatment is 1 litre per 16 - 20 cubic meters of fuel.

This proportion can vary according to the quantity of the fuel to be treated, the operation handling procedures in progress and in particular the characteristics of the engine, as specified by the manufacturer. However, these variances can be adjusted against the test results obtained and the operator's experience.

#### B. Feeding Procedure

**F.O.T. 10 NEW GENERATION** must be applied to the system in question, by continuous feeding into the fuel line or into the settling tank. In any case, the use of a metering pump is recommended; it provides the advantage of appropriate dispersion under standard treatment conditions.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

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**F.O.T. C-100™****DESCRIPTION**

**F.O.T. C-100** is a unique product specifically designed to increase fuel energy efficiency upon consumption and to reduce combustion deposits. This innovative formula combines superior quality ingredients, which result to its catalytic action as a fuel additive and deposit eliminator for all types of diesel engines that operate on heavy oils. Additionally, it is engineered to eliminate heavy metal depositions such as Vanadium, Sulfur, Lead, etc.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ Reduces low and high temperature acid corrosion.
- ◆ Reduces carbonaceous combustion deposits by increasing the combustion temperature enough to fragment and force them to pass out of the engines through burning with the fuel.
- ◆ Reduces heavy metal deposits such as Vanadium, Sulfur and Sodium formed by poor quality heavy fuels in the same way as the carbonaceous combustion deposits.
- ◆ Preserves engine condition and especially vital parts such as the exhaust spaces, the valves, the turbochargers and engine heads from acid corrosion and carbon ash build-up.
- ◆ Assists in the blending of different grade fuels and the dispersion of sludge.
- ◆ Increases fuel efficiency, this results in fuel saving.
- ◆ Completely soluble in oil.
- ◆ Can be used with a specific range of other products.
- ◆ Easy to apply and use.

**PHYSICAL PROPERTIES**

**F.O.T. C-100** is a 100% oil-soluble, organometallic liquid compound.

<b>Appearance/Color</b>	: Brown liquid
<b>Specific gravity</b>	: 0.90 - 0.94 gr/cm <sup>3</sup> at 20°C
<b>Flash Point</b>	: >40°C
<b>Odor</b>	: Strong Aromatic Solvent Odor

**PACKAGING**

Order Number	: 562503 (25 ltrs)
Container	: Steel drum

**APPLICATION AND USE****A. Dosing Procedure**

The proportion of **F.O.T. C-100** to be used is 1 litre for 6–8 cubic meters of fuel.

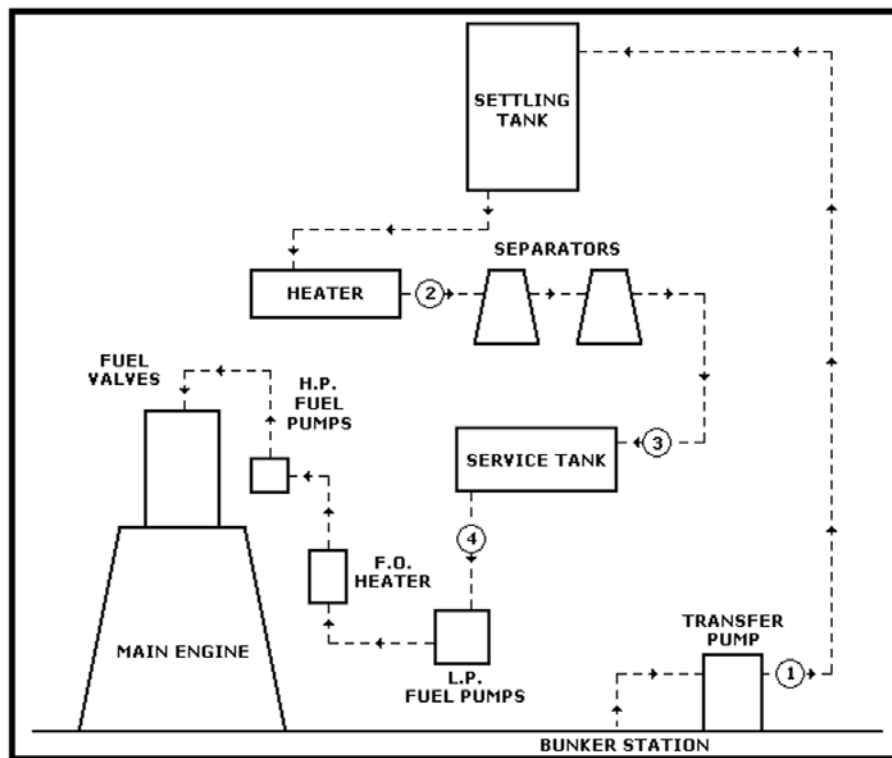
This proportion can vary though, it can vary according to the quantity of the fuel to be treated and the operation handling procedures in progress. Therefore, in order to reach maximum results, the dose required may be linked to the above-mentioned factors when observations of the end results are considered.

**B. Feeding Procedure**

**F.O.T. C-100** is in fed, at a continuous rate, into the fuel tank of the fuel treatment system or into the fuel line by means of a metering pump.



## FUEL STORAGE AND SERVICE SCHEMATIC



RECOMMENDED INJECTION POINTS FOR F.O.T. C-100  
IN TYPICAL MAIN ENGINE FUEL ARRANGEMENT ① ② ③ ④

### ! SAFETY AND HANDLING

HANDLING	Handle with care. Store in a dry, cool and well ventilated environment.
SAFETY	IMMEDIATE ACTIONS
Eye Contact	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
Skin Contact	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
Inhalation	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
If Swallowed	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
GENERAL INSTRUCTIONS	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## DESCRIPTION

**F.O.T. C-100 NEW GENERATION** is a unique and sophisticated product, containing advanced organometallic compounds, specifically designed to increase fuel energy efficiency upon consumption and to reduce combustion deposits. This improved and more concentrated innovative formula combines superior quality ingredients, which result to its catalytic action as a fuel additive and deposit eliminator for all types of diesel engines that operate on heavy fuel oils.

**F.O.T. C-100 NEW GENERATION** is engineered to eliminate heavy metal depositions such as Vanadium, Sulfur, Lead contaminants in the fuel. These deposit eliminators are very effective in changing ash composition during their reaction with the heavy metals depositions. The reactions occurring lead to the prevention of low and high temperature acid corrosion on sensitive surfaces.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Very small dosage, highly concentrated and easy to dose and store.
- ◆ Reduces carbonaceous combustion deposits by increasing the combustion temperature enough to fragment and force them to pass out of the engines through burning with the fuel.
- ◆ Reduces heavy metal deposits such as Vanadium, Sulfur and Lead formed by poor quality heavy fuels in the same way as the carbonaceous combustion deposits.
- ◆ Improves performance in fuels with high CCAI.
- ◆ Preserves engine condition and especially vital parts such as the exhaust spaces, the valves, the turbochargers and engine heads from acid corrosion and carbon ash build-up.
- ◆ Increases fuel performance and efficiency, and as a result offers fuel consumption reduction.
- ◆ Reduces low and high temperature acid corrosion on sensitive surfaces.
- ◆ Completely soluble in fuel oil.
- ◆ Can be used with a specific range of other products.
- ◆ Easy to apply and use.

## F.O.T. C-100 NEW GENERATION™

### PHYSICAL PROPERTIES

**F.O.T. C-100 NEW GENERATION** is a 100% oil-soluble, containing advanced organometallic compounds and deposit eliminators.

Appearance/Color	: Dark Brown liquid
Specific gravity	: 1.03 - 1.07 gr/cm <sup>3</sup> at 20°C
Flash Point	: 64°C
Odor	: Aromatic Solvent Odor

### PACKAGING

Order Number	: 562513 (25 ltrs) 562113 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

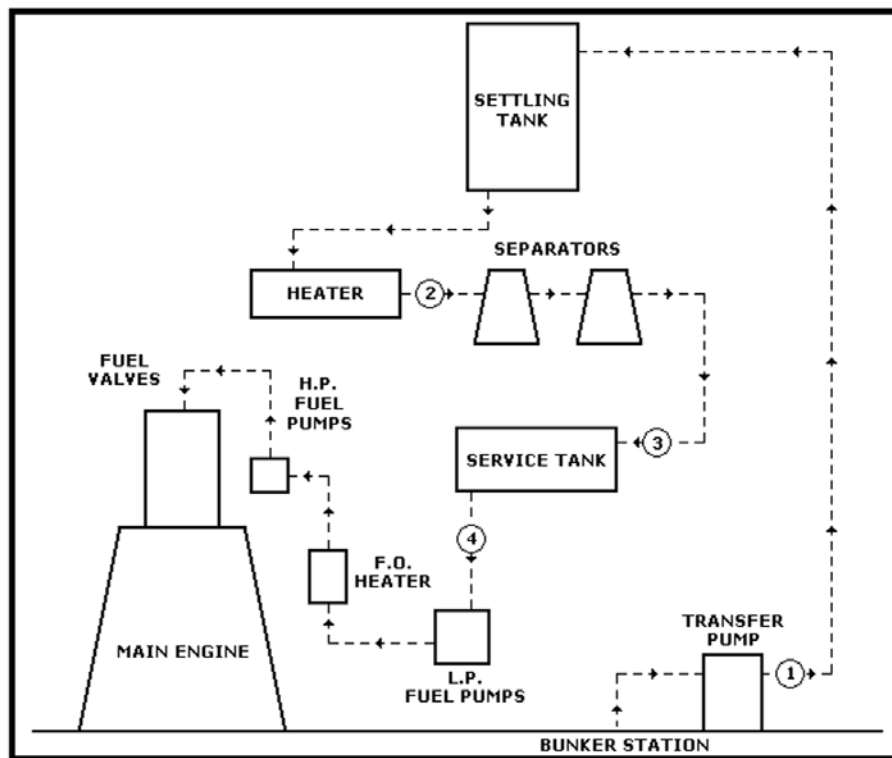
The proportion of **F.O.T. C-100 NEW GENERATION** to be used is 1 litre for 12 - 15 cubic meters of fuel, depending on the nature and severity of the problem. This proportion can vary though, it can vary according to the quantity of the fuel to be treated and the operation handling procedures in progress.

#### B. Feeding Procedure

**F.O.T. C-100 NEW GENERATION** is in fed, at a continuous rate, into the service tank by means of a metering pump, as it can be seen in the below diagram points 3 and/or 4.



## FUEL STORAGE AND SERVICE SCHEMATIC



RECOMMENDED INJECTION POINTS FOR F.O.T. C-100  
IN TYPICAL MAIN ENGINE FUEL ARRANGEMENT ① ② ③ ④

### ! SAFETY AND HANDLING

HANDLING	Handle with care. Store in a dry, cool and well ventilated environment.
SAFETY	IMMEDIATE ACTIONS
Eye Contact	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
Skin Contact	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
Inhalation	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
If Swallowed	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
GENERAL INSTRUCTIONS	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

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**F.O.T.-LS**™

## DESCRIPTION

**F.O.T.-LS** is a fuel additive which improves the lubricity of all low Sulfur Marine Fuels. It is a combination of specific solvents, lubricity additives, ashless dispersants, detergents and corrosion inhibitors.

Emission concerns have led to the application of new regulations in Marine Fuels.

According to the revised **IMO MARPOL Annex VI-2008** the Sulphur content globally shall not exceed a 3,5% content in all Marine Fuel Oils. However, European Union regulations stipulate Emission Control Areas (ECA's) where the Sulphur content in the fuel shall not exceed 1.0%

Reducing the level of Sulphur compounds in Marine Fuel Oils can reduce the ability of the oil to lubricate the injection system of the engine, causing the fuel injection pump of the engine to seize. Lower lubricity can significantly increase wear of fuel pumps, valves and injector nozzles over an extended period of use.

**F.O.T.-LS** provides superior lubricity properties to the Marine Fuel Oils in order to avoid these situations. Furthermore contains detergent and dispersant additives to prevent problems associated with the accumulations of injector deposits.

**F.O.T.-LS** reduces significantly the injector deposits and therefore has a positive effect on emissions (smoke, carbon monoxide, unburned hydrocarbons and particulates). Additionally, the fuel system is protected against corrosion.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Provides superior lubricity properties to the Ultra Low Sulphur Marine Fuel Oils.
- ◆ Prevents wear on contacting metal surfaces and their seizure.
- ◆ Reduces significantly injector deposits.
- ◆ Protects fuels systems against corrosion
- ◆ Will not separate in the fuel tank.
- ◆ Contains dispersants and detergents.
- ◆ Does not contain chlorinated solvents.
- ◆ Well dispersing product into the fuel.
- ◆ Easy to apply and use in the fuel oil with excellent results.

## PHYSICAL PROPERTIES

Appearance/Color	: Clear, yellow liquid
Odor	: Aromatic solvent odor
Specific Gravity	: 0.87 - 0.91 gr/cm <sup>3</sup> at 20°C
Cloud Point	: -25°C (ASTM D 2500)
Pour Point	: -47°C (ASTM D 445)
Flash Point	: 54°C

## PACKAGING

Order Number	: 562506 (25 ltrs)
Container	: Steel drum

## APPLICATION AND USE

### A. Dosing Procedure

For Marine Gas Oils (MGO), Marine Diesel Oils (MDO) and Ultra Low Sulphur Diesel (ULSD), the normal dosage of **F.O.T.-LS** is 1 lt per 5 cubic meters of fuel.

For Intermediate Fuel Oils (IFO) and Heavy Fuel Oils (HFO) the dosage of 1lt of **F.O.T.-LS** per 4 cubic meters of Fuel Oil, to deal with the problem of injector deposits and emissions.

### B. Feeding Procedure

**F.O.T.-LS** should be dosed directly in the fuel storage tank, preferably prior to bunkering. This way the product is better dispersed in the fuel.

It is suggested, to dose firstly the requested quantity of **F.O.T.-LS** and then add the Low Sulphur Fuel Oil in the settling tank, in order to accomplish better homogenization.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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F.O.T.-ULS™

## DESCRIPTION

**F.O.T.-ULS** is a new generation fuel additive which improves the lubricity of all Ultra Low Sulphur Marine Fuel Oils. This combination of solvents, lubricity additives, and corrosion inhibitors, is the only solution for such type of fuels. **F.O.T.-ULS** is highly cost effective due to the very low dosage needed, yielding from its concentrated nature.

Emission concerns have led to the application of new regulations in Marine Fuels. From 1st January 2015, ships travelling within 200 nautical miles of shore in North America, the Baltic, North seas and through English channel must limit sulphur content into fuel oil to 0.1% (Ultra Low Sulphur Fuel Oil), down from 1%, according to International Maritime Organization rules - Annex VI of MARPOL - Sulphur limits, as adopted by IMO Marine Environment Protection Committee (MEPC) 58th Session in October 2008 - Revised MARPOL Annex VI – Resolution MEPC.176 (58).

Reducing the level of Sulphur compounds in the Marine Fuel Oil can reduce the ability of the oil to lubricate the injection system of the engine, causing the fuel injection pump to seize. Lower lubricity can significantly increase wear of fuel pumps, valves and injector nozzles over an extended period of use.

**F.O.T.-ULS** provides superior lubricity properties to the Ultra Low Sulphur Fuel Oils in order to avoid these eventualities. Furthermore, it prevents problems associated with the accumulations of injection deposits.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Provides superior lubricity properties to the Ultra Low Sulphur Fuel Oils.
- ◆ Also, suitable for normal low Sulphur Fuel Oils.
- ◆ Prevents wear on contacting metal surfaces and their seizure.
- ◆ Reduces significantly injector deposits.
- ◆ Protects fuels systems against corrosion.
- ◆ Will not separate in the fuel tank.
- ◆ It gives effective results well below standard EC limit of 460 µm, as proven by HFRR test performed according to ISO 12156-1 standard test method.
- ◆ Contains only harmless substances.
- ◆ Does not contain chlorinated solvents.

- ◆ Easily dispersed into the fuel.
- ◆ Cost effective due to the very low dosage needed, yielding from its concentrated nature.
- ◆ Easy to apply and use in the fuel oil with excellent results.

## PHYSICAL PROPERTIES

Appearance	: Clear liquid.
Color	: Yellow.
Odor	: Characteristic (Slight).
Specific Gravity	: 0.87 - 0.90 gr/cm <sup>3</sup> at 20°C (ASTM D 1298)
Flash Point	: > 120°C

## PACKAGING

Order Number	: 562508 (25 ltrs)
Container	: Steel drum

## APPLICATION AND USE

### A. Dosing Procedure

For Marine Gas Oils (MGO) and Marine Diesel Oils (MDO), the normal dosage of **F.O.T.-ULS** is 1lt per 25 cubic meters of fuel.

For Intermediate Fuel Oils (IFO) and Heavy Fuel Oils (HFO) the dosage is 1lt of **F.O.T.-ULS** per 20 cubic meters of Fuel Oil.

### B. Feeding Procedure

**F.O.T.-ULS** should be dosed directly in the fuel storage tank, preferably prior to bunkering. This way the product is better mixed in the fuel.

It is suggested that, firstly dose the requested quantity of **F.O.T.-ULS** followed by the Ultra Low Sulphur Fuel Oil in the settling tank, in order to accomplish better homogenization.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## FUEL BIOCONTROL™

### DESCRIPTION

**FUEL BIOCONTROL** is a special designed liquid biocide that provides complete control against bacteria and microorganisms, which can infect fuel storage tanks and fuel systems, therefore degrading the fuel properties.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Powerful at the fuel–water interface where microbe growth is most dynamic.
- ◆ Maintains homogeneity and stabilization of the fuel, this leads to the improved combustion.
- ◆ Provides complete disappearance of the microorganisms, which contaminate fuel storage tanks and systems.
- ◆ Can be added directly to the fuel tank.
- ◆ Cost effective, easy to handle and use.
- ◆ Prevents corrosion in fuel systems.
- ◆ Keeps filters, nozzles and injectors free from clogging.
- ◆ Will not harm metallic parts and synthetic rubber.
- ◆ Completely biodegradable with fast results.
- ◆ Characterized by its very good biocidal and biostatic effect.

### PHYSICAL PROPERTIES

**FUEL BIOCONTROL** is a liquid mixture of organic solvents and highly effective biocides. It has the following physical properties:

Appearance/Color	: Red liquid
Specific Gravity	: 0.86 - 0.90 gr/cm <sup>3</sup> at 20°C
Odor	: Characteristic solvent odor
Flash Point	: >40°C

### PACKAGING

Order Number	: 562504 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**FUEL BIOCONTROL** dosage depends on a number of factors such as the type of system being treated, the nature and the extent of microbial contamination and the degree of control required.

In case of preventive treatment, 0.2lt–0.4lt of **FUEL BIOCONTROL** must be added per tone of fuel. For the contaminated fuel distillation 2lt of **FUEL BIOCONTROL** is a sufficient quantity per ton of fuel.

In cases of filter blockages a shock dosing of 10lt **FUEL BIOCONTROL** is recommended per ton of fuel.

#### B. Feeding Procedure

**FUEL BIOCONTROL** is best added to the dewatered tank that is about a third full. When the tank is filled, the product is mixed into the system.

In cases of heavy fouling, the system should, if possible, be cleaned before **FUEL BIOCONTROL** is used.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for several minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, remove contaminated clothes. Rinse and wash thoroughly with water and soap.
<b>Inhalation</b>	Avoid inhalation of vapours. Otherwise, remove the affected person to fresh air, if not breath give artificial respiration. If breathing is difficult qualified personnel should administer Oxygen. Seek medical attention.
<b>If swallowed</b>	Avoid ingestion. Otherwise, rinse mouth. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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## FUELBREAK™

### DESCRIPTION

**FUELBREAK** is a solution of specific solvents combined with appropriate emulsion-break compounds, which can be efficiently used for separating the quantities of water in marine fuels by breaking the water in oil emulsions.

Usually all Heavy Fuel Oils (HFO) when contaminated with water form stable water in oil emulsions (W/O emulsions). The formation of these emulsions is due to asphaltenes, resins and other heavy hydrocarbon molecules of HFO acting as 'natural emulsifiers'. These emulsions are very stable and are difficult to be broken without the application of special formulated products which are called de-emulsifiers.

In marine fuel handling systems the presence of Water in Oil emulsion could lead to the formation of sludge that can be deposited and encrusted inside the metallic tubes. These conditions can block the filters and prevent the separation of metallic elements/ash which the HFO contains. They can also boost the biological growth and increase microbes with result of fuel degradation and decrease the combustion efficiency.

When HFO is contaminated with seawater it can cause serious damage on metallic parts during handling. This will lead to the formation of corrosive substances at the exhaust.

In any case the quantity of water must be removed before burning.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Breaks Water in Oil emulsion and separates most of the water in settling tank and in the centrifuge.
- ◆ Improves the efficiency of separator.
- ◆ Prevents formation of sludge in the tubes and the blockage of filters.
- ◆ Facilitates the removal of metallic elements.
- ◆ Improves fuel flow by reducing viscosity without affecting other physical characteristics.
- ◆ It is not toxic, not corrosive and it does not contain chlorinated solvents.
- ◆ Suggested for use especially with marine fuel types IFO 180, IFO 380 when having high water and ash/metallic content.

### PHYSICAL PROPERTIES

Appearance	: Clear Liquid
Odor	: Aromatic
Specific Gravity	: 0.88 - 0.92 gr/cm <sup>3</sup> at 20°C
Cloud Point	: < -15°C
Pour Point	: < -30°C
Flash Point	: 41°C

### PACKAGING

Order Number	: 562507 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

The product should be applied inside the fuel storage tank or by a dosimetric pump at the initial stage of fuel handling, so as to ensure good dispersion of the active ingredients. The separation of water will be succeeded both inside the settling tank and in the fuel centrifuges at a temperature 60–70°C. The separation will be slower in the settling tank, where the water will be accumulated at the bottom of the tank and must be collected and separation will be faster when the fuel centrifuges.

The dosage should be according the following table, taking into consideration the volume percentage (%) of water as recorded in the fuel analysis.

Liters of product/liters of HFO	1/5000	1/2500	1/1250	1/500
Volume percentage (%) of water	0.5-1.0%	1.0-2.0%	2.0-3.0%	3.0-5.0%

If no fuel chemical analysis is available, then **MARICHEM WATER IN OIL TEST KIT** (Order Number: 720101) can be used for measuring the volume percentage (%) of water in fuel oil.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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## FUELFLOW PPR™

### DESCRIPTION

**FUELFLOW PPR** (Pour Point Reducer) is a highly concentrated fuel oil additive specifically designed to reduce/depress the Pour Point (the temperature at which a fuel becomes solid) and prevent the formation of wax structures. In the case of marine distillate fuels, there seems a notable move toward fuels with higher wax contents, and this leads to worsening cold temperature operability.

As more ships sailing through polar waters and as new hybrid and ultra low sulfur distillate fuels are becoming available in the market, there is an increased risk of wax formation which can make fuel unpumpable.

As the temperature in the fuel decreases, the molecules of paraffin tend to come together, forming large structures which will degrade the flow characteristics of the fuel.

Modification of the crystallization of the wax is necessary to maintain the fuel at a liquid condition and avoid solidification in extreme conditions.

**FUELFLOW PPR** is suitable for all distillate fuels and offers no paraffin crystallization at very low temperatures/arctic waters. When using **FUELFLOW PPR** the fuel remains liquid and easy to handle/pump.

**FUELFLOW PPR** has been tested by independent lab, and has demonstrated to reduce pour point and cold filter plugging point (CFPP), by an average of 21°C and 11°C respectively.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Pour point reducer/depressant
- ◆ Prevents the formation of wax structures
- ◆ Suitable for all distillate fuels
- ◆ No paraffin crystallization at very low temperatures/arctic waters
- ◆ Reduces the risk of fuel waxing and solidification
- ◆ Fuel remains liquid and easy to handle/pump
- ◆ Dose into the fuel tank prior to filling at 1ltr/ tone of fuel
- ◆ Cost effective due to the low dosage needed.
- ◆ Easy to handle and use, as it is available in 25L pails.

### PHYSICAL PROPERTIES

**FUELFLOW PPR** is an organic-based pour point reducer/depressant that prevents the formation of wax structures and is suitable for all distillate fuels.

- Appearance/Color** : Colorless liquid
- Specific gravity** : 0.88 - 0.90 gr/cm<sup>3</sup> at 20°C
- Flash Point** : 64°C
- Odor** : Aromatic Solvent Odor

### PACKAGING

- Order Number: 562515 (25 lt)
- Container: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The fuel must be above its cloud point prior to treating with **FUELFLOW PPR**.

- ◆ Cloud point (CP) is the temperature below which wax in fuel form a cloudy appearance.
- ◆ Pour Point (PP) is the lowest temperature at which fuel continues to flow without losing its flow characteristics.
- ◆ Cold filter plugging point (CFPP) is the lowest temperature, expressed in degrees Celsius (°C), at which a given volume of fuel still passes through a standardized filtration device in a specified time.
- ◆ Cloud Point > CFPP Point > Pour Point
- ◆ CFPP is generally around 3°C below the Cloud Point.

The recommended dosage of **FUELFLOW PPR** is 1 liter to 1 tonne of fuel oil. In case the results are not the desired ones, then dosage can be increased to 1 liter of **FUELFLOW PPR** for 0.5 tonnes of fuel oil.

#### B. Feeding Procedure

**FUELFLOW PPR** should be dosed directly into the bunker tanks prior to filling.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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## SOOT CLEANER™

### DESCRIPTION

**SOOT CLEANER** is a highly effective powder compound that acts as a combustion catalyst in order to easily remove soot and ash deposits from surfaces where accumulation exists. Soot accumulation occurs, as a result of the fuel combustion that takes place during the ignition period or the soot blowing operation.

**SOOT CLEANER** is applicable to all types of boiler and diesel exhaust systems due to its characteristic action to explode when it enters the combustion flame.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Reduces soot and ash deposits at a controlled rate.
- ◆ Eliminates the risk of hazardous soot fires.
- ◆ Effectively protects steel surfaces against wear off and short life duration caused by ash and soot build up and very high temperatures.
- ◆ Reduces the ignition point temperature of soot and fire scale, which results in easy combustion of carbon deposits forming an easily removable dry ash.
- ◆ Prevents acid from forming, reducing the risk of corrosion.
- ◆ Induces fuel efficiency which contributes to fuel saving.
- ◆ Increases heat transfer and can maximize boiler efficiency.
- ◆ Minimizes cleaning and maintenance cost.
- ◆ Easy to handle and apply.

### PHYSICAL PROPERTIES

**SOOT CLEANER** is a dry powder compounded by specific combustion catalysts, formulated to intrude and break fused ash deposits and strong bonded carbonaceous deposits by dislocating the combustion binders due to its explosive action inside the exhaust system.

**Appearance/Color** : Blue, thin granules powder

**Specific gravity** : 1.16 - 1.20 gr/cm<sup>3</sup> at 20°C

**Flash Point** : None

### PACKAGING

**Order Number** : 562604 (25 kgs)

**Container** : Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **SOOT CLEANER** to be used is suggested at a ratio of 1kg per 400–500m<sup>2</sup> of surface area on a daily basis. Notice that the above quantity may be altered, depending on the system to be treated, based on particular variations and/or the manufacturer's technical specifications.

#### B. Cleaning Procedure

**SOOT CLEANER** is applicable to many systems such as diesel exhaust gas economizers, fire tube boilers, main boilers, etc.

In the case of diesel exhaust economizers, the product is applied upstream, of the area being treated into the exhaust gas system.

In the case of boilers, the product is applied from a suitable port point of the system.

Make sure that the powder is spread through towards the backside of the combustion chamber.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## SOOT CLEANER LIQUID™

### DESCRIPTION

**SOOT CLEANER LIQUID** is a water-based, magnesium-containing liquid formulated to act as a combustion catalyst in order to easily remove soot and ash deposits from surfaces where accumulation has occurred during fuel combustion. It is applicable to all types of boiler and diesel engine exhaust systems. It is a low viscosity liquid, making handling and feeding easy.

**SOOT CLEANER LIQUID** works to control fireside slagging and fouling by decreasing the ignition point of the soot, making deposits easier to remove during normal soot blowing and out-of-service cleaning. It is also effective in controlling cold-end corrosion and acid smut emissions.

### LITERATURE - TECHNOLOGY

Combustion-related problems in boilers include slagging, fouling, high temperature corrosion and cold-end corrosion of heat transfer surfaces and other boiler components.

Deposition is related to the presence of impurities in the fuels being burned while combined with combustion practices. High temperature deposition will occur when molten ash derived from fuel impurities, comes into contact with the metal surfaces of the boiler and solidifies. When this "slag" contacts a metal surface, additional ash particles become trapped within the sticky molten mass, this results in fouling and uncontrolled heavy slagging. Once deposits have formed, corrosion can result beneath. Soot blowing may not be able to remove these tenacious deposits. Continuous build up, will result in lost efficiency and reduced throughput of the boiler. High temperature corrosion causes metal loss and eventual tube failure.

**SOOT CLEANER LIQUID** combines with various ash constituents to decrease the ignition point and weaken their deposit structure. This permits the ash to pass through the boiler as a solid and increases friability of any deposits, which do form, making deposit removal easier by means of soot blowing or off-line cleaning.

Sulfur trioxide (SO<sub>3</sub>) is formed from the combustion of sulfur contained in fuels. It combines with water vapor in the flue gas to form Sulfuric Acid. The acid corrodes metal surfaces that are below the acid dew point. This condition is typically referred to as low temperature or cold-end corrosion. In addition, the corroded products can block gas passages between tubes.

**SOOT CLEANER LIQUID** reduces the catalytic conversion of Sulfur dioxide (SO<sub>2</sub>) in the flue gas to Sulfur trioxide (SO<sub>3</sub>). Preventing the formation of SO<sub>3</sub> in the flue gas can also result in lower stack opacity.

Also, **SOOT CLEANER LIQUID** directly inhibits acid corrosion by neutralizing Sulfur trioxide (SO<sub>3</sub>) and coating the tube surfaces.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Non-hazardous liquid which reduces slagging and fouling.
- ◆ Effective in controlling cold-end corrosion and acid smut emissions.
- ◆ Reduces high-temperature corrosion as well as cold-end corrosion and fouling.
- ◆ Provides better soot blowing results.
- ◆ Eliminates the risk for hazardous soot fires.
- ◆ Results to higher boiler efficiency and reliability.
- ◆ Induces fuel efficiency thus contributing to fuel saving.
- ◆ Minimizes costs associated with maintenance and downtime.
- ◆ Easy to use.
- ▶ **SOOT CLEANER LIQUID** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**SOOT CLEANER LIQUID** is a water-based, magnesium containing liquid, formulated with a dispersant to enhance product dispersion in fuel oil. As a water-based product, it has no flash point issues and is not sensitive to moisture ingress.

Appearance/Color	: Yellow to amber liquid
Odor	: Odorless
Flash Point	: Not applicable
Solubility in Water	: Completely soluble
Specific gravity	: 1.14 - 1.18 gr/cm <sup>3</sup> at 20°C
pH value (conc. product)	: 6.0 - 7.0

### PACKAGING

Order Number	: 563005 (30 ltrs)
Container	: Plastic jerrican



## APPLICATION AND USE

### A. Dosing Procedure

The quantity of **SOOT CLEANER LIQUID** to be used can depend on many factors such as the type of problem and its severity; we must also take into consideration the design and operating characteristics of the boiler. The suggested quantity of **SOOT CLEANER LIQUID** is 1litre per 4–6m<sup>3</sup> of fuel. Note that the above quantity may be altered, depending on the type of system to be treated, based on particular variations in the quality of the fuel and/or the manufacturer's technical specifications.

### B. Cleaning Procedure

**SOOT CLEANER LIQUID** is applicable to many systems such as diesel exhaust gas economizers, fire tube boilers, main boilers, etc. In the case of diesel exhaust systems, the product is applied upstream, of the area being treated into the exhaust gas system. In the case of boilers, the product is applied from a suitable port point of the system, preferably with an injector, making sure that the liquid is spread right through towards the backside of the combustion chamber.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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# MARICHEM

Division  
MARINE CHEMICALS & EQUIPMENT

Section C  
**MAINTENANCE**

Part 1  
**TANK CLEANING**

Part 2  
CARGO HOLD CLEANING

Part 3  
BIOACTIVE PRODUCTS

Part 4  
GENERAL CLEANING & MAINTENANCE







## MARICHEM T.T.C.™

### DESCRIPTION

**MARICHEM T.T.C.** is a concentrated organic solvent-based liquid compound formulated with strong aromatic solvents, emulsifying agents and surface-active agents in order to attack, penetrate and dissolve heavy oil contamination, grease, petrochemical compounds and light carbonaceous deposits, which are accumulated in oil coolers, preheated double bottoms, bilges, deep tanks etc. Furthermore, it acts as a sludge conditioner.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively removes and dissolves mineral oils, grease, petrochemicals and carbon residues from tank surfaces, engine rooms, mechanical installations, engine units, parts and components that experience heavy deposition.
  - ◆ A powerful sludge conditioner.
  - ◆ Provides a quick and thorough emulsifying action.
  - ◆ Can safely be used on all metal surfaces and its alloys (even if painted).
  - ◆ No known effect on rubber and plastic compounds.
  - ◆ May be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ Non-corrosive, non-conductive and of low toxicity.
  - ◆ Disperses in water to form a milky-white emulsion before the separation of water from oil.
  - ◆ Can be combined with a specific range of products.
  - ◆ Reduces emulsion carryover and permits water-oil mixtures to separate into an aqueous phase and an oil phase.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **MARICHEM T.T.C.** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

### PHYSICAL PROPERTIES

**MARICHEM T.T.C.** is a powerful liquid blend of organic solvents, superior emulsifying agents and high grade surfactants.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.82 - 0.88 gr/cm <sup>3</sup> at 20°C
Solubility in water	: Miscible
Flash Point	: 46°C
Odor	: Characteristic aromatic solvent odor

### PACKAGING

Order Number	: 832520 (25 ltrs)
	: 832120 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**MARICHEM T.T.C.** may be applied fully concentrated or diluted with water. The quantity to be used is proportional to the degree of contamination, the available downtime, the surface area to cover and the desired degree of cleaning. For heavy contamination, **MARICHEM T.T.C.** may be used undiluted, where as for lighter contamination we suggest a 10–30% solution with water. For tank cleaning and sludge conditioning various strength solutions between 0.1–0.3% may be used.

#### B. Cleaning Procedure

The application of **MARICHEM T.T.C.** may be done by agitation, recirculation and/or soaking immersion.

**Rock and Roll method:** This method is applicable for tank cleaning at sea. Fill the tank with 0.1–0.3% of **MARICHEM T.T.C.** and let the solution to act for 2–6 hours. This will enable the solution to soften, penetrate and dissolve the hard bottom deposits, which have formed. Then fill with seawater at 30% of the tank's capacity and let the solution stand for approximately 1–2 days time. In that period cleaning will be initiated due to wave motion. Then fill with more seawater to 60% of the tank's capacity and leave the solution to act long enough, so that complete cleaning due to wave motion/natural agitation is accomplished. Afterwards, discharge the tank out and rinse off by filling the tank 1–2 times its capacity with seawater.



► **Note** that **MARICHEM T.T.C.** must always be fed to the tank and then to the bunkers.

**Recirculation Method:** It is recommended to use the desired solution according to the degree of contamination and number of tanks to be cleaned with this solution. For this reason the dose rates and results of the cleaning may vary, but as minimum dosage a 0.5% solution of the product must be used. The best result is achieved around 70°C.

Slop water should be pumped ashore or should be pumped to ship's slop tanks after finishing with the cleaning procedure.

**Soaking Immersion method:** After the solution is prepared, immerse the part, component or unit to be cleaned, and leave it to soak for 30 minutes. Afterwards, rinse thoroughly with water.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.





## TANK CLEANER-A™

### DESCRIPTION

**TANK CLEANER-A** is a highly concentrated liquid blend of superior, innovative constituents which contribute to the efficient removal and cleaning of cargo tanks, fuel oil tanks and tank lines from oil contamination, fuel residues and sludge deposits. It contains biodegradable raw materials and it's a powerful cleaning product. It may safely be applied to all kinds and types of metal surfaces painted or not, it is non corrosive and it has non known effect on rubber and plastic parts. Furthermore, it may be used as a general degreaser in special situations where optimum results are sought.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Concentrated degreasing solution, ideal for use in cleaning cargo tanks, deep tanks, bilges and pipelines.
  - ◆ Non-corrosive and non-toxic.
  - ◆ Consists of water-based raw materials.
  - ◆ No known effect on rubber or plastic compounds.
  - ◆ Can be used as a general degreaser in very difficult cleaning situations.
  - ◆ May be applied to all kinds and types of metal surfaces, painted or not.
  - ◆ May be combined with a broad range of products.
  - ◆ Cost effective, easy to apply and use.
- **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- **TANK CLEANER-A** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
- **TANK CLEANER-A** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**TANK CLEANER-A** is a liquid solution that contains an aromatic solvent, non-ionic, surface-active agents, corrosion inhibitor and biodegradable, water-based raw materials.

Appearance/Color	: Light yellow liquid
Specific gravity	: 0.96 - 1.00 gr/cm <sup>3</sup> at 20°C
Odor	: Slight Aromatic
Stability	: Very Stable
pH value	: 11 - 12

### PACKAGING

Order Number	: 832531 (25 ltrs) 832131 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **TANK CLEANER-A** to be used is proportional to the tank capacity, the level of contamination and the degree of cleaning required, as such; appropriate dosing can be decided by consulting the table found below.

- **NOTE:** The dosage to be used must be based on the total tank capacity and not on the water percentage to be ballasted in the tank.

BALLAST TANK CAPACITY (tones)	TANK CLEANER QUANTITY (litres)		
	MINIMUM	NORMAL	MAXIMUM
2.5	2	4	6
5.0	4	8	12
10.0	8	16	24
15.0	12	24	36
20.0	16	32	48
25.0	20	40	60
30.0	24	48	72
40.0	32	64	96
50.0	40	80	120
75.0	60	120	180
100.0	80	160	240
200.0	160	320	480
250.0	200	400	600
300.0	240	480	720
400.0	320	640	960
500.0	400	800	1,200



600.0	480	960	1,440
700.0	560	1,120	1,680
800.0	640	1,280	1,920
900.0	720	1,440	2,160
1,000.0	800	1,600	2,400

## B. Cleaning Procedure

**Preparation:** Before applying **TANK CLEANER-A**, prepare the tanks that are to be cleaned by washing them first (if this is possible), with a high-pressure warm water supply.

**When not at sea:** Determine the quantity of **TANK CLEANER-A** to be used and fill 75% of tank capacity with seawater. At the end of the three days time, deballast the tanks of the cleaning solution and rinse clean with seawater by ballasting and deballasting until the water flow becomes clear.

► **Note:** In cases, where tanks are heavily stained or contaminated, the cleaning procedure must be repeated, as described above.

**Rock and Roll method:** This method is applicable for tank cleaning at sea. Fill the tank with 0.1–0.3% of **TANK CLEANER-A** and leave solution to act for 2–6 hours. This will enable the solution to soften, penetrate and

dissolve the hard bottom deposits. Then fill the tank with seawater to 30% of total capacity and let the solution stand for approximately 1–2 days. During this period, cleaning will be initiated due to wave motion. After that, fill the tank with seawater to 60% of total capacity and let the solution act for long enough, so that complete cleaning can be accomplished, due to wave motion/natural agitation. Afterwards, discharge solution from tank and then rinse off by filling tank 1–2 times its capacity with seawater.

► **Note** that **TANK CLEANER-A** must always be fed to the tank and then to the bunkers.

**Recirculation Method:** It is recommended to use the desired solution according to the degree of contamination and number of tanks to be cleaned with this solution. For this reason the dose rates and results of the cleaning may vary, but as minimum dosage a 0.5% solution of the product must be used. The best result is achieved around 70°C.

Slop water should be pumped ashore or should be pumped to ship's slop tanks after finishing with the cleaning procedure.

**General Cleaning:** For general cleaning applications, **TANK CLEANER-A** may be used by brushing, soaking/immersion or any other conventional method that the user believes to be suitable for the situation at hand.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## TANK CLEANER-S™

### DESCRIPTION

**TANK CLEANER-S** is similar to **TANK CLEANER-A** with regards to its applications and uses. However, **TANK CLEANER-S** is a more powerful, heavy duty concentrated cleaning solution, engineered to be used in the cleaning and gas freeing for double bottom tanks, wing tanks, tank lines, fuel oil tanks, etc. from oil and fuel contamination. Moreover, it is formulated with more advanced emulsifying agents, stronger surface-active agents, superior solvents and longer lasting corrosion inhibitors.

### ADVANTAGES AND CHARACTERISTICS

A highly concentrated liquid blend of superior, innovative constituents which contribute to the efficient removal and cleaning of cargo tanks, deep tanks, wing tanks, tank lines, bilges, etc. from oil residues, petroleum based chemicals, heavy dirt, grime and old sludge deposits.

- ◆ Acts quickly and thoroughly.
- ◆ Non-corrosive and of low toxicity.
- ◆ When mixed with water, a milky white emulsion is formed.
- ◆ No known effect on rubber or plastic compounds.
- ◆ Can be used as a multi-purpose degreaser in extremely hard cleaning conditions.
- ◆ Safe to be applied to all kinds and types of metal parts and surfaces (painted or not).
- ◆ May be combined with a specific range of products.
- ◆ The product is readily biodegradable.
- ◆ Cost effective, easy to apply and use.

▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).

▶ **TANK CLEANER-S** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

### PHYSICAL PROPERTIES

**TANK CLEANER-S** is a blend of superior aliphatic solvents, non-ionic and anionic surface agents, emulsifying agents and corrosion inhibitors.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.82 - 0.88 gr/cm <sup>3</sup> at 20°C
Flash Point	: >40°C
Odor	: Strong Aromatic Solvent odor

### PACKAGING

Order Number	: 832530 (25 ltrs) 832130 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **TANK CLEANER-S** to be used is proportional to the tank capacity, the level of contamination and the degree of cleaning required, as such; appropriate dosing can be decided by consulting the table found below.

▶ **NOTE:** The dosage to be used must be based on the total tank capacity and not on the water percentage to be ballasted in the tank.

BALLAST TANK CAPACITY (tones)	TANK CLEANER QUANTITY (litres)		
	MINIMUM	NORMAL	MAXIMUM
2.5	2	4	6
5.0	4	8	12
10.0	8	16	24
15.0	12	24	36
20.0	16	32	48
25.0	20	40	60
30.0	24	48	72
40.0	32	64	96
50.0	40	80	120
75.0	60	120	180
100.0	80	160	240
200.0	160	320	480
250.0	200	400	600
300.0	240	480	720
400.0	320	640	960
500.0	400	800	1,200
600.0	480	960	1,440
700.0	560	1,120	1,680



800.0	640	1,280	1,920
900.0	720	1,440	2,160
1,000.0	800	1,600	2,400

## B. Cleaning Procedure

**Preparation:** Before applying **TANK CLEANER-S**, prepare the tanks that are to be cleaned by washing them first (if this is possible), with a high-pressure warm water supply.

**When not at sea:** Determine the quantity of **TANK CLEANER-S** to be used and fill 75% of the tank capacity with seawater. In order to achieve optimum results, the emulsion formed must be warmed and maintained at 60°C for at least 3–5 days (if possible). At the end of the three days time, deballast the tanks of the cleaning solution and rinse clean with seawater by ballasting and deballasting until the water flow becomes clear.

**Rock and Roll method:** This method is applicable for tank cleaning at sea. Fill the tank with 0.3–1ltr of **TANK CLEANER-S** per 1,000ltrs of water and let solution act for 2–6 hours. This will enable the solution to soften, penetrate and dissolve the hard bottom deposits. Then fill the tank with seawater to 30% of total capacity and let the solution stand for approximately 1–2 days. During this period, cleaning will be initiated due to wave

motion. After, fill the tank with seawater to 60% of total capacity and let the solution act for long enough, so that complete cleaning can be accomplished, due to wave motion/natural agitation. Afterwards, discharge solution from tank and then rinse off by filling tank 1–2 times its capacity with seawater.

► **Note** that **TANK CLEANER-S** must always be fed to the tank and then to the bunkers.

**Recirculation Method:** It is recommended to use the desired solution according to the degree of contamination and number of tanks to be cleaned with this solution. For this reason the dose rates and results of the cleaning may vary, but as minimum dosage a 0.5% solution of the product must be used. The best result is achieved around 70°C.

Slop water should be pumped ashore or should be pumped to ship's slop tanks after finishing with the cleaning procedure.

**General Cleaning:** For general cleaning applications, **TANK CLEANER-S** may be used by brushing, soaking/immersion or any other conventional method that the user believes to be suitable for the situation at hand.

► **Note:** In cases, where tanks are heavily stained or contaminated, the cleaning procedure must be repeated, as described above.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## TANK SHINE CLEANER™

### DESCRIPTION

**TANK SHINE CLEANER** is a powerful, heavy duty concentrated acid-based cleaning agent engineered to remove fatty acids stains from epoxy-coated tanks. The fatty acids remaining in the tanks are white-colored residues and they can be found in various petroleum products.

### ADVANTAGES AND CHARACTERISTICS

A highly concentrated liquid blend of superior acids and non-ionic surface-active agent which contribute to the efficient removal and cleaning of cargo tanks, from fatty acid deposits.

- ◆ Acts quickly and thoroughly.
  - ◆ It is non - toxic.
  - ◆ When mixed with water gives excellent results.
  - ◆ Does not contain nonyl phenol ethoxylates and chlorinated compounds.
  - ◆ Non - flammable.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **TANK SHINE CLEANER** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **TANK SHINE CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

Appearance/Color	: White-colored liquid
Odor	: Odorless
Specific Gravity	: 1.40 gr/cm <sup>3</sup> at 20°C
pH value	: 1.5 - 2.0
Flash Point	: None.

### PACKAGING

Order Number	: 833053 (30 ltrs)
Container	: Plastic jerrican
Order Number	: 832154 (210 ltrs)
Container	: Plastic drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **TANK SHINE CLEANER** to be used is proportional to the tank capacity, the level of contamination and the degree of cleaning required. **TANK SHINE CLEANER** must be diluted with fresh water before use at a dilution rate 0.1% - 2%. After deciding the desired solution for the needs of the vessel the user (whilst taking all the necessary personal precautions) must add **TANK SHINE CLEANER** into fresh water and thoroughly mix.

#### B. Cleaning Procedure

Preparation: Before applying **TANK SHINE CLEANER**, prepare the tanks that are to be cleaned by washing them first (if this is possible), with a high-pressure warm water supply.

**Rock and Roll method:** This method is applicable for tank cleaning at sea. Fill the tank with 0.1-0.3% of **TANK SHINE CLEANER** and let solution act for 2-6 hours. This will enable the solution to soften, penetrate and dissolve the hard bottom deposits. Then fill the tank with seawater to 30% of total capacity and let the solution stand for approximately 1-2 days. During this period, cleaning will be initiated due to wave motion. After, fill the tank with seawater to 60% of total capacity and let the solution act for long enough, so that complete cleaning can be accomplished, due to wave motion/natural agitation. Afterwards, discharge solution from tank and then rinse off by filling tank 1-2 times its capacity with seawater.

▶ **Note** that **TANK SHINE CLEANER** must always be fed to the tank and then to the bunkers.

**Recirculation Method:** It is recommended to use the desired solution according to the degree of contamination and number of tanks to be cleaned with this solution. For this reason the dose rates and results of the cleaning may vary, but as minimum dosage a 0.5% - 2.0% solution of the product must be used. The best result is achieved around 70°C. ➔



Slop water should be pumped ashore or should be pumped to ship's slop tanks after finishing with the cleaning procedure.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## IGS MARI-CLEANER™

## DESCRIPTION

IGS MARI-CLEANER is high performance water based alkaline cleaning agent. It is a product that does not contain either nonyl phenols or caustic alkalis. It consists of biodegradable ingredients safe for Inert Gas Soot (IGS) removal, oil cleaning and metal degreasing.

## ADVANTAGES AND CHARACTERISTICS

IGS MARI-CLEANER can be used as a cleaning agent for decks, cargo holds or even as a tank cleaner. It efficiently removes heavy grease, sludge, fatty oil, fish oil, animal and vegetable oil. It can be used neat or diluted with fresh water. It is readily biodegradable after use.

One of the main advantages of IGS MARI-CLEANER is that can provide excellent cleaning effect of inert gas soot in cargo tanks.

- ▶ According to MARPOL 73/78 chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ IGS MARI-CLEANER was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
- ▶ IGS MARI-CLEANER is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

## PHYSICAL PROPERTIES

Appearance/Color	: Pale/Yellow Liquid
Odor	: Ethereal Odor
Specific Gravity	: 0.98 - 1.02 gr/cm <sup>3</sup> at 20°C
pH value	: 11.50 - 13.00
Flash Point	: None
Solubility	: Completely Soluble in water
Compatibility	: May attack Aluminium and Zinc when used in a high concentrated solution.

## PACKAGING

Order Number	: 833065 (30 ltrs)
Container	: Plastic jerrican
Order Number	: 832165 (210 ltrs)
Container	: Plastic drum

## APPLICATION AND USE

For direct cleaning of inert gas soot contamination (spraying method) a solution of 6% - 8% of IGS MARI-CLEANER must be used.

After application, leave the solution to act for 30 - 45 minutes and rinse thoroughly with water under high pressure. Keep the surface wet.

- ▶ When using Butterworth recirculation method a solution of 1% - 2% of IGS MARI-CLEANER must be used.

## CLEANING PROCEDURE FOR RECIRCULATION WITH BUTTERWORTH

1. Wash the tanks to be cleaned with hot water using the Butterworth.
2. Remove all deposits and residues.
3. Apply the chemical solution (MARICHEM TTC solution 0.3% - 0.5%) through the Butterworth.
4. Depending on contamination and temperature/moisture conditions, the cleaning time generally varies between 2 to 3 hours, or more if required.
5. After the application, rinse with sea or fresh water (preferably hot water at 50°C - 70°C) and check the results.
6. Proceed with spot clean, in case required.
7. For removing IGS (Inert Gas Soot) contamination the required product is IGS MARI-CLEANER.
  - 7a. For direct cleaning of contamination (spraying method) a solution of 6% - 8% of IGS MARI-CLEANER must be used. After application, leave the solution to act for 30 - 45 minutes and rinse thoroughly with water under high pressure.
  - 7b. When using Butterworth recirculation method a solution of ca. 1% - 2% of IGS MARI-CLEANER must be used.
8. Steam out tank, if necessary.
9. Drain tank, pumps and line.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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# MARICHEM

**Division**  
MARINE CHEMICALS & EQUIPMENT

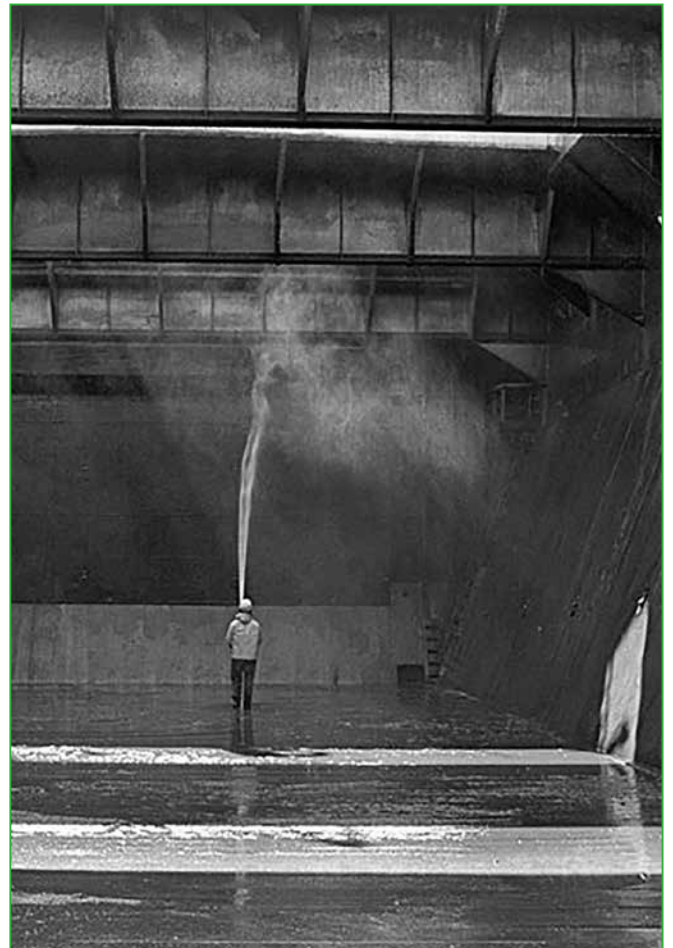
**Section C**  
MAINTENANCE

**Part 1**  
TANK CLEANING

**Part 2**  
CARGO HOLD CLEANING

**Part 3**  
BIOACTIVE PRODUCTS

**Part 4**  
GENERAL CLEANING & MAINTENANCE





**ALCACLEAN H.D.**™**DESCRIPTION**

**ALCACLEAN H.D.** is a high quality product classified as a general cleaner/remover of vegetable oil, animal oil, fat, fuel oil, lube oil and coal residues from cargo and storage tanks as well as to other systems. Furthermore, it removes different type of coal cargo residues from the cargo holds and carbonaceous deposits, resulting from car exhausts that can exist in a ship's garage area, roof walls and hull sides. This powerful concentrated formula provides immediate and efficient results whilst also acting as an odor eliminator. Its use on Aluminum, Zinc and Tin surface coatings is prohibited unless further dilution with water has been conducted.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ A non-flammable liquid mixture.
  - ◆ Effectively dissolves all fat, vegetable and animal oil, dry or not.
  - ◆ It removes coal cargo residues from the cargo holds.
  - ◆ Efficiently removes coal deposits.
  - ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ An odor binder and eliminator.
  - ◆ Can be combined with a specific range of products.
  - ◆ Soluble in fresh and sea water.
  - ◆ Acts as an acid-neutralizing agent.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **ALCACLEAN H.D.** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **ALCACLEAN H.D.** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

**PHYSICAL PROPERTIES**

**ALCACLEAN H.D.** is a water solvent alkaline concentrated liquid solution, consisting of specific salts, detergents and wetting agents.

<b>Appearance/Color</b>	: Clear, colorless liquid
<b>Odor</b>	: Odorless
<b>Specific gravity</b>	: 1.17 - 1.27 gr/cm <sup>3</sup> at 20°C
<b>pH value</b>	: 13
<b>Flash Point</b>	: None

**PACKAGING**

<b>Order Number</b>	: 833003 (30 ltrs), 832103 (210 ltrs)
<b>Container</b>	: Plastic jerrican, Plastic drum

**APPLICATION AND USE****A. Dosing Procedure**

**Rock and Roll method:** Add 15–20 litres of **ALCACLEAN H.D.** for every ton of fresh or sea water when the tank is filled to 30% of its capacity.

**Circulation method:** A solution of 5–10% must be prepared by diluting **ALCACLEAN H.D.** with fresh or sea water.

**Injection method:** Prepare a solution of 5–10% by diluting **ALCACLEAN H.D.** with fresh or sea water.

**B. Cleaning Procedure**

**Rock and Roll method:** After you have filled the tank with water (fresh or sea) to 30% of its capacity and added the required amount of **ALCACLEAN H.D.**, let it stand for approximately 24 hours. Then fill with more water to 90% of the tank's capacity level. This way the tank will be cleaned by natural agitation due to wave motion. Leave for a few days, then drain the tank completely and rinse off by ballasting–deballasting the tank 2–3 times with water.

**Circulation method:** After the solution is prepared, apply by circulating for approximately 6–8 hours. Thereon, wash thoroughly with water.

**Injection method:** When the prescribed solution is prepared, inject directly to the contaminated area. Afterwards, rinse thoroughly with water.

**▶ IMPORTANT INFORMATION**

**ALCACLEAN H.D.** is considered to be a highly caustic product. Operators must always consult the Safety and Handling instructions table before using this product.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## ALCACLEAN XF™

### DESCRIPTION

**ALCACLEAN XF** is a high quality product, with good foaming properties specifically formulated to remove different type of coal cargo residues from the cargo holds.

**ALCACLEAN XF** formula provides immediate and efficient results in cleaning as well as an odor eliminator. The foam created increases the cleaning duration and the penetration of the treated surface to be adequately enhanced. The results being, increased chemical competence and cost effectiveness.

**ALCACLEAN XF** can also act as a general cleaner/remover of vegetable oil, animal oil, fat, fuel oil, lube oil and pet coke residues from cargo and storage tanks as well as from other systems. It is water-based product and is non harmful for the marine environment (non HME), as per latest IMO regulations.

Its use on Aluminum, Zinc and Tin surface coatings is not recommended unless diluted with water.

### ADVANTAGES AND CHARACTERISTICS

- ◆ A non-flammable liquid mixture.
  - ◆ Effectively removes different type of coal cargo residues from the cargo holds.
  - ◆ It removes rubber traces from car tyres in a ship's garage area
  - ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ An odor binder and eliminator.
  - ◆ Can be combined with a specific range of products.
  - ◆ Soluble in fresh and sea water.
  - ◆ Effectively dissolves all fat, vegetable and animal oil, dry or not.
  - ◆ Acts as an acid-neutralizing agent.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **ALCACLEAN XF** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

- ▶ **ALCACLEAN XF** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**ALCACLEAN XF** is a water-based alkaline concentrated liquid solution, consisting of specific minerals, detergents and wetting agents.

Appearance/Color	: Clear, colorless liquid
Odor	: Odorless
Specific gravity	: 1.10 - 1.20 gr/cm <sup>3</sup> at 20°C
pH value	: 12.00 - 13.00
Flash Point	: None

### PACKAGING

Order Number	: 833007 (30 ltrs)/832116 (210 ltrs)
Container	: Plastic jerrican/Plastic drum

### APPLICATION AND USE

#### A. Dosing Procedure

**ALCACLEAN XF** can be used either diluted or undiluted, depending on the degree of contamination on the surface area that needs to be treated.

**Circulation method:** A solution of 5-10% must be prepared by diluting **ALCACLEAN XF** with fresh or sea water.

**Injection method:** Prepare a solution of 5-10% by diluting **ALCACLEAN XF** with fresh or sea water.

#### B. Cleaning Procedure

**Circulation method:** After the solution is prepared, apply by circulating for approximately 6-8 hours. Thereon, wash thoroughly with water.

**Injection method:** When the prescribed solution is prepared, inject directly to the contaminated area. Afterwards, rinse thoroughly with water.

### ▶ IMPORTANT INFORMATION

**ALCACLEAN XF** is considered to be a highly caustic product. Operators must always consult MSDS (Material Safety Data Sheet) and the Safety and Handling instructions table before using this product.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## BAUXITE REMOVER™

### DESCRIPTION

**BAUXITE REMOVER** is an effective acid based liquid mixture specifically designed to deal with hard cases of bauxite cargo deposits or bauxite stains. Its proven advantage is the provision of immediate penetration and complete dissolution of bauxite, the result being a thorough cleaning.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the removal of bauxite deposits.
  - ◆ Acts quickly and thoroughly.
  - ◆ It is applicable to all metal surfaces and parts except those being galvanized and those made of Tin, Zinc and Aluminum.
  - ◆ It is a water-soluble and non-flammable liquid mixture.
  - ◆ Safe to use on rubber and plastic compounds.
  - ◆ Can be combined with a specific range of other products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **BAUXITE REMOVER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**BAUXITE REMOVER** is an aqueous acid liquid solution containing a synergistic antioxidant, and a strong corrosion inhibitor, which result to bauxite removal on metal surfaces and articles.

Appearance/Color	: Clear, colorless liquid.
Specific gravity	: 1.14 - 1.16 gr/cm <sup>3</sup> at 20°C
Solubility	: Adequate
pH value	: 1.0 - 2.0
Odor	: Odorless

### PACKAGING

Order Number	: 833023 (30ltrs) / 832125 (210ltrs)
Container	: Plastic jerrican / Plastic Drum

### APPLICATION AND USE

#### A. Dosage

**Undiluted:** In cases where we deal with heavy deposit build-up, **BAUXITE REMOVER** must be applied undiluted.

**Diluted:** In cases of light deposition, on large surface areas, a solution between 10–40% may be used.

#### B. Cleaning Procedure

**Undiluted/Diluted:** In parts such as corner cavities, tank skeleton inlets, etc, **BAUXITE REMOVER** must be carefully poured and/or applied by conventional means such as a hard brush, mop, sponge or any other manual devices feasible to move with rapid and irregular action. Let it soak for 15 minutes. Afterwards, wash thoroughly by applying high-pressure water source.

In case of deposit persistence, repeat the cleaning procedure.

#### ▶ IMPORTANT INFORMATION

**BAUXITE REMOVER** is considered a highly corrosive product. Operators must consult the Safety and Handling instructions table before use.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**BUFFERSOL™**

## DESCRIPTION

**BUFFERSOL** is a revolutionary, concentrated liquid product engineered to attack, penetrate and remove deposits such as traces of lead, aromatic hydrocarbons, chloride compounds and sulfide compounds from zinc-silicate coated tank surfaces and articles. Furthermore, it is formulated with specific acids and corrosion inhibitors, pH buffered to efficiently bind and neutralize strong acid and alkaline compounds in extreme cleaning conditions.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively removes lead, hydrocarbon, chloride and sulfide deposits from zinc-silicate coated tanks and articles.
- ◆ Prevents, maintains and protects from corrosion.
- ◆ Acts quickly and thoroughly.
- ◆ No known effect on rubber and plastic compounds.
- ◆ Non-flammable, non-corrosive and non-toxic.
- ◆ A water soluble product that may be used with a wide range of other products.
- ◆ May be safely used on all common metal surfaces and their alloys, whether painted, varnished or not.
- ◆ pH buffered, thus acting as a neutralizing agent in acidic or alkaline environments.
- ◆ Cost effective, easy to handle and apply.

- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **BUFFERSOL** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

## PHYSICAL PROPERTIES

**BUFFERSOL** is an aqueous concentrated liquid solution consisting of a specific blend of acids and corrosion inhibitors, pH buffered.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.05–1.08 gr/cm <sup>3</sup> at 20°C
pH value	: 5.5
Solubility in water	: Very soluble
Odor	: Odorless

## PACKAGING

Order Number	: 833033 (30 ltrs)/832134 (210 ltrs)
Container	: Plastic jerrican/Plastic drum

## APPLICATION AND USE

### A. Dosing Procedure

The quantity of **BUFFERSOL** to be used is proportional to the degree of contamination, the surface area to be treated, the desired degree for cleaning and the available downtime.

In small systems, most frequently, **BUFFERSOL** is used undiluted.

In larger systems, where the circulation method is required and contamination is normal, a 10% solution of **BUFFERSOL** with water is adequate, and should be enough in volume to fill the tank up to 1% of its capacity. If the contamination is heavy, higher concentrated solutions with **BUFFERSOL** must be made. Furthermore, more of the system's capacity must be filled, so that greater quantities will be circulated.

### B. Cleaning Procedure

In small tanks and small surface areas, **BUFFERSOL** may be applied by conventional methods with a brush, sponge or a mop. Once applied, **BUFFERSOL** must be left for a period long enough, for it to act effectively, whilst allowing time to wash it off, before it dries out. The application must be repeated two more times and finally rinsed with large quantities of water (preferably at high-pressure) for one hour. Then, the treated surface should be left to dry.

With Butterworth tank-washing systems, for large cargo tanks, a 10% solution of **BUFFERSOL** with water must be used in order to fill 1% of the tank's volume capacity, which then is circulated for 2–6 hours at



20–70°C by the feeding pump, found below the tank's bottom, to the heater and then to the tank's sprinkler system. Thus, the solution is re-circulated, resulting in thorough cleaning.

Also note that if the solution is still adequate, and contamination is not heavy, it can be used for washing 2–3 tanks. For this, the bottom valve of the treated tank may be shut, allowing access of the solution through the system to the second tank. Likely, the same cleaning procedure is followed for the rest of the tanks.

For optimum results, especially in cases of heavy contamination, fresh **BUFFERSOL** solution may be used separately for each tank.

In all cases, after completion of the application, the

solution must be discarded and the system must be washed with fresh water for at least one hour.

► **Note** that when desired, **BUFFERSOL** may only be used diluted by making a solution with fresh, de-ionized or distilled water. In all cases, avoid the use of river or sea water.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## CEMENT REMOVER™

### DESCRIPTION

**CEMENT REMOVER** is an effective acid based liquid mixture specifically designed to deal with hard cases of cement cargo deposits or dry cement stains. Its proven advantage is the provision of immediate penetration and complete dissolution of cement, the result being a thorough cleaning.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the removal of cement deposits and dry stains.
  - ◆ Acts quickly and thoroughly.
  - ◆ It is applicable to all metal surfaces and parts except those being galvanized and those made of Tin, Zinc and Aluminum.
  - ◆ It is a water-soluble and non-flammable liquid mixture.
  - ◆ Safe to use on rubber and plastic compounds.
  - ◆ Can be combined with a specific range of other products.
  - ◆ Replaces the use of other products, which fail to treat awkward situations like the removal of salt deposits and other hard deposits such as rust
  - ◆ Cost effective, easy to apply and use.
- ▶ According to MARPOL 73/78 bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **CEMENT REMOVER** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **CEMENT REMOVER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**CEMENT REMOVER** is an aqueous acid liquid solution assisting in the neutralization of basic systems also used for the pickling and cleaning of metal parts.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.16 gr/cm <sup>3</sup> at 15°C
Solubility in water	: Appreciable
pH value	: 1.0 - 2.0
Odor	: Pungent

### PACKAGING

Order Number	: 833008 (30 ltrs), 832108 (210 ltrs)
Container	: Plastic jerrican, Plastic drum

### APPLICATION AND USE

#### A. Dosage

**Undiluted:** In cases where we deal with heavy deposit build-up, **CEMENT REMOVER** must be applied undiluted.

**Diluted:** In cases of light deposition, on large surface areas, a solution between 10-40% may be used.

#### B. Cleaning Procedure

**Undiluted/Diluted:** In parts such as corner cavities, tank skeleton inlets, etc, **CEMENT REMOVER** must be carefully poured and/or applied by conventional means such as a hard brush, mop, sponge or any other manual devices feasible to move with rapid and irregular action. Let it soak for 15 minutes. Afterwards, wash thoroughly by applying high-pressure water source.

In case of deposit persistence, repeat the cleaning procedure.

#### ▶ IMPORTANT INFORMATION

**CEMENT REMOVER** is considered a highly corrosive product. Operators must consult the Safety and Handling instructions table before use.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## FOAM PLUS™

### DESCRIPTION

**FOAM PLUS** is a concentrated water based and water soluble product which can be used as an additive in all alkaline water based cleaning chemicals. It can especially be used with our products **ALCACLEAN H.D.** and **MARICHEM P.C.S.** This enables the cleaning duration and the penetration of the treated surface to be adequately enhanced. The results being, increased chemical competence and cost effectiveness.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Compatible to use with all alkaline water based cleaning chemicals.
  - ◆ It can be used together with **ALCACLEAN H.D.** and **MARICHEM P.C.S.** for better cleaning results.
  - ◆ A liquid mixture that is water-soluble, non-flammable and biodegradable.
  - ◆ No effect on rubber or plastic compounds.
  - ◆ Retains chemical cleaning applications on treated surfaces.
  - ◆ Cost effective, easy to apply and use.
- ▶ According to **MARPOL 73/78** bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **FOAM PLUS** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **FOAMPLUS** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**FOAM PLUS** is a concentrated, semi-viscous product.

Appearance/Color	: Yellow liquid
Odor	: Odorless
Specific gravity	: 1.08 - 1.12 gr/cm <sup>3</sup> at 20°C
Solubility	: Complete
pH value	: 8.0 - 9.0

### PACKAGING

Order Number	: 830543 (5 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**FOAM PLUS** must be used in quantities proportional, to the tank surface area that is to be covered, the extent of the contamination, the available downtime and the application method being used. Therefore, various concentrated solutions can be tried and tested, in order to obtain the optimal amount for the job in hand. In general, 150–300ml of **FOAM PLUS** is adequate per 30 litres of washing solution and 3-5 litres of **FOAM PLUS** is adequate per 210 litres of washing solution.

#### B. Use

**FOAM PLUS** may be used in aqueous solutions with alkaline cleaning chemicals so that during the application procedure, as described in the individual catalogue sheets of each cleaning chemical, the final product is applied in the form of foam by a high pressure machine or a regular air powered paint-spray thick nozzle unit.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry and cool environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention if necessary.
<b>Skin Contact</b>	Try to Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once.
<b>If swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## IRON DUST CLEANER™

### DESCRIPTION

**IRON DUST CLEANER** is a concentrated aqueous liquid solution consisting of a blend of synergetic antioxidants and passivators. It is used to remove iron dust from any steel surface area and iron dust stains from brass, copper, stainless steel, wood, ceramic and aluminum surfaces, painted or not.

**IRON DUST CLEANER** can be used for cleaning cargo holds from Hot Briquetted Iron (HBI) contamination, after unloading the cargo, with great success.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Readily removes iron dust and rust stains from metal and non-metal surfaces.
  - ◆ Protects and keeps surfaces free from corrosion.
  - ◆ Removes iron dust contamination from cargo hold surfaces after unloading Hot Briquetted Iron (HBI) cargoes.
  - ◆ Non-flammable, does not affect rubber or plastic compounds.
  - ◆ May be used with a specific range of other cleaning products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **IRON DUST CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**IRON DUST CLEANER** is a non-flammable mixture of special acids, passivators and emulsifiers.

Appearance/Color	: Clear, colorless liquid
Specific Gravity	: 1.15 - 1.17 gr/cm <sup>3</sup> at 20°C
pH value	: 0.8 - 2.0
Solubility in water	: Complete
Odor	: Odorless

### PACKAGING

Order Number	: 833045 (30 ltrs)/832145 (210 ltrs)
Container	: Plastic jerrican / Plastic Drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **IRON DUST CLEANER** to be used cannot be directly specified, since it depends on the cleaning results desired and the situation at hand. The user is the one responsible to regulate the quantity needed. However, when the cleaning application is determined, **IRON DUST CLEANER** must be used diluted with fresh water with a percentage concentration ranging between 10-50% depending on the desired strength of the solution.

- ▶ **Note** that a 10% solution is sufficiently strong and it can be used for most general/everyday situations involving rust.

A solution of 30% - 50% solution is recommended when we have very difficult cases, involving areas that are contaminated with dust contamination from Hot Briquetted Iron (HBI) cargo.

#### B. Cleaning Procedure

Before application, when the affected area has been determined, ensure the absence of oil, grease, dirt or other foreign matter. Then shake the **IRON DUST CLEANER** well and prepare the desired concentration solution.

The solution may now be applied either by brushing and/or injection.

Smaller parts may be immersed directly into the prepared solution.

In all of the above situations, you must allow **IRON DUST CLEANER** to act for 20-30 minutes and then rinse thoroughly with high or regular pressure fresh water.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.





## LIME CLEANER™

### DESCRIPTION

**LIME CLEANER** is a concentrated acid-based liquid product designed to attack and eliminate limestone, caustic lime deposits and dry lime stains from cargo tanks and other large common metal surface installations. **LIME CLEANER** is formulated with strong acids, surface-active agents and special corrosion inhibitors, sufficient enough to neutralize strong alkaline-caustic conditions.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the removal of limestone, birdlime and dry lime stains from all common metal tanks and installations.
  - ◆ Acts quickly and thoroughly.
  - ◆ Applicable to all metal surfaces and parts except those being galvanized and those made of Tin, Zinc, Aluminum and Lead.
  - ◆ A water-soluble, non-flammable liquid mixture.
  - ◆ Can be used to safely neutralize strong alkaline liquids and solids.
  - ◆ No known effect on rubber or plastic compounds.
  - ◆ May be combined with a specific range of other products.
  - ◆ Replaces the use of other products, which fail to treat awkward situations like the removal of salt deposits and other hard deposits such as rust.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **LIME CLEANER** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **LIME CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**LIME CLEANER** is a concentrated aqueous solution consisting of a blend of acids, special surfactants and specific corrosion inhibitors.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.20 - 1.30 gr/cm <sup>3</sup> at 20°C
Solubility in water	: Appreciable
pH value	: 1.0 - 2.0
Odor	: Acidic

### PACKAGING

Order Number	: 833017 (30 ltrs)/832117 (210 ltrs)
Container	: Plastic jerrican / Plastic drum

### APPLICATION AND USE

#### A. Dosing Procedure

**LIME CLEANER** must be used in quantities proportional to the cargo hold surface area that is to be covered, the extent of contamination, the available downtime and the application method being used. Therefore, the actual quantity needed cannot be prescribed beforehand, since the operator is the best placed person, to decide the required quantity, analogous to the situation at hand.

#### B. Cleaning Procedure

**LIME CLEANER** may be applied by two methods, injection and soaking.

**Injection** is a method where a high - pressure machine, suitable to process chemical solutions, is used with a 50% **LIME CLEANER**/water solution to inject directly onto the tank surface area. Then, the solution must be left to act for 15 minutes followed by thorough rinsing using a high-pressure water supply source. Thereafter, the surface must be left to dry.

Note that percentage dilutions may vary depending on the thickness and hardness of the deposited lime layer.

**Soaking** is a method where **LIME CLEANER** is used undiluted and applied with conventional methods such as an elongated thick and hard brush, a hard sponge etc. Once applied, **LIME CLEANER** must be left to soak for 30 minutes. Thereafter, thorough rinsing with water is necessary, followed by leaving the surface to



dry. Usually, this method is applicable to heavily contaminated small and large cargo hold surface areas and installations.

#### ► IMPORTANT INFORMATION

**LIME CLEANER** is considered a highly corrosive product. Operators must consult the Safety and Handling instructions table before use.

### ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



MARICHEM P.C.S.™

## DESCRIPTION

**MARICHEM P.C.S.** is an innovative, concentrated liquid product specifically engineered to attack, penetrate and remove pet coke accumulations from cargo holds. Additionally, it may also be used to remove mineral deposits and eliminate bad odors in tanks and other closed systems.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively removes pet coke and mineral deposits from cargo holds and tanks.
  - ◆ Can also be efficiently used as a general purpose cleaner to eliminate bad odors in tanks and other closed systems.
  - ◆ Acts quickly and thoroughly.
  - ◆ Can safely be used on all metals and metal alloys (even if painted/varnished).
  - ◆ Non-flammable, non-toxic, non-conductive & non-volatile.
  - ◆ Soluble in seawater and fresh water.
  - ◆ No known effect on rubber or plastic compounds.
  - ◆ May be combined with a specific range of other products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** bulk carriers are only permitted to use cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **MARICHEM P.C.S.** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
- ▶ **MARICHEM P.C.S.** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

## PHYSICAL PROPERTIES

**MARICHEM P.C.S.** is a concentrated liquid solution containing powerful surface active agents, a corrosion inhibitor and aqueous chemical agents.

Appearance/Color	: Clear, light yellow liquid.
Specific gravity	: 1.18 - 1.22 gr/cm <sup>3</sup> at 20°C
pH value	: 12.5 -13.5
Odor	: Chlorine-like

## PACKAGING

Order Number	: 833037 (30 ltrs)/832138 (210 ltrs)
Container	: Plastic jerrican / Plastic drum

## APPLICATION AND USE

### A. Dosing Procedure

**MARICHEM P.C.S.** may be used concentrated or diluted with water, depending on the degree of contamination, the surface area to be treated, the desired degree of cleaning and the available downtime.

Actually, the user is the best one capable to regulate the quantity and concentration to be used for the situation at hand.

In any case, when the accumulation is not heavy, a 50% solution with water must be used. Otherwise, **MARICHEM P.C.S.** can be used undiluted especially when deposition is heavy and hard spots persist.

### B. Cleaning Procedure

Conventional cleaning methods such as a brush, hard sponge, thick and hard broom and/or a mop can be used on heavy duty and hard stain deposits.

Note that for heavy accumulations the cleaning procedure might be necessary to be repeated until the results are satisfactory. Furthermore, is important to keep in mind that 1 litre of **MARICHEM P.C.S.** solution is sufficient to cover a surface area of 8–10 square meters.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## UREA DISINFECTING AGENT™

### DESCRIPTION

**UREA DISINFECTING AGENT** is an innovative, concentrated liquid product specifically engineered to attack, penetrate and remove urea accumulations from cargo holds and storage tanks. It is a bactericide that can act against urea-based microorganisms. Additionally, it may also be used to disinfect the holds and eliminate bad odors in tanks and other closed systems.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively removes urea deposits from cargo holds and tanks.
  - ◆ Can also be efficiently used as a general purpose cleaner to eliminate bad odors in tanks and other closed systems.
  - ◆ Acts as a bactericide against urea-based microorganisms.
  - ◆ Can safely be used on all metals and metal alloys (even if painted/varnished).
  - ◆ Non-flammable, non-toxic, non-conductive and non-volatile.
  - ◆ Soluble in seawater and fresh water.
  - ◆ No known effect on rubber or plastic compounds.
  - ◆ May be combined with a specific range of other products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **UREA DISINFECTING AGENT** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**UREA DISINFECTING AGENT** is a concentrated liquid solution containing powerful surface- active agents, a corrosion inhibitor and aqueous chemical agents.

Appearance/Color : Clear, light yellow liquid.

Specific gravity : 1.15 - 1.22 gr/cm<sup>3</sup> at 20°C

pH value : 12.5 -13.5

Odor : Chlorine-like

### PACKAGING

Order Number : 833090 (30 ltrs), 832190 (210 ltrs)

Container : Plastic jerrican / Plastic drum

### APPLICATION AND USE

#### A. Dosing Procedure

**UREA DISINFECTING AGENT** may be used concentrated or diluted with water, depending on the degree of contamination, the surface area to be treated, the desired degree of cleaning and the available downtime.

Actually, the user is the best one capable to regulate the quantity and concentration to be used for the situation at hand.

In any case, when the accumulation is not heavy, a 50% solution with water must be used. Otherwise, **UREA DISINFECTING AGENT** can be used as a 70% solution or even undiluted, especially when deposition is heavy and hard spots persist.

#### B. Cleaning Procedure

**UREA DISINFECTING AGENT** may be applied either by spraying or by conventional methods. When spraying is used, the solution prepared is sprayed on the contaminated area, using a high-pressure machine compatible to chemicals, where is left to act for approximately 20 - 30 minutes. Thereafter, the treated area must be washed thoroughly with high-pressure water.

Conventional cleaning methods can also be used for on the spot heavy duty and hard stain deposits using a brush, hard sponge, thick and hard broom and /or a mop. These methods may be used in coordination or separately from the spraying method.

Note that for heavy accumulations the cleaning procedure might be necessary to be repeated until the results are satisfactory. Furthermore, is important to keep in mind that 1 liter of **UREA DISINFECTING AGENT** may cover a surface area of 8-10 sq. meters.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

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# MARICHEM

**Division**  
MARINE CHEMICALS & EQUIPMENT

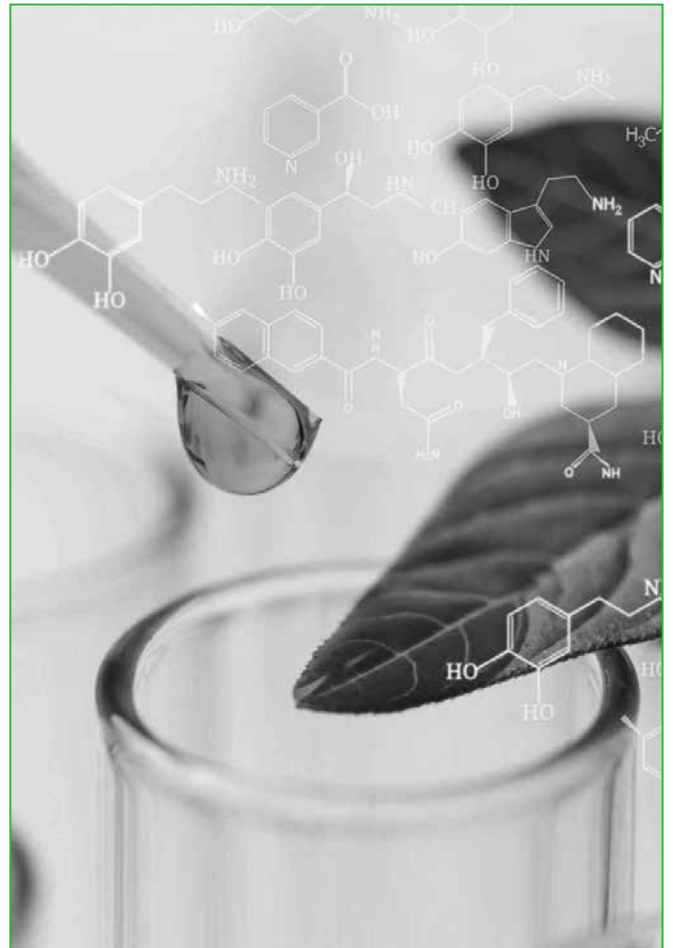
**Section C**  
MAINTENANCE

**Part 1**  
TANK CLEANING

**Part 2**  
CARGO HOLD CLEANING

**Part 3**  
BIOACTIVE PRODUCTS

**Part 4**  
GENERAL CLEANING & MAINTENANCE









## BIOACTIVE DESCALER™

### DESCRIPTION

**BIOACTIVE DESCALER** is an environmentally, sustainable, highly effective cleaning, descaling and maintenance mixture for toilets, drain lines and sewage tanks. It is offering odor elimination at its source and maintains pipes and tanks clean.

**BIOACTIVE DESCALER** is backed by years of research by the experts at Marichem Marigases laboratories who developed its innovative treatment process.

The product is using the natural power of citric acid to remove lime and mineral (scale) build-up. Then the bioactive process is taking place, by employing ultra-effective microorganisms to stabilize pH values and eliminate odor. These specially selected microorganisms attack odor-producing organic matter, eliminate urine scale, prevent clogs, encourage the growth of active flora, and improve the biological activity on sewage system.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Removes lime and mineral deposits (scale)
  - ◆ Eliminates urine scale.
  - ◆ Eliminates odor at its source.
  - ◆ Destroys the source of odors and leaves a pleasant mint fragrance.
  - ◆ Environmentally safe and completely biodegradable.
  - ◆ No effects on rubber, metal or plastic compounds.
  - ◆ Maintains pipes and sewage tanks.
  - ◆ Water soluble sachets for a safe and easy application.
  - ◆ Cost effective, easy to handle and apply.
  - ◆ Brings aerobic flora that maintains clean piping, increases the lifespan of piping and prevents blocked piping in the future.
  - ◆ It is not hazardous for the user, is GMO-free and reduces the risk of allergic reactions.
  - ◆ Works in places where mechanical methods are inefficient.
- **BIOACTIVE DESCALER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**BIOACTIVE DESCALER** is a mixture that contains micro-organisms harmless to humans and the environment, citric acid and a combination of nutrients, minerals and oligoelements.

Appearance	: Powder on water-soluble sachets
Color	: Blue
pH value	: 4.0 at 15°C

### PACKAGING

Order Number	: 550511 (5 kgrs) Contains 100 water soluble sachets of 50 g each
Container	: Plastic pail

### APPLICATION AND USE

#### DOSAGE

##### Toilets:

Maintenance: 1 sachet per toilet each week  
Shock treatment: 3 sachets per toilet over 3 consecutive days (one per day).

##### Urinals and Drains:

Maintenance: 1 sachet per week per drain or urinal.  
Shock treatment: 3 sachets over 3 consecutive days (one per day).

### DIRECTIONS OF USE

#### Toilets:

1. Place a sachet in the bowl.
2. Let stand for 5 min.
3. Scrub the bowl with a brush.
4. Flush.

#### Urinals and Drains:

Dissolve the product on 1L of water.  
Pour the solution into the urinal or drain to be treated.

- **Do not use** any bactericidal 2 hours before and 2 hours after using this product.

#### ► IMPORTANT NOTE

**BIOACTIVE DESCALER** contains only microorganisms complying with class 1 of the NFX 42040 standard (non-modified microorganisms that are non-pathogenic to humans and the environment).



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Keep out of reach of children. Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## BIOACTIVE FLOOR CLEANER™

### DESCRIPTION

**BIOACTIVE FLOOR CLEANER** is the perfect solution for the cleaning of floors on any area subject to organic grease problems, such as galley areas helping to improve general safety.

**BIOACTIVE FLOOR CLEANER** combines the efficiency of biosurfactants with a liquid suspension of especially selected microorganisms that digest grease, fat oils and organic matter.

The microorganisms are selected based on their enzymatic activity and work in synergy to accelerate the biodegradation.

Biosurfactants produce a more powerful wetting and emulsifying action to quickly penetrate and remove surface soils. Working in synergy, the microorganisms penetrate surface pores, grouts and cracks to continuously break down and eliminate heavy grease build-ups that may cause slipping on the floors.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Cleans floors on any area helping in general safety improvement.
  - ◆ Digests grease fat oils and organic matter.
  - ◆ Penetrates and immediately removes surface soils.
  - ◆ In-depth and continuous elimination of heavy grease build-ups that may cause slipping on the floors.
  - ◆ Environmentally safe and completely biodegradable.
  - ◆ May be used in combination with other cleaning products.
  - ◆ Cost effective, easy to handle and apply.
  - ◆ Eliminates the organic matter that feeds insects, leading to their annihilation.
  - ◆ Guarantees proper safety conditions in galley areas.
  - ◆ Works in places where mechanical methods are inefficient.
  - ◆ Hazard-free for people and the environment.
- **BIOACTIVE FLOOR CLEANER** is GMO-free (Genetically Modified Organism-free) and reduces the risk of allergic reactions. The selected microorganisms are all Class 1 as per the European Directive 2000/54 EC (non-modified microorganisms that are non-pathogenic to humans and the environment).

### PHYSICAL PROPERTIES

**BIOACTIVE FLOOR CLEANER** is a mixture that contains especially selected micro-organisms with high enzymatic activity and biosurfactants producing a more powerful wetting and emulsifying action.

Appearance	: Clear liquid
Color	: Blue
Fragrance	: Characteristic
pH value	: 8.0 - 9.0

### PACKAGING

Order Number	: 550520 (5 lt).
Container	: Plastic pail.

### APPLICATION AND USE

#### DOSAGE

The quantity of **BIOACTIVE FLOOR CLEANER** that must be used each time depends on the degree of contamination and the type of contamination needs to be cleaned.

For heavily soiled floor areas use 1% solution of the product.

For lightly soiled areas 0.5% solution must be used.

When cleaning with high pressure washing 0.3% solution of **BIOACTIVE FLOOR CLEANER** is recommended to be used.

#### DIRECTIONS OF USE

Clean away any surface residues.

Dilute according to recommendations (maximum water temperature: 40°C).

Wash the surface with traditional methods.

Let it stand if necessary.

If used at right concentration it requires no rinsing on floors. Just mop up the overflow or scrape towards floor drains.

### PRECAUTIONS FOR USE

Do not use any bactericidal 2 hours before and 2 hours after applying the product.

Use of any additional acidic, alkaline or chlorine-based cleaner is not recommended, as will de-activate the bacterial action.



► **IMPORTANT NOTE**

**BIOACTIVE FLOOR CLEANER** is certified not to contain any pathogenic bacteria (class 1 E.F.B.), safe for mankind, flora and fauna in accordance with the European directive 2000/54/CE.

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment. Keep away from heat and damp.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Keep out of reach of children. Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## BIOACTIVE LIQUID™

### DESCRIPTION

**BIOACTIVE LIQUID** is a special-formulated mixture that contains, among other ingredients, micro-organisms in liquid suspension and biosurfactants produced by selected and adapted strains as well as mint essential oil.

**BIOACTIVE LIQUID** main property is that unclogs, cleans and sanitizes vertical piping. It eliminates greasy deposits, soap and organic matter obstructing vertical piping, as well as the bad odors associated. It works efficiently for the cleaning of restrooms (toilets), vacuum toilets, bathing rooms, storage rooms, kitchen sinks, collection lines, and in general in all waste water circuits of the vessel.

Furthermore, its concentrated scent provides the added advantage of being an odor eliminator.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Cleans piping by eliminating scale and deposits hardened by sedimentation.
  - ◆ Unclogs and maintains clearways in pipelines and sewage sanitary systems.
  - ◆ Restores the flow by eliminating grease and organic matter obstructing the passage.
  - ◆ Destroys the source of odors and leaves a pleasant mint fragrance.
  - ◆ Environmentally safe and completely biodegradable.
  - ◆ No effects on rubber, metal or plastic compounds.
  - ◆ May be used in combination with other cleaning products.
  - ◆ Cost effective, easy to handle and apply.
  - ◆ Brings aerobic flora that maintains clean piping, increases the lifespan of piping and prevents blocked piping in the future.
  - ◆ Guarantees long-lasting protection against corrosion.
  - ◆ Works in places where mechanical methods are inefficient.
- ▶ **BIOACTIVE LIQUID** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**BIOACTIVE LIQUID** is a mixture (green liquid) that contains, among other ingredients, micro-organisms in liquid suspension and biosurfactants produced by selected and adapted strains as well as mint essential oil.

**BIOACTIVE LIQUID** must be used under the following parameters:

Temperature : 10°C - 50°C

pH value : 4.5 - 9.0

**BIOACTIVE LIQUID** pH value is 5.5 - 6.0.

### PACKAGING

Order Number : 550510 (5 lt)

Container : Plastic pail

### APPLICATION AND USE

#### DOSAGE

##### STARTING/RESTARTING PHASE/SATURATION

100 ml applied for 3 consecutive days per piping. Then use the recommended dosage for maintenance, as described below.

##### MAINTENANCE

50 ml applied once a week per piping.

#### DIRECTIONS OF USE

##### STARTING/RESTARTING PHASE/SATURATION

Empty the sink the most proper way. Apply the product in the evening. Wait for 2 hours or the whole night and rinse with hot water.

##### MAINTENANCE

- ◆ Ready to use product.
- ◆ Shake before use.
- ◆ Pour **BIOACTIVE LIQUID** into warm water before application.
- ◆ Pour the entire dosage at the top of piping or in the drain.



### ► PRECAUTIONS FOR USE

Do not use any bactericidal 2 hours before and 2 hours after applying the product.

Apply when effluent is lowest (when installations are least in use).

Use of any additional acidic, alkaline or chlorine-based cleaner is not recommended, as will de-activate the bacterial action.

### ► IMPORTANT NOTE

**BIOACTIVE LIQUID** is certified not to contain any pathogenic bacteria (class 1 E.F.B.), safe for mankind, flora and fauna in accordance with the European directive 2000/54/CE.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Keep out of reach of children. Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## BIOACTIVE POWDER™

### DESCRIPTION

**BIOACTIVE POWDER** is a mixture of various enzymes and spores, formulated to eliminate hazardous and toxic waste and their growth. It will also remove and dissolve solid organic waste, natural oils, grease and tartar deposits. The enzymes and spores will break down organic matter into simple compounds. It has been designed for the cleaning of restrooms (toilets), vacuum toilets, bathing rooms, storage rooms, kitchen sinks, collection lines and in general the sewage/sanitary system of the vessel.

Furthermore, its concentrated scent provides the added advantage of being an odor eliminator.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Multi purpose cleaner for toilets, drains, showers, storage rooms, quarter rooms etc.
  - ◆ Unclogs and maintains clearways in pipelines and sewage sanitary systems.
  - ◆ Acts quickly and efficiently, while being safe to use.
  - ◆ Eliminates odor and is biologically active.
  - ◆ Environmentally safe and completely biodegradable.
  - ◆ No effects on rubber or plastic compounds.
  - ◆ May be used in combination with other cleaning products.
  - ◆ Cost effective, easy to handle and apply.
  - ◆ Acts as an anti-foaming agent and is water soluble.
- **BIOACTIVE POWDER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**BIOACTIVE POWDER** is a mixture of various enzymes along with spores and vegetable cells containing powerful surfactants and bacterial strains.

**BIOACTIVE POWDER** works better under the following parameters:

Temperature	: 20°C - 50°C
pH value	: 5.5 - 9.0

### PACKAGING

Order Number	: 555555 (4 kgrs)
Container	: Plastic pail

### APPLICATION AND USE

**BIOACTIVE POWDER** is a mixture of various enzymes and spores to be used in organic waste treatment. Organic wastes contain a mixture of complex compounds, which have to be broken down to simple compounds before disposal. The enzymes of **BIOACTIVE POWDER** immediately start to break down the organic waste. The nutrient salts present in **BIOACTIVE POWDER** help to create a medium for the spores to produce additional enzymes, which constantly break down proteins and fats.

That way, **BIOACTIVE POWDER** reduces Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS).

The initial dosage is 1kgr of **BIOACTIVE POWDER** for 15,000ltrs system capacity.

Then, continue dosing 50grs for 1,500ltrs once per week to keep a clean system.

- **Use** of any additional acidic, alkaline or chlorine-based cleaner is not recommended, as will deactivate the bacterial action.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.





## DESCRIPTION

**BIOACTIVE TOILET CLEANER** is the perfect multi-purpose product for general toilet maintenance. Its super concentrated gel formula sticks to surfaces, making it perfect for cleaning walls and vertical surfaces.

**BIOACTIVE TOILET CLEANER** is a powered formulation which combines ultra-effective biosurfactants, with organic substance-digesting microorganisms. This increases cost-efficiency by speeding up cleaning time and significantly reducing the amount of product required. It has a fresh, long-lasting perfume.

**BIOACTIVE TOILET CLEANER** is a unique 7-in-1 product. Works on all toilet fixtures and surfaces (urinals, showers, fittings and trim, porcelain, walls, floors, etc.), as well as on enamel, ceramic, chrome, stainless, glass, and more.

1. Cleans and shines. Ultra-effective biosurfactants scrub away grime and bring out the shine in all toilet fixtures.
2. Prevents and removes lime and mineral (scale) deposits. The slightly acidic pH value of **BIOACTIVE TOILET CLEANER** prevents scale and eliminates lime stains.
3. Destroys odor at their source. Special microorganisms digest odor-causing organic matter.
4. Long-lasting perfume. Unique "original" perfume leaves the unmistakable smell of clean.
5. Keeps drain pipes and tanks cleaner for better maintenance. Biosurfactants and microorganisms combine to eliminate urine scale, clean fixtures and restore proper drain flow. Enriches active flora.
6. Protective film. Powerful biosurfactants leave a protective film that prevents new deposits and makes cleaning easier.
7. Effluent conditioner. Microorganisms and biosurfactants work immediately to break down waste effluent

## BIOACTIVE TOILET CLEANER™

### ADVANTAGES AND CHARACTERISTICS

- ◆ Cleans and shines.
  - ◆ Removes and prevents lime and mineral (scale) deposits.
  - ◆ Eliminates odor at its source.
  - ◆ Long-lasting clean perfume
  - ◆ Maintains drain lines and tanks
  - ◆ Creates a protective film
  - ◆ Conditions effluents
  - ◆ Speeds up cleaning
  - ◆ Cost efficient and easy to use
- ▶ **BIOACTIVE TOILET CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**BIOACTIVE TOILET CLEANER** is the perfect multi-purpose product for a complete and effective biotreatment.

Appearance/Color	: Opaque turquoise liquid
Odor	: Original - fresh pleasant perfume.
pH value	: 5.0 at 15°C

### PACKAGING

Order Number	: 551212 (12X1L)
Container	: 1 plastic box contains 12X1L plastic bottles

### APPLICATION AND USE

#### DILUTION

**For heavily soiled surfaces:** Undiluted.

**For surfaces and floors:** 5% to 15% solution in bucket or sprayer.

**Drain lines maintenance:** 20ml in each drain daily or 50ml in each drain 1 to 2 times per week, depending on the degree of contamination.

#### INSTRUCTIONS FOR USE

**BIOACTIVE TOILET CLEANER** may be used diluted or undiluted. In case it has to be used diluted the following procedure must be used:

1. Dilute according to recommendations.
2. Apply to surface.



3. Rinse with clear water.

**For drain lines maintenance:**

1. Use product cap to measure correct amount.

2. Pour down the drain (toilet, urinal)

Do not use any bactericidal 2 hours before and 2 hours after using this product.

► **Important Note:**

The microorganisms contained in **BIOACTIVE TOILET CLEANER** are all Class 1 as per the European Directive 2000/54/EC (non-modified microorganisms that are non-pathogenic to humans and the environment).

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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# MARICHEM

Division  
MARINE CHEMICALS & EQUIPMENT

Section C  
MAINTENANCE

Part 1  
TANK CLEANING

Part 2  
CARGO HOLD CLEANING

Part 3  
BIOACTIVE PRODUCTS

Part 4  
GENERAL CLEANING & MAINTENANCE







ACC NG™

## DESCRIPTION

**ACC NG** is a powerful cleaning product that contains biodegradable surfactants, strong emulsifying agents and low toxicity solvents. It replaces the use of cleaning products containing toxic hydrocarbons, chlorinated solvents and nonyl phenol ethoxylates, without affecting its cleaning ability at all.

**ACC NG** contains substances not toxic for the environment. It attacks, penetrates and completely removes mineral oils, grease, soot and other carbonaceous deposits from air coolers and turbochargers in two & four stroke marine diesel engines.

## ADVANTAGES & CHARACTERISTICS

- ◆ Ideal for the removal of oil, grease, soot and carbon deposits.
- ◆ Highly efficient when used for air coolers and turbochargers.
- ◆ Can safely be used, especially, when in operation without damaging the engine or running the risk of fire.
- ◆ Contains biodegradable surfactants, strong emulsifying agents and low toxicity solvents.
- ◆ Maintains and keeps the air cooler clean so that the air input inside the cylinder is increased, this results in the maximization of horsepower and fuel combustion.
- ◆ Minimizes fuel consumption.
- ◆ Cost effective, easy to handle and apply.
- ▶ **ACC NG** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC.71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

## PHYSICAL PROPERTIES

**ACC NG** is a liquid compound consisting of corrosion inhibitors, ionic metal surface activators, biodegradable surfactants, and strong emulsifying agents. Moreover, it is important to note that it does not contain chlorinated solvents. A light milky solution is produced when diluted with water.

Appearance	: Clear liquid
Color	: Colorless
Specific gravity	: 0.80 - 0.90 gr/cm <sup>3</sup> at 20°C
Flash Point	: >61°C
Odor	: Odorless



MARICHEM®

## PACKAGING

Order Number	: 832583 (25 ltrs)
	: 832183 (210 ltrs)
Container	: Steel drum

## APPLICATION AND USE

### A. Dosing Procedure

When the engine is in operation, the required quantity to be used is a 1:3 proportion diluted with water.

The frequency of application of the final solution depends mainly on the condition of the engine.

When the engine is not in operation, **ACC NG** can be used either diluted with water or undiluted and in quantities according to the judgement of the user and the degree of deposit accumulation, until such time, that cleaning is complete.

### B. Cleaning Procedure

When the engine is in operation, the **ACC NG**/water solution must be injected directly into the top surface area of air cooler and sprayed over it by means of the auxiliary chemical solutions application tank. The solution must be used while the engine is running at full/partial load, as per engine manufacturer's recommendations. Then, rinse with water and dry by blowing with compressed air.

When the engine is not in operation and **AIR COOLER CLEANER** is absent, then **ACC NG** may be used according to the **AIR COOLER CLEANER** instructions.

The application of **ACC NG** solution can be done by the circulation, soaking and the injection method.

**Circulation** is the method used when dismantling of the air cooler is not possible. In this cleaning procedure the air cooler is connected to a buffer tank with inflow and outflow piping, the **ACC NG** is circulated through, during a period of 4–6 hours by use of a pump. The solution may be heated at a temperature up to 40°C so that we ease the cleaning procedure and accomplish better results. This will significantly reduce the cleaning time, whilst improving the cleaning effect.

**Soaking** is the method to be used on dismantled air coolers; they should be immersed in a bath filled with undiluted **ACC NG**. In the meantime, the cleaning process can be started by agitating the solution, while heating should be applied at approximately 40°C. Leave to soak for approximately 2 hours, afterwards,

remove from bath, rinse with large amounts of warm water under pressure, then blow-dry with air. Note that the immersion period and heating temperature are dependent on the severity of contamination.

**Injection** is the method, which should be used for the following cases, those dealing with static, those when dismantling is not possible, and those when the air cooler uses a high-pressure machine. In this procedure, the **ACC NG** is directly injected into the air cooler unit, which is then left to soak for as long as is needed, in order to keep the deposits soft. Afterwards, rinse thoroughly with plenty of fresh warm water using a high pressure supply and blow it dry with air.

► **Note** that if necessary, the cleaning procedure may be repeated depending on the degree of deposit accumulation.

► **This** cleaning method is only recommended if approved by engine manufacturers.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## ADVANCE BILGE COAT™

### DESCRIPTION

**ADVANCE BILGE COAT** is an advanced liquid solution, formulated with alkaline compounds, inhibitors and antifoaming agents. It is used for protection of the bilge lines and bilge wells from corrosion, during voyages when the cargo holds are loaded with Sulphur. During these voyages, the reaction between Sulphur and water creates water of acidic nature, neutralised with the use of **ADVANCE BILGE COAT**.

### ADVANTAGES & CHARACTERISTICS

- ◆ Acts as neutralising agent for water of acidic nature.
  - ◆ Contains alkaline compounds and inhibitors.
  - ◆ Protects the bilge lines and the bilge wells from corrosion.
  - ◆ Raises the pH level.
  - ◆ Suitable for vessels carrying Sulphur cargoes.
  - ◆ Cost effective, easy to handle and apply.
  - ◆ Non harmful to the marine environment.
  - ◆ Easier to use than other products available in the market.
- ▶ **ADVANCE BILGE COAT** is non harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**ADVANCE BILGE COAT** is a liquid solution formulated with alkaline compounds, inhibitors and antifoaming agents.

Appearance	: Clear liquid
Color	: Colorless
Specific gravity	: 1.26 gr/cm <sup>3</sup> at 20°C
pH value	: 13 - 14
Odor	: Odorless

### PACKAGING

Order Number	: 833070 (30L)
Container	: Plastic jerrican

### APPLICATION AND USE

For proper application of **ADVANCE BILGE COAT**, the below steps must be carefully followed:

1. Use a clean, empty drum.
2. Add 5L of **ADVANCE BILGE COAT** to 95L of fresh water very slowly.
3. Pour 15 to 20L of the **ADVANCE BILGE COAT** solution created in step 2, directly into each hold sounding pipe from deck.
4. Proceed with replenishment of the solution each time after the bilge water is pumped out.

**BE CAREFUL** Please wear personal protective equipment for the skin and eyes during the preparation and the application of **ADVANCE BILGE COAT** solution.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Possibility of serious damage upon contact. Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Possibility of serious damage upon contact. Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek immediate medical attention.
<b>Inhalation</b>	Possibility of serious damage if inhaled. Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek immediate medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Possibility of serious damage if swallowed. Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## AIR COOLER CLEANER™

### DESCRIPTION

**AIR COOLER CLEANER** is a concentrated liquid solution of aromatic hydrocarbons, powerful surfactants, corrosion inhibitors and strong emulsifying agents designed to attack, penetrate and completely remove mineral oils, grease, soot and other carbonaceous deposits from air coolers and turbochargers in two & four stroke marine diesel engines.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Efficiently removes oil, grease and carbon deposits from marine engines, air coolers, scavenging systems and turbochargers.
- ◆ Can be safely used on all metals and metal alloys, as well as on components of an engine without causing any damage.
- ◆ Acts quickly and thoroughly.
- ◆ Prevents the ignition of oil, sludge and soot accumulation.
- ◆ Non corrosive, non-toxic and non-volatile.
- ◆ Water-soluble and when dissolved forms a white-milky emulsion.
- ◆ No known effect on rubber and plastic compounds.
- ◆ May be combined with a specific range of other products.
- ◆ Cost effective, corrosion proof, easy to apply and use.

### PHYSICAL PROPERTIES

**AIR COOLER CLEANER** is an organic solvent-based liquid solution consisting of surface-active agents, a blend of aromatic hydrocarbons and powerful emulsifying agents.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.80 - 0.90 gr/cm <sup>3</sup> at 20°C
Solubility	: Appreciable
Flash point	: >40°C
Odor	: Aromatic Solvent Odor

### PACKAGING

Order Number	: 832501 (25 ltrs), 832101 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **AIR COOLER CLEANER** to be used is proportional to the degree of accumulation, the available downtime and the surface area to be cleaned. In any case, when decided, **A.C.C.** may be used undiluted and in quantities feasible to accomplish complete removal of the deposits, when the accumulation is heavy. Whereas, in cases of light deposition, **A.C.C.** may be used with diesel oil, the diluted solution should be appropriate enough to accomplish the desired cleaning.

Using **A.C.C.** diluted with diesel oil or undiluted is beneficiary as the solution may be reused for future oil removal on other engine parts. Note that the above-mentioned is not feasible when the **A.C.C.** is diluted with water.

#### B. Cleaning Procedure

The application of **A.C.C.** can be done by the circulation, soaking and the injection method.

**Circulation** is the method used when dismantling of the air cooler is not possible. In this cleaning procedure the air cooler is connected to a buffer tank with inflow and outflow piping, the **A.C.C.** is circulated through, during a period of 4–6 hours by use of a pump. The solution may be heated at a temperature up to 30°C so that we ease the cleaning procedure and accomplish better results. This will significantly reduce the cleaning time, whilst improving the cleaning effect.

**Soaking** is the method to be used on dismantled air coolers; they should be immersed in a bath filled with undiluted **A.C.C.** In the meantime, the cleaning process can be started by agitating the solution, while heating should be applied at approximately 30°C. Leave to soak for approximately 2 hours, afterwards, remove from bath, rinse with large amounts of warm water under pressure, then blow-dry with air. Note that the immersion period and heating temperature are dependent on the severity of contamination.

**Injection** is the method, which should be used for the following cases, those dealing with static, those when



dismantling is not possible, and those when the air cooler uses a high-pressure machine. In this procedure, the **A.C.C.** is directly injected into the air cooler unit, which is then left to soak for as long as is needed, in order to keep the deposits soft. Afterwards, rinse thoroughly with plenty of fresh warm water using a high pressure supply and blow it dry with air.

► **Note** that if necessary, the cleaning procedure may be repeated depending on the degree of deposit accumulation.

► **This** cleaning method is only recommended if approved by engine manufacturers.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## AIR COOLER CLEANER L.T.™

### DESCRIPTION

AIR COOLER CLEANER L.T. is a powerful cleaning product familiar to AIR COOLER CLEANER, but it has a lower toxicity level. It dissolves accumulated deposits, oil, grease and soot, which are dissolved along with the product into the engine's cylinders where burning of the deposits takes place.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the removal of oil, grease, soot and carbon deposits.
- ◆ Highly efficient when used for air coolers and turbochargers.
- ◆ Can safely be used, especially, when in operation without damaging the engine or running the risk of fire.
- ◆ Maintains and keeps the air cooler clean so that the air input inside the cylinder is increased, this results in the maximization of horsepower and fuel combustion.
- ◆ Cost effective, easy to handle and apply.

### PHYSICAL PROPERTIES

AIR COOLER CLEANER L.T. is a liquid compound consisting of corrosion inhibitors, ionic metal surface activators and low toxicity aromatic hydrocarbons. Moreover, is important to note that it does not contain chlorinated solvents. A light milky solution is produced when diluted with water.

Appearance/Color	: Colorless, clear liquid
Specific gravity	: 0.82 - 0.86 gr/cm <sup>3</sup> at 20°C
Odor	: Aromatic solvent

### PACKAGING

Order Number	: 832502 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

When the engine is in operation, the required quantity to be used is a 1:3 proportion diluted with water.

When the engine is not in operation, AIR COOLER CLEANER L.T. must be used undiluted and in quantities according to the judgement of the user and the degree of deposit accumulation, until such time, that cleaning is complete. In this case, AIR COOLER CLEANER may also be used.

#### B. Cleaning Procedure

When the engine is in operation, the AIR COOLER CLEANER L.T. / water solution must be injected directly into the top surface area of air cooler and sprayed over it by means of the auxiliary chemical solutions application tank.

Then rinse with water and dry by blowing with compressed air. When the engine is not in operation and AIR COOLER CLEANER is absent, then AIR COOLER CLEANER L.T. may be used according to the AIR COOLER CLEANER instructions.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## ALCACTIVE LIQUID™

### DESCRIPTION

**ALCACTIVE LIQUID** is a water based liquid solution formulated to attack and remove vegetable and animal fats and oils from epoxy coatings and from most of the common ferrous alloy metals. Moreover, it can safely be applied on Tin, Zinc and/or Zinc Silicate, Aluminum and galvanized surface coatings and materials.

### ADVANTAGES AND CHARACTERISTICS

- ◆ A non-toxic, non-flammable and non-corrosive liquid mixture.
  - ◆ Acts as an odor binder and eliminator while giving off a soft scent.
  - ◆ Effectively dissolves all fat, vegetable and animal oils, dry or not.
  - ◆ Can safely be used on Tin, Zinc, Aluminum and any galvanized or epoxy surface coatings.
  - ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ May be applied to any ferrous alloy metals.
  - ◆ Ideal to use for "Gas-Free" when sprayed after any hydrocarbon cleaning process as it discharges an additional pleasant lemon aroma.
  - ◆ Cost effective, easy to handle and apply.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **ALCACTIVE LIQUID** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **ALCACTIVE LIQUID** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**ALCACTIVE LIQUID** is a water based liquid solution, containing specific salts, detergents, wetting agents and corrosion inhibitors.

Appearance/Color	: Colorless liquid
Odor	: Soft, lemon odor
Specific gravity	: 1.00 - 1.02 gr/cm <sup>3</sup> at 20°C
pH value	: 10.5 - 11.5

### PACKAGING

Order Number	: 833004 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**Rock and Roll method:** Add 15–20 litres of **ALCACTIVE LIQUID** for every ton of water at the point where the tank is filled to 30% of its capacity.

**Circulation method:** A solution of 5–10% must be prepared by diluting **ALCACTIVE LIQUID** with water.

**Injection method:** Prepare a solution of 3–6% by diluting **ALCACTIVE LIQUID** with water.

#### B. Cleaning Procedure

**Rock and Roll method:** After the tank has been filled with water (fresh or seawater) to 30% of its capacity and the required amount of **ALCACTIVE LIQUID** has been added, let it stand for approximately 24 hours. Then fill the tank with more water, up to 90% of its capacity level. This way the tank will be cleaned by natural agitation due to wave motion. Leave for a few days, then drain the tank completely and rinse off by ballasting – deballasting 2–3 times with water..

**Circulation method:** After the solution is prepared, apply by circulating for approximately 6–8 hours. Thereon, wash thoroughly with water.

**Injection method:** When the prescribed solution is prepared, inject directly to the contaminated area. Afterwards, rinse thoroughly with water.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## ALCACTIVE LIQUID PLUS™

### DESCRIPTION

**ALCACTIVE LIQUID PLUS** is a water solvent based liquid solution developed to attack and remove vegetable and animal fats and oils from epoxy coatings and from most of the common ferrous alloy metals.

Moreover, it can safely be applied on Tin, Zinc and/or Zinc Silicate, Aluminum and galvanized surface coatings and materials. A biodegradable material that is very safe in handling. It is specially formulated for ultrasonic cleaning applications..

### ADVANTAGES AND CHARACTERISTICS

- ◆ A non-toxic, non-flammable and non-corrosive liquid mixture.
  - ◆ Acts as an odor binder and eliminator while giving off a soft scent.
  - ◆ Effectively dissolves all fat, vegetable and animal oils, dry or not.
  - ◆ Can safely be used on Tin, Zinc, Aluminum and any galvanized or epoxy surface coatings.
  - ◆ Developed for ultrasonic cleaning applications.
  - ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ May be applied to any ferrous alloy metals.
  - ◆ Ideal to use for "Gas-Free" when sprayed after any hydrocarbon cleaning process as it discharges an additional pleasant lemon aroma.
  - ◆ Cost effective, easy to handle and apply.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **ALCACTIVE LIQUID PLUS** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **ALCACTIVE LIQUID PLUS** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**ALCACTIVE LIQUID PLUS** is a water based liquid solution, containing specific salts, detergents, wetting agents and corrosion inhibitors.

Appearance/Color	: White liquid
Odor	: Soft
Specific gravity	: 1.02 gr/cm <sup>3</sup> at 15°C

### PACKAGING

Order Number	: 833022 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

Firstly, fill the ultrasonic unit with 30 litres of clean fresh water.

Then, mix 1 litre of **ALCACTIVE LIQUID PLUS** at the ultrasonic unit. For heavier deposits a bigger quantity (2 - 3 litres) may be added.

#### B. Cleaning Procedure

**ALCACTIVE LIQUID PLUS** is developed for use in cleaning of ultrasonic tanks.

Firstly, fill the ultrasonic unit with 30 litres of clean fresh water.

Before using the product, the ultrasonic bath must be degassed by following the procedure below:

Allow the bath to run for 2 minutes without any objects or cleaning agent involved until the evolution of gas bubbles ceases. That way the cleaning effect will be enhanced.

Then, mix 1 litre of **ALCACTIVE LIQUID PLUS** at the ultrasonic unit. For heavier deposits a bigger quantity (2 - 3 litres) may be added.

The requested temperature for achieving best results is around 70°C.

Time required for best cleaning results depends on the degree and nature of the deposits. A time period of about 30 minutes will be sufficient for most applications.

For heavier contamination like aged or carbonized up to 4 hours may required.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



**BALLAST W.CH.A.™****DESCRIPTION**

**BALLAST W.CH.A. (Ballast Water Chlorinating Agent)** is an innovative, advanced formulated product that prevents marine ecological imbalance occurring with the introduction of foreign species of aquatic life.

When ships take on ballast water in port, they frequently pick up living organisms, along with the local water. This becomes a problem when these aquatic hitchhikers are pumped out of the ballast tanks in another port and settle into a new home, taking over the resources that previously served only the local population.

The discharge of water from ballast tanks has been responsible for the introduction of species that cause environmental and economic damage.

**BALLAST W.CH.A.** has been proven to be the solution for this problem, by removing all the water borne species and pathogens including the residents in the ballast water and ballast water tanks, with its special formulation.

**BALLAST W.CH.A.** will ensure a completely safe ballast water transfer from one geographical region to another.

**ADVANTAGES AND CHARACTERISTICS**

- ◆ Effectively removes all the water borne species and pathogens.
- ◆ It can be added to the ballast water very easily.
- ◆ It can be added to the ballast water by using many different and convenient methods.
- ◆ It acts as an odor eliminator.
- ◆ It acts quickly and efficiently, while being safe to use.
- ◆ Can be used in combination with other products.
- ◆ It will ensure a completely safe ballast water transfer between two different regions.
- ◆ Very cost effective, easy to handle and apply.

**PHYSICAL PROPERTIES**

**BALLAST W.CH.A.** is a concentrated liquid blend containing powerful surfactants, bacterial strains and an aqueous chlorinating agent.

<b>Appearance/Color</b>	: Clear, light yellow liquid
<b>Specific gravity</b>	: 1.19 - 1.23 gr/cm <sup>3</sup> at 20°C
<b>pH value</b>	: 12.5 - 13.5
<b>Odor</b>	: Mild Chlorine Scent

**PACKAGING**

Order Number	: 673015 (30lt) / 672115 (210lt)
Container	: Plastic jerrican & plastic drum.

**APPLICATION AND USE****A. Dosage**

**BALLAST W.CH.A.** may be dosed in quantities sufficient to provide thorough and complete safe ballast water transfer.

Normally, 300 ltrs of **BALLAST W.CH.A.** is sufficient quantity for treatment of 10,000 tones ballast water.

**B. Application Procedure**

**BALLAST W.CH.A.** can be added to the Ballast water through the following methods:

- a) during pumping,
- b) during pre loading before pumping,
- c) during post loading after ballast water loading is complete.

These application procedures will ensure a completely safe ballast water transfer from one region to another.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## CHLORIDE TABLETS™

### DESCRIPTION

**CHLORIDE TABLETS** are a unique strong oxidizing disinfectant in solid tablet form, which when dissolved in water release active chlorine in the most efficient hypochlorous acid form. **CHLORIDE TABLETS** are ideal for the conditioning, by chlorination of swimming pools, Jacuzzis, sewage and waste water systems.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Treats effectively pool, sewage and waste water.
- ◆ Acts quickly and thoroughly.
- ◆ A biocide, non toxic, non flammable and non corrosive.
- ◆ Can be safely applied to water, that is contained in any metal tank (even if tank is painted or coated).
- ◆ 100% water soluble under ambient conditions.
- ◆ No heat for dissolving is required.
- ◆ Can be combined with a specific range of products.
- ◆ No known effects on rubber and plastic compounds.
- ◆ Cost effective, easy to apply and use.

### PHYSICAL PROPERTIES

**CHLORIDE TABLETS** are a strong oxidizer consisting of Trichloroisocyanuric acid, which undergoes hydrolysis upon contact with water to release active chlorine as hypochlorous acid.

Appearance/Color	: White, solid tablets
Specific gravity	: 1.10 - 1.20 gr/cm <sup>3</sup> at 20°C
pH value (1% aqueous solution)	: 2.7 - 3.3
Odor	: Chlorine like odor
Size	: 75mm Diam. x 25mm H

### PACKAGING

Order Number	: 830506 (5 kgrs)
Container	: Carton box

### APPLICATION AND USE

#### A. Dosing Procedure

The initial dosage for the treatment of pool, sewage and waste water should be 5 tablets for every 100m<sup>3</sup> of water. Thereafter the daily dosage should approximately be 1/10 of a tablet for every 10m<sup>3</sup> of water. This is equivalent to 20gr of a tablet per 10m<sup>3</sup> of water, or 1 tablet per 100m<sup>3</sup> of water. This dosage will approximately release 2–5ppm of active chlorine.

#### B. Feeding Procedure

The water system in consideration must be fed by skimmers or in floating trays. Moreover, feeding can also be done by feeling the chlorinating pipes when a concentration of 2–5ppm of residual active chlorine is obtained. If the concentration is shown to have dropped below the 2ppm value, then use both chlorinating pipes.

- **Note** that periodical washing of the chlorinator is necessary. In this case, **MARICHEM DESCALER LIQUID 555** or **DESCALER POWDER** may be used.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## DESCALER LIQUID 555™

### DESCRIPTION

**DESCALER LIQUID 555** is a superior, heavy duty, concentrated liquid acid solution specifically designed to remove rust and water scale build-up from boilers, evaporators, heat exchangers, cooling systems, pipe-line collection systems, etc.

**DESCALER LIQUID 555** is characterized by the composition of high quality raw materials and the quick and effective results once applied.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the complete removal of scale and rust accumulation.
  - ◆ Acts quickly and thoroughly without the necessity for heating.
  - ◆ Applicable to all ferrous metal surfaces and parts, except stainless steel surfaces, those being galvanized and those made of Tin, Zinc, Lead and Aluminum.
  - ◆ Water-soluble, non-flammable and non-volatile.
  - ◆ Has no known effect on rubber and plastic.
  - ◆ May be combined with a specific range of other products.
  - ◆ Can be used for difficult cleaning conditions such as the lavatories, showers, biological wastewater treatment units etc.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **DESCALER LIQUID 555** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **DESCALER LIQUID 555** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**DESCALER LIQUID 555** is a concentrated, non-volatile, acid based, aqueous solution consisting of wetting agents, corrosion inhibitors, powerful descalers and a color indicator.

Appearance/Color	: Clear, red liquid
Specific gravity	: 1.15 - 1.17 gr/cm <sup>3</sup> at 20°C
Solubility in water	: Appreciable
pH value (1% Solution)	: 0.5 - 2.0
Odor	: Pungent

### PACKAGING

Order Number	: 833009 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**DESCALER LIQUID 555** must be used diluted at a proportion of 1 litre for every 4–9 litres of water. Dilution must not exceed this proportion as it may alter the inhibiting effect of the solution.

- ▶ **Note** that after the application of **DESCALER LIQUID 555**, a 1% solution of **ALKALINITY CONTROL** must be used to neutralize the treated surface area.

#### B. Cleaning Procedure

**Preparation:** Before the application of **DESCALER LIQUID 555**, remove Tin, Zinc, Aluminum, Lead and galvanized parts/components from the surface area to be treated. Additionally, rinsing of the contaminated area is suggested in order to eliminate sludge and other loose deposits.

**Application:** **DESCALER LIQUID 555** may be used either at room temperature, or in order to accomplish quicker results, it can be heated up, but the temperature must be no more than 55°C.

The methods used are the circulation, soaking and spreading.

**Circulation** is applicable to boilers, evaporators, condensers, heat exchangers and generally closed systems that have the capability to circulate at a temperature of approximately 45–55°C, for 6–15 hours with a solution of 8–12% of **DESCALER LIQUID 555** in water. Keep in mind that the strength of the solution is analogous to the degree of contamination/accumulation.



**Soaking** is usually applicable in open or closed systems that do not provide circulation. In these cases, two or three cleaning trials are recommended beforehand. Generally, a solution of 20%, at 45–55°C, should be used; it must not stand still, and should have periodic agitation. This ensures constant reaction rate. At the same time we must maintain the strength of the desired acidity by adding **DESCALER LIQUID 555** and fresh water, periodically, in order to make up for the lost volume proportion due to steam loss and surface reaction.

**For general cleaning** on large surface areas, conventional means such as a brush, sponge or a mop with **DESCALER LIQUID 555** are suitable, either diluted or not, depending on the degree of contamination and the kind or type of deposition.

► **After** the completion of the cleaning process, regardless of the method used, rinse with plenty of water and neutralize (only for the metal surface areas) with 1% solution of **ALKALINITY CONTROL**.

► **Note** that during application inflammable and/or toxic gases may be liberated. In this case, adequate ventilation is necessary.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## DESCALER POWDER™

### DESCRIPTION

**DESCALER POWDER** is an advanced acid concentrated dry powder formula consisting of a blend of specific acids, wetting agents, corrosion inhibitors, antifoam agents and a color indicator. Its purpose is to remove hard scale and rust deposits from water boilers, diesel engine cooling systems, condensers, evaporators, heat exchangers, pipeline collection systems, etc.

**DESCALER POWDER** is similar to **DESCALER LIQUID 555** as to its properties and range of applications. However, the difference lies over the fact that **DESCALER POWDER** is a dry powder formula, which makes it easy and safe to handle and store in awkward conditions. Furthermore, **DESCALER POWDER** is safe to use on sensitive metals and their alloys such as Zinc, Lead, Aluminum, Tin etc.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Highly effective for the complete removal of rust and scale deposits from water boilers, engine cooling systems and other water processing units and installations, due to its wetting agents.
  - ◆ Acts quickly and thoroughly.
  - ◆ Requires no heating unless its activity is required to increase drastically.
  - ◆ Due to its strong corrosion inhibitors, it is applicable to all ferrous metal surfaces and parts, as well as those being galvanized and those made of Tin, Zinc, Lead, Aluminum etc.
  - ◆ Contains anti-foaming agents and a color indicator as a determinant agent of the strength of the powder.
  - ◆ Water-soluble, non-flammable, non-volatile and non-hygroscopic.
  - ◆ Has no known effect on rubber and plastic compounds.
  - ◆ May be combined with a specific range of other products.
  - ◆ Can be used for difficult cleaning conditions such as the lavatories, showers, biological wastewater treatment units etc.
  - ◆ Cost effective, easy to handle, apply and store.
- ▶ **DESCALER POWDER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**DESCALER POWDER** is a concentrated, highly acidic powder compound containing a blend of strong acids, wetting agents, corrosion inhibitors, anti-foam agents and a color acid indicator.

Appearance/Color	: Reddish powder
Specific gravity	: 1.3 - 1.4 gr/cm <sup>3</sup> at 20°C
Solubility	: Moderate, slow reaction
pH value (10% Solution)	: 1.0 - 2.0
Odor	: Odorless

### PACKAGING

Order Number	: 832509 (25 kgrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **DESCALER POWDER** to be used corresponds to the scale and degree of contamination, the available downtime, the desired results and the system to be treated. Therefore, the concentration of the applied solution must be made after considering the above parameters. However, **DESCALER POWDER** is recommended for use at a quantity proportion of 4–5kgs for every 100litres of fresh water.

#### B. Preparation

There are certain actions, which must be taken before applying **DESCALER POWDER**. These are the following: Dissolve the powder in fresh water at a concentration of 4–5%.

Before the application of the solution, rinse the area to be treated thoroughly with water in order to eliminate sludge and other loose deposits

#### C. Cleaning Procedure

**DESCALER POWDER** may be used either at room temperature or can be heated up to no more than 60 °C in order to increase its activity and reduce the reaction rate.

The methods to use are circulation, soaking and spreading.

**Circulation** is applicable to boilers, evaporators, condensers, heat exchangers and generally closed systems that have the capability to circulate at a temperature of approximately 45–60°C, for 6–15 hours.



**Soaking** is usually applicable in open or closed systems that do not provide circulation. In these cases, two or three cleaning trials are recommended beforehand. Generally, a solution of 20%, at 45–55°C, should be used; it must not stand still, and should have periodic agitation. This ensures constant reaction rate. At the same time we must maintain the strength of the desired acidity by adding **DESCALER POWDER** and fresh water solutions, periodically, in order to make up for the lost volume proportion due to steam loss and surface reaction.

**For general cleaning** on large surface areas, conventional means such as a brush, sponge or a mop with **DESCALER POWDER** are suitable. The concentration of the solution should depend on the degree of contamination and the kind or type of deposition.

After the completion of the cleaning process, regardless of the method used, rinse with plenty of water and neutralize (only for the metal surface areas) with 1% solution of **ALKALINITY CONTROL**.

► **Note** that during application, due to the dissolving of the scale deposits, inflammable and/or toxic gases may be liberated. In this case, adequate ventilation is necessary.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>GENERAL INSTRUCTIONS</b>	Avoid mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**DG SUPER ECO™****DESCRIPTION**

**DG SUPER ECO** is a high performance water-based product, specifically formulated to address carbonaceous deposits, exhaust fumes and rubber trails commonly found from car tyres on a ship's car deck.

It is an environmental-friendly formulation consisting of biodegradable ingredients, safe for vessel's garage area cleaning.

**DG SUPER ECO** provides immediate and efficient results in cleaning as well as an odor eliminator, and it is readily biodegradable after use.

**ADVANTAGES & CHARACTERISTICS**

- ◆ A non-flammable mixture.
- ◆ It consists of readily biodegradable ingredients.
- ◆ Effectively removes all carbonaceous deposits, resulting from car exhausts.
- ◆ It removes rubber traces from car tyres in a ship's garage area
- ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
- ◆ An odor binder and eliminator.
- ◆ Can be combined with a specific range of products.
- ◆ Soluble in fresh and sea water.
- ◆ Acts as an acid-neutralizing agent.
- ◆ Cost effective, easy to apply and use.

**DG SUPER ECO** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

**PHYSICAL PROPERTIES**

**DG SUPER ECO** is a water based liquid solution, containing specific salts, detergents, wetting agents and corrosion inhibitors.

Appearance / Color	: Pale/Yellow liquid
Specific gravity	: 1.00 - 1.04 gr/cm <sup>3</sup> at 20°C
Odor	: Ethereal Odor
pH value	: 11.5 - 12.5
Flash Point	: None

**PACKAGING**

Order Number	: 833060 (30 ltrs)
Container	: Plastic jerrican

**APPLICATION AND USE****A. Dosing Procedure**

**DG SUPER ECO** can be used diluted with water, depending on the degree of contamination on the surface area that needs to be treated.

The quantity to be used is proportional to the degree of contamination, the surface area to be covered and the desired degree of cleaning.

In most of the cases **DG SUPER ECO** can be used after preparing a solution of 5%-10% by diluting it with water.

**B. Cleaning Procedure**

**Conventional methods:** In parts such as corner cavities, tank skeleton inlets and in general difficult parts to be cleaned, **DG SUPER ECO** must be carefully poured and/or applied by conventional means such as a hard brush, mop, sponge or any other manual devices feasible to move with rapid and irregular action.

Let the prescribed soak for 15 - 20 minutes.

Afterwards, wash thoroughly with water source.

In case of deposit persistence, repeat the cleaning procedure.

**Spraying method:** When the prescribed solution is prepared, spray directly to the contaminated area. Leave the solution to act for ca. 20 - 30 minutes. Afterwards, rinse thoroughly with water. In case of heavy contamination the above procedure needs to be repeated.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for several minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, remove contaminated clothes. Rinse and wash thoroughly with water and soap.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## ELECTROCLEAN ECO QUICK™

### DESCRIPTION

**ELECTROCLEAN ECO QUICK** is a special blend of non-chlorinated and powerful degreasing solvents with a controlled evaporation rate, formulated to remove grease, oil, carbon deposits and other residues from electric parts and equipment without damaging painted or varnished metal surfaces, insulating materials and cables.

**ELECTROCLEAN ECO QUICK** is an ideal replacement for chlorinated electro cleaners as it has low non-volatile residue effect.

### ADVANTAGES & CHARACTERISTICS

- ◆ Removes completely oil, grease, carbonaceous and various deposits leaving no dry dirt or stains behind.
- ◆ Free of chlorinated solvents.
- ◆ Safe for both the environment and user.
- ◆ Offers quick penetration and complete action.
- ◆ Safe to use on painted or varnished metal surfaces.
- ◆ A controlled evaporation rate gives efficient cleaning results as opposed to slow drying solutions.
- ◆ Rinsing not required after application.
- ◆ It is non corrosive to metals and machinery parts.
- ◆ Preserves and maintains electrical equipment in its original state.
- ◆ It has low non-volatile residue value.
- ◆ Cost effective, easy to apply and ready to use.

### PHYSICAL PROPERTIES

**ELECTROCLEAN ECO QUICK** is a vaporous, volatile, concentrated product of low flammability, non-corrosive and non-conductive with controlled evaporation rate.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.79 - 0.85 gr/cm <sup>3</sup> at 20°C
Flash Point	: >60°C
Stability	: Stable under normal conditions
Odor	: Odorless

### PACKAGING

Order Number	: 832585 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Application Procedure

**ELECTROCLEAN ECO QUICK** should be applied neat, at a proportional quantity to the degree of contamination on parts/equipment. The operator/user should determine the quantity needed depending on the degree of cleaning and the size of the part(s) in each case. **ELECTROCLEAN ECO QUICK** should not be used diluted.

#### B. Cleaning Procedure

Once the quantity of **ELECTROCLEAN ECO QUICK** has been determined, apply to contaminated parts/equipment by brushing, wiping or by immersion (for small parts). After finishing the cleaning procedure in generators and motor parts the remaining solvent may be helped to fully evaporate with the use of dry compressed air of low pressure. Then, warm air blowers must be used for quick dry.

Note that after use, the product must always be well sealed in its metallic drum.

#### ► IMPORTANT NOTICE

When cleaning with this product, all equipment should be offline and discharged.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## ELECTROCLEAN ENVIRO™

### DESCRIPTION

**ELECTROCLEAN ENVIRO** is a special blend of non-chlorinated and powerful degreasing solvents formulated to remove grease, oil, carbon deposits and other residues from electric parts and equipment without damaging painted or varnished metal surfaces, insulating materials and cables.

Compared to **ELECTROCLEAN-ECO QUICK** it has slower evaporation rate.

**ELECTROCLEAN ENVIRO** has a high dielectric strength and low non-volatile residue.

### ADVANTAGES & CHARACTERISTICS

- ◆ Removes completely oil, grease, carbonaceous and various deposits leaving no dry dirt or stains behind.
- ◆ Non-dangerous for the user and environmental friendly.
- ◆ Can be used with a specific range of products.
- ◆ Safe to use on painted or varnished metal surfaces.
- ◆ A controlled evaporation rate gives efficient cleaning results as opposed to slow drying solutions.
- ◆ No need to be rinse off after it has been applied.
- ◆ Strong antistatic capabilities result in the repulsion of suspended solids in the air such as dust, fumes and dirt.
- ◆ Preserves and maintains electrical equipment in its original state.
- ◆ It has a high dielectric strength and low non-volatile residue.
- ◆ Cost effective, easy to apply and ready to use.

### PHYSICAL PROPERTIES

**ELECTROCLEAN ENVIRO** is a vaporous, volatile, concentrated product of low flammability, non-corrosive and non-conductive with controlled evaporation rate.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.78 - 0.82 gr/cm <sup>3</sup> at 20°C
Flash Point	: >60°C
Stability	: Stable under normal conditions
Odor	: Aromatic

### PACKAGING

Order Number	: 832516 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**ELECTROCLEAN ENVIRO** must be applied concentrated at a quantity needed to accomplish complete cleaning; this depends on the degree of contamination to the parts/equipment. Therefore, the operator/user is the one to judge the quantity needed depending on the degree of cleaning required in that particular case.

#### B. Cleaning Procedure

Once the quantity of **ELECTROCLEAN ENVIRO** has been determined, apply to contaminated parts/equipment by brushing, wiping or by immersion (for small parts). All applications must be carried out in areas that are properly ventilated; this is due to the nature of the product.

Note that after use, the product must always be well sealed in its metallic drum.

#### ► IMPORTANT NOTICE

When cleaning with this product, all equipment should be offline and discharged.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## FILTER CLEANER™

### DESCRIPTION

**FILTER CLEANER** is a special product formulated by strong emulsifying agents, surfactants and powerful solvents to treat metal and ceramic oil filters, which suffer from oil depositions, carbonized oil accumulation and sludge.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Non-corrosive and safe to use in all types and kinds of filters.
- ◆ Preserves, protects and maintains the operational capabilities of the filter by thorough and complete cleaning.
- ◆ Provides quick and efficient action.
- ◆ Its pure, high quality components readily remove oil and grease deposits, even when dry.
- ◆ Can be combined with a specific range of products.
- ◆ Safe to use on all metals and their alloys as well as those with inorganic clay finishes.
- ◆ Attacks and dissolves water/oil emulsions and concentrations.
- ◆ Cost effective, easy to apply and use.

### PHYSICAL PROPERTIES

**FILTER CLEANER** is a concentrated petroleum solvent based liquid mixture, non-corrosive with strong emulsifying agents and surfactants.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.80 - 0.88 gr/cm <sup>3</sup> at 20°C
Flash Point	: >40°C
Odor	: Aromatic Solvent

### PACKAGING

Order Number	: 832513 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **FILTER CLEANER** to be used depends on two factors: the volumetric capacity of the filter to be cleaned and the degree of deposition/contamination in the filter.

In the first case, the dosage must equal the filter capacity.

In the second case, the dosage must be corresponding to the desired degree of cleaning.

#### B. Cleaning Procedure

The application of **FILTER CLEANER** is done by the circulation or immersion method.

If using the circulation method, determine the filter capacity and circulate at a constant rate for 6–20 hours.

If using the immersion method, let the filter soak in enough quantity of **FILTER CLEANER**, analogous to the degree of contamination, for a time of 6–20 hours.

#### ► IMPORTANT NOTICE

**FILTER CLEANER** must be used undiluted at all times and when using the immersion method, periodic agitation with the assistance of air is necessary, so that a constant surface reaction rate is maintained.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## FILTER CLEANER PLUS™

### DESCRIPTION

**FILTER CLEANER PLUS** is a special product formulated by strong emulsifying agents, biodegradable surfactants and powerful - low toxicity - solvents to treat metal and ceramic oil filters, which suffer from oil depositions, carbonized oil accumulation and sludge.

### ADVANTAGES & CHARACTERISTICS

- ◆ Non-corrosive, non-toxic, non - flammable and safe to use in all types and kinds of filters.
  - ◆ Preserves, protects and maintains the operational capabilities of the filter by thorough and complete cleaning.
  - ◆ Provides quick and efficient action.
  - ◆ Its pure, high quality components readily remove oil and grease deposits, even when dry.
  - ◆ Contains biodegradable surfactants, strong emulsifying agents and low toxicity solvents.
  - ◆ Free of chlorinated solvents and nonyl-phenol ethoxylates.
  - ◆ Can be combined with a specific range of products.
  - ◆ Safe to use on all metals and their alloys as well as those with inorganic clay finishes.
  - ◆ Attacks and dissolves water/oil emulsions and concentrations.
  - ◆ Minimizes fuel consumption.
  - ◆ Cost effective, easy to apply and use.
- ▶ **FILTER CLEANER PLUS** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**FILTER CLEANER PLUS** is a concentrated petroleum solvent based liquid mixture, consisting of corrosion inhibitors, ionic metal surface activators, biodegradable surfactants, and strong emulsifying agents.

Appearance/Color	: Clear liquid / Colorless
Specific gravity	: 0.85 - 0.90 gr/cm <sup>3</sup> at 20°C
Flash Point	: >61°C
Odor	: Light Aromatic

### PACKAGING

Order Number	: 832549 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **FILTER CLEANER PLUS** to be used depends on two factors: the volumetric capacity of the filter to be cleaned and the degree of deposition/contamination in the filter.

In the first case, the dosage must equal the filter capacity.

In the second case, the dosage must be corresponding to the desired degree of cleaning.

#### B. Cleaning Procedure

The application of **FILTER CLEANER PLUS** is done by the circulation or immersion method.

If using the circulation method, determine the filter capacity and circulate at a constant rate for 6–20 hours.

If using the immersion method, let the filter soak in enough quantity of product, analogous to the degree of contamination, for a time of 6–20 hours.

#### ▶ IMPORTANT NOTICE

When using the immersion method, periodic agitation with the assistance of air is necessary, so that a constant surface reaction rate is maintained.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## GARAGE CLEANER™

### DESCRIPTION

**GARAGE CLEANER** is a high quality product, specifically formulated to address carbonaceous deposits, exhaust fumes and rubber trails commonly found from car tyres on a ship's car deck.

**GARAGE CLEANER** formula provides immediate and efficient results in cleaning as well as an odor eliminator.

Its use on Aluminum, Zinc and Tin surface coatings is not recommended unless diluted with water.

### ADVANTAGES AND CHARACTERISTICS

- ◆ A non-flammable liquid mixture.
- ◆ Effectively removes all carbonaceous deposits, resulting from car exhausts.
- ◆ It removes rubber traces from car tyres in a ship's garage area
- ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
- ◆ An odor binder and eliminator.
- ◆ Can be combined with a specific range of products.
- ◆ Soluble in fresh and sea water.
- ◆ Acts as an acid-neutralizing agent.
- ◆ Cost effective, easy to apply and use.

▶ **GARAGE CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**GARAGE CLEANER** is a water-based alkaline concentrated liquid solution, consisting of specific minerals, detergents and wetting agents.

Appearance/Color	: Clear, colorless liquid
Odor	: Odorless
Specific gravity	: 1.19 - 1.23 gr/cm <sup>3</sup> at 20°C
pH value	: 12.0 - 13.0
Flash Point	: Not Applicable

### PACKAGING

Order Number	: 833035 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**GARAGE CLEANER** can be used either diluted or undiluted, depending on the degree of contamination on the surface area that needs to be treated.

**Undiluted:** In cases of heavy carbonaceous and rubber deposits build-up, **GARAGE CLEANER** must be applied undiluted.

**Diluted:** In cases of light deposition, a solution between 40-60% may be used.

#### B. Cleaning Procedure

**Conventional methods:** In parts such as corner cavities, tank skeleton inlets and in general difficult parts to be cleaned, **GARAGE CLEANER** must be poured and/or applied by conventional means such as a hard brush, mop, sponge or any other manual devices feasible to move with rapid and irregular action.

Let the prescribed soak for 15–20 minutes.

Afterwards, wash thoroughly with water.

In case of deposit persistence, repeat the cleaning procedure.

**Spraying method:** When the prescribed solution is prepared, spray directly to the contaminated area. Leave the solution to act for ca. 20 minutes. Afterwards, rinse thoroughly with water. In case of heavy contamination the above procedure needs to be repeated.

#### ▶ IMPORTANT INFORMATION

Operators must always consult MSDS (Material Safety Data Sheet) and the Safety and Handling instructions table before using this product.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention if necessary.
<b>Skin Contact</b>	Try to Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once.
<b>If swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## GENERAL CLEANING AND SOLVENT™

### DESCRIPTION

**GENERAL CLEANING AND SOLVENT** is a multi purpose cleaner and dispersant, designed to attack, penetrate and remove oil, dirt, dust, stains and organic deposits from large and small surface areas. It is an innovative, water soluble, biodegradable liquid product, pH buffered, formulated with strong wetting and cleaning agents.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Suitable for a wide range of industrial and marine cleaning applications such as toilets, bathing rooms, windows, floors, carpets, storage rooms, crew accommodations, etc.
  - ◆ Safe to use, acts quickly and efficiently.
  - ◆ Can be used with a wide range of other products.
  - ◆ A water base product where no drying time is required.
  - ◆ Non-flammable, pH buffered, non-corrosive and non-toxic.
  - ◆ Eliminator of bad odors with its strong but pleasant scent.
  - ◆ Has biocide properties and can be easily rinsed with water.
  - ◆ Completely biodegradable.
  - ◆ 100% soluble in fresh or seawater.
  - ◆ Cleans thoroughly leaving no films or stains behind.
  - ◆ Cost effective, easy to handle and apply.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **GENERAL CLEANING & SOLVENT** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **GENERAL CLEANING & SOLVENT** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**GENERAL CLEANING AND SOLVENT** is a concentrated, biodegradable liquid aqueous solution consisting of emulsifying, wetting and cleaning agents, pH stabilized. Furthermore, it is non-flammable, non-corrosive and non-toxic.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 0.97 - 1.01 gr/cm <sup>3</sup> at 20°C
Flash Point	: None
pH value	: 7.5 - 8.5
Odor	: mild, characteristic odor

### PACKAGING

Order Number	: 833014 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The recommended proportion of **GENERAL CLEANING AND SOLVENT** to be used is 1 litre for every 3–4 litres of water. In cases of extreme soiling and where hard cleaning is required, **GENERAL CLEANING AND SOLVENT** should be used undiluted, to achieve maximum results

#### B. Cleaning Procedure

**GENERAL CLEANING AND SOLVENT** may be applied by conventional methods such as a brush, sponge, or a mop.

When any conventional method is used, 1 litre of solution will approximately cover 8–12m<sup>2</sup> of surface area always in cases of normal contamination.

In any case, after the application of **GENERAL CLEANING AND SOLVENT** on any surface area, a time period of 2–6 hours is feasible for that area to be left to dry completely.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry and cool environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention if necessary.
<b>Skin Contact</b>	Try to Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once.
<b>If swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## HAND CLEANER™

### DESCRIPTION

**HAND CLEANER** is a multi-purpose heavy duty cleaning gel mixture used by commercial and industrial companies as a common dirt and grease remover. Its powerful formula ensures quick and thorough cleaning after any mechanical process where the engineer has been manually involved. Its content of cosmetic cleaners, safe degreasers, heavy duty detergent agents and light stone micro granules make **HAND CLEANER** one of the most effective and safe products on the market.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Highly effective at general-purpose hand cleaning / degreasing.
- ◆ Safe to use and apply even in the most sensitive cases.
- ◆ Removes all known kinds of dirt.
- ◆ Acts as a bacteria controller and eliminates odors.
- ◆ Can be used daily.
- ◆ Non corrosive, non toxic, non flammable and non oxidizing.
- ◆ pH stabilized, thus it acts as an acid and alkali neutralizing agent.
- ◆ May be combined with a specific range of products.
- ◆ Easy to rinse off as water soluble.
- ◆ Cost effective, easy to apply and use.

### PHYSICAL PROPERTIES

**HAND CLEANER** is a concentrated paste, blended with detergent agents, cosmetic cleaners, degreasers and light stone micro granules. It is also pH stabilized.

Appearance/Color	: Light orange gel
Specific gravity	: 0.80 - 0.90 gr/cm <sup>3</sup> at 20°C
pH value (1% Solution)	: 7.0 - 8.0
Solubility	: Appreciable
Odor	: Lemon scent

### PACKAGING

Order Number	: 833501 (5 ltrs)
Container	: Plastic pail

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **HAND CLEANER** to be used depends on the degree of contamination along with the desired degree of cleaning by the engineer. Thus, under normal conditions a small quantity of 5–10grs is sufficient to apply. In difficult cases, bigger quantities may be required and repetition of the cleaning procedure might also be necessary.

#### B. Cleaning Procedure

**HAND CLEANER** is applied in its original form. Once the quantity is determined, the engineer must rinse off his hands with water so as the chunk deposits are removed beforehand. Thereafter, **HAND CLEANER** is applied and the vigorous rubbing of the hands is necessary to accomplish deep and thorough dirt penetration. When a couple of minutes have elapsed, the engineer must rinse off with plenty of water and wipe dry with a towel. The cleaning procedure can be repeated if necessary. Note that hand cleaning may be assisted by the use of a brush and/or a sponge.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## LIQUID SOAP™

### DESCRIPTION

**LIQUID SOAP** is a multi-purpose heavy duty cleaning solution used as a common dirt remover in commercial and industrial cleaning processes. It may also be used to clean efficiently large surface areas and cargo tanks from animal oil, vegetable oil, fish oil, fat and waxes.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Very effective general-purpose cleaner.
  - ◆ Can be applied on all sensitive metal surfaces (Tin, Lead, Zinc and Aluminum) and their alloys as well as galvanized metals.
  - ◆ Ideal for use in the cleaning of animal oil, vegetable oil, fish oil, fat and wax deposits.
  - ◆ Acts as a bacteria controller.
  - ◆ pH stabilized, thus acts as a neutralizing agent.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **LIQUID SOAP** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **LIQUID SOAP** is not harmful to the marine environment as per MARPOL MEPC63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**LIQUID SOAP** is an aqueous concentrated liquid soap solution, able to control pH and bacteria growth.

Appearance/Color	: Light yellow, viscous liquid
Specific gravity	: 1.02 - 1.04 gr/cm <sup>3</sup> at 20°C
pH value	: 7.0 - 8.0
Solubility	: Appreciable
Odor	: Lemon scent

### PACKAGING

Order Number	: 833018 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **LIQUID SOAP** to be used depends on the degree of contamination to the affected area in question, along with the desired degree of cleaning required by the user. Thus, in cases of extreme soiling and heavy contamination **LIQUID SOAP** must be used undiluted, where as in less extreme situations it may be diluted to a concentration, appropriate for the deposited accumulation.

#### B. Cleaning Procedure

**LIQUID SOAP** may be applied undiluted or dissolved in water by injection and/or circulation, when required. In simple cleaning procedures it can be used like any other common liquid soap with conventional ways such as a brush, sponge and/or a mop.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## DESCRIPTION

**MARICHEM ANTISEPTIC LIQUID** is an Isopropyl alcohol-based cleanser, which removes the vast majority of germs and bacteria from user's skin and from various surface areas. It cleans and disinfects skin without drying it. Acts quickly and thoroughly and offers safety against all kind of infection-causing possibilities. No water required.

**MARICHEM ANTISEPTIC LIQUID** can be applied in galley and accommodation areas, as well as in the kitchen and in the dining room, in order to remove and eliminate microorganisms, bacteria and viruses.

Its content of cosmetic cleaner, safe alcohol, and light stone micro granules makes **MARICHEM ANTISEPTIC LIQUID** one of the most effective and safe products on the market.

## ADVANTAGES AND CHARACTERISTICS

- ◆ Highly effective palm cleanser.
- ◆ It can be applied in galley and accommodation areas.
- ◆ It is recommended for use in kitchens and dining rooms.
- ◆ Safe to use and apply.
- ◆ Removes the vast majority of germs, microorganisms and bacteria from user's skin and various surface areas.
- ◆ Cleans and disinfects hands without drying them.
- ◆ Offers safety against all kind of infection-causing possibilities.
- ◆ Non corrosive, non toxic and non oxidizing.
- ◆ Ensures thorough disinfection by using only 2-3ml each time.
- ◆ No water required.

## PHYSICAL PROPERTIES

**MARICHEM ANTISEPTIC LIQUID** is an Isopropyl alcohol – based cleanser, which removes the vast majority of germs and bacteria from user's skin and from various surface areas.

Appearance	: Clear liquid
Color	: Colorless
Specific gravity	: 0.80 - 0.85 gr/cm <sup>3</sup> at 20°C
Odor	: Alcohol odor

## MARICHEM ANTISEPTIC LIQUID™

### PACKAGING

Order Number	: 830510 (5L)
Container	: Plastic pail

### APPLICATION AND USE

#### For hand and skin cleaning

Apply to hands, rub in ensuring contact with fingernails and in between fingers. Leaves your hands fresh and crisp. Please use 2-3ml of the product each time.

Clean and dry hands before using the antiseptic liquid.

Apply an appropriate amount (2-3ml) of **MARICHEM ANTISEPTIC LIQUID** to moisten your palm and rub, all over the hands, for 10-15 seconds front back to front & in-between your fingers, under the nails and wrists, until the liquid covers your hands and dries.

Do not wash with water.

Avoid using on damaged or irritated skin.

#### For surface areas cleaning

Apply the appropriate amount of **MARICHEM ANTISEPTIC LIQUID** with cloth, mop or sponger in the surface area you want to clean.

Leave it to act for 10-15 minutes for galley and accommodation areas and for 20 minutes for kitchen and dining rooms.

Rinse off or leave it to air dry.

Surfaces that may come in contact with food should be cleaned with fresh water



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## MARICHEM C.R.-LT™

### DESCRIPTION

**MARICHEM C.R.-LT** is an advanced liquid product specifically made to attack, penetrate and efficiently remove completely carbonized soils, grease, oil, varnishes and other heavy deposits from diesel engine blocks, gear boxes, pistons, rings, valves, atomizers, pipes, burner tips, coolers and other engine parts. **MARICHEM C.R.-LT** does not contain any chlorinated solvents, phenolic compounds and corrosive ingredients. It consists of low toxicity ingredients with improved cleaning properties. It has been proven to be the most effective product in its category due to its quick and complete action.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Removes completely carbonized and baked soils, grease, oil, varnish, combustion by-products and other deposits as well as old paint, resins and lacquer coatings.
  - ◆ Insoluble materials are softened and they can easily be removed with water.
  - ◆ It is effective on Aluminum surfaces where the most Carbon Removers could cause corrosion and deterioration due to Chlorinated Solvents and Hydroxyl Compounds.
  - ◆ Does not contain Chlorinated Solvents, Phenolic compounds & non biodegradable Nonyl Phenol Ethoxylates.
  - ◆ Acts quickly and thoroughly.
  - ◆ Non-flammable.
  - ◆ Non-corrosive to most metal surfaces and parts.
  - ◆ Very efficient on Aluminium baked carbon surfaces.
  - ◆ Very good results are achieved under ambient cleaning conditions; this eliminates the need for mechanical means, requiring heat.
  - ◆ Contains a strong corrosion inhibitor.
  - ◆ Can be combined with a specific range of products.
  - ◆ Easy to apply and use.
- ▶ According to **MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **MARICHEM C.R.-LT** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group

on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

- ▶ **MARICHEM C.R.-LT** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**MARICHEM C.R.-LT** is an advanced liquid product consisting of low toxicity ingredients with improved cleaning properties.

Appearance/Color	: Orange to Yellow liquid
Specific gravity	: 0.86 - 0.90 gr/cm <sup>3</sup> at 20°C
Flash Point	: >61°C
pH value	: 11.5 - 12.5

### PACKAGING

Order Number	: 832505 (25 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### For Dosing Procedure

##### Soaking/Immersion Method

This method gives maximum efficiency results with minimum use of **MARICHEM C.R.-LT**.

For removal of light deposits or oil, a dilution of up to 1:3 in fresh water can be used. Light deposits could be removed at 1–2 hrs but for hard baked-carbon soils the product must be used undiluted and for a time period of 2–12 hrs. The product needs to be applied at a temperature higher than 20°C and heating of the soaking tank is required. It could be heated up from 20°C to 60°C for efficient and complete removal of soil, but in that case the user must make sure that a cover on the tank is used in order chemical evaporation to be avoided. The liquid is very safe upon heating use and does not emit toxic, volatile or harmful compounds.

##### Brush Method

The quantity of **MARICHEM C.R.-LT** to be used cannot be prescribed, since it must be applied diluted and in quantities sufficient enough to treat the problem at hand. The quantity depends on the degree of cleaning desired and the contamination level. The operator is



basically the one to judge the actual quantity needed in order to accomplish a particular cleaning job.

### Cleaning Procedure

#### Soaking/Immersion Method

The application of **MARICHEM C.R.-LT** when carried out using the soaking/immersion method is according to the following procedure. Initially, the desired quantity of **MARICHEM C.R.-LT** solution must be put into a steel bath, then, the parts/items for cleaning should be immersed and soaked for a period of 2–12 hours, depending on the degree of deposition/soiling.

The user must make sure that the rubber, silicon, plastic and elastic parts have been removed from the metal, before starting the cleaning procedure, as the product affects all these kind of materials. In case the temperature is below 20°C the user must apply heat

to the cleaning tank. The product could be heated up to 60°C where it will be more efficient. Light deposits will be removed in about 1–2 hours time, whilst heavier deposits will need overnight soaking. Afterwards, these treated parts/items must be taken out from the bath and washed thoroughly with a high-pressure water supply jet system, or with a sponge. Finally, dry them with the use of a cloth.

#### Brush Method

Once the quantity of **MARICHEM C.R.-LT** has been determined, apply to contaminated large parts/equipment, heavy pieces by brushing and/or wiping with a piece of thick cloth. Continue brushing until deposits are saturated and removed. Spray with water or sponge to rinse and then dry with an unused cloth.

For both cleaning procedures described above adequate ventilation is required.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention immediately.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention immediately.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## MARICHEM OIL SPILL DISPERSANT™

### DESCRIPTION

MARICHEM OIL SPILL DISPERSANT is the 3<sup>rd</sup> generation dispersant, approved as **Type II** and **Type III** from the **Greek General Chemical State Laboratory**, as per the latest European Union regulations. It can be used concentrated or diluted to a ratio of 1:10 depending on the contamination level. It is an efficient and environmental friendly product containing no hydrocarbons. It has been specifically designed for oil dispersion at sea, at shore and in port, either on-or-off board.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Non toxic to marine life.
  - ◆ Converts oil spills to hydrophilic droplets that are easily biodegradable.
  - ◆ Minimizes environmental damage.
  - ◆ Does not contribute further to pollution.
  - ◆ Cost effective and economical.
  - ◆ Easy to handle and apply.
  - ◆ Applicable to mineral oils, crude oils, fuel oils, kerosene, white spirit and lubricant oils.
- ▶ MARICHEM OIL SPILL DISPERSANT is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

MARICHEM OIL SPILL DISPERSANT is a low viscosity liquid product containing surface-active wetting agents combined with a biodegradable oil-soluble, non-ionic emulsifying agent.

Appearance/Color	: Yellow liquid
Specific Gravity	: 1.00–1.04 gr/cm <sup>3</sup> at 20°C
Odor	: Characteristic ether - like odor
Flash Point	: 90°C
pH value	: 7.0 - 8.0

### PACKAGING

Order Number	: 832076 (30 ltrs)/832176 (210 ltrs)
Container	: Plastic jerrican / Plastic drum

### APPLICATION AND USE

#### A. Dosing Procedure

##### At Sea

The quantity of MARICHEM OIL SPILL DISPERSANT to be used depends on three main factors: the quantity of oil spilled, the type of oil spilled and the weather conditions (prevailing and forthcoming). However, experience and expertise have proved that an adequate volume of MARICHEM OIL SPILL DISPERSANT to be used is 1litre per 15–20m<sup>2</sup> (1 gallon per 75–100 square yards) as tested on a spillage of Kuwait crude oil.

##### At Shore

The quantity of MARICHEM OIL SPILL DISPERSANT demanded in this case, depends on the size of contamination in the affected area. Repetition of the cleaning process may be necessary, until oil-spill elimination is complete.

##### On Ship

Follow the Procedure as per Paragraph **At Shore**.

#### B. Cleaning Procedure

##### At Sea

1. Determine the oil-spillage size and kind.
2. Prepare the tools necessary to apply the product, undiluted, as specified, using the MARICHEM OIL CLEAN KIT equipment.
3. Spray the required quantity of the product, with the appropriate spraying equipment, over the oil spill.
4. Wait for a few minutes until oil spill has emulsified.
5. In the case of a persistent/stubborn oil spill, repeat cleaning process until oil spill elimination is complete.

##### At Shore

1. Follow steps 1, 2, 3 as described in part **At Sea**.
2. Let it soak for few minutes and remove from the treated area.
3. Rinse thoroughly by applying high pressure water source and collect residual using MARICHEM OIL SPILL KIT.

Repeat cleaning of contaminated area if necessary.



**MARICHEM®**



**On Ship:**

1. Follow steps 1, 2, 3 as described in part **At Sea**.
2. After spraying and/or pouring, mix thoroughly using a brush, mop, sponge or any other stirring device feasible to move with rapid and irregular action.
3. Pour water over the treated surface and mix vigorously.
4. Rinse thoroughly by applying high - pressure water source.
5. Repeat cleaning if necessary.

**▶ IMPORTANT NOTICE**

The crew that will perform the oil spill dispersion must take all the precautionary measurements required before the beginning of the process.

**▶ IMPORTANT INFORMATION**

**Toxicity** According to the **European Union (EU)** laws, the **MARICHEM OIL SPILL DISPERSANT** is in the class of chemical dispersants that fulfill the limits of non-toxicity for a chemical dispersant substance. The lethal concentration 50 (LC 50) for aquatic microorganisms has been tested and found to be equal to 0.03%, after 24 hours of exposure. This value is within the acceptable limits of non-toxicity from **EU** directives.

**▶ ADDITIONAL INFORMATION**

**MARICHEM MARIGASES Worldwide Services** has won the **2004 Seatrade Dubai International Maritime Award** in the category Countering Marine Pollution and Atmospheric Pollution for the technical excellence of **MARICHEM OIL SPILL DISPERSANT**.

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for several minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, remove contaminated clothes. Rinse and wash thoroughly with water and soap.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If swallowed</b>	Avoid ingestion. Otherwise, rinse mouth. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## MARICLEAN DG-25™

### DESCRIPTION

**MARICLEAN DG-25** is a high performance water based alkaline cleaning agent. It is a product of low toxicity that does not contain either nonyl phenols or caustic alkalis. It consists of biodegradable ingredients safe for oil cleaning and metal degreasing.

**MARICLEAN DG-25** can be used as a cleaning agent for engine rooms, decks, cargo holds or even as a tank cleaner. It efficiently removes heavy grease, sludge, fatty oil, fish oil, animal and vegetable oil. **MARICLEAN DG-25** can be used neat or diluted with fresh water. It is readily biodegradable after use.

One of the main advantages of **MARICLEAN DG-25** is that can provide excellent cleaning effect of inert gas soot in cargo tanks.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Multi-purpose water based cleaner.
  - ◆ Consists of biodegradable ingredients.
  - ◆ Does not contain nonyl phenols neither caustic alkalis.
  - ◆ Free from hydrocarbons and chlorinated solvents.
  - ◆ Non flammable and non combustible liquid of low toxicity.
  - ◆ Can be used for a variety of general cleaning, such as removal of grease, oil, sludge and grime.
  - ◆ Can be used efficiently as cleaning agent for engine rooms, decks, cargo holds and tanks.
  - ◆ Excellent inert gas soot cleaner in cargo tanks.
  - ◆ No known effect on rubber.
  - ◆ Applicable to plastic, rubber and epoxy compounds as well to painted, coated and varnished surfaces.
  - ◆ If you are using **MARICLEAN DG-25** on a vertical or horizontal surface, the resident time and cleaning ability can be furthered, by adding Foam Plus.
  - ◆ May attack aluminium and zinc.
  - ◆ Cost effective, easy to apply and use.
- ▶ According to **MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
- ▶ **MARICLEAN DG-25** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards

of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of **MARPOL 73/78**.

- ▶ **MARICLEAN DG-25** is not harmful to the marine environment as per **MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)]**.

### PHYSICAL & CHEMICAL PROPERTIES

**MARICLEAN DG-25** is a water based alkaline cleaner containing specific eco-friendly solvents, non ionic and anionic surface active agents and corrosion inhibitors.

Appearance/Color	: Pale/Yellow Liquid
Odor	: Ethereal Odor
Specific Gravity	: 0.99 - 1.03 gr/cm <sup>3</sup> at 20°C
pH	: 12.0 - 13.0
Flash Point	: None
Solubility	: Completely Soluble in water
Compatibility	: May attack Aluminium and Zinc when used in a high concentrated solution

### PACKAGING

Order Number	: 833032 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**MARICLEAN DG-25** may be applied concentrated or diluted with water. The quantity to be used is proportional to the degree of contamination, the available downtime, the surface area to be covered and the desired degree of cleaning.

For heavy duty cleaning and degreasing, **MARICLEAN DG-25** can be used undiluted whereas for lighter contamination can be used diluted with water depending on the degree and nature of the contamination.

**Circulation method:** A solution of 5%–10% must be prepared by diluting **MARICLEAN DG-25** with water.

**Injection method:** Prepare a solution of 3%–6% by diluting **MARICLEAN DG-25** with water.

#### B. Cleaning Procedure

**Circulation method:** After the solution is prepared, apply by circulating for approximately 6–8 hours.



Thereon, wash thoroughly with water. You may have to repeat the procedure, in cases of heavy contamination.

**Injection method:** When the prescribed solution is prepared, inject directly to the contaminated area. Afterwards, rinse thoroughly with water.

**Soaking/Immersion method:** Once the solution is prepared, immerse the part, component or unit to be cleaned and leave it to soak for about 30 minutes, making sure that all the surfaces remain covered in solution. Afterwards rinse thoroughly with water.

## ! SAFETY AND HANDLING

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for several minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, remove contaminated clothes. Rinse and wash thoroughly with water and soap.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## MARICLEAN-POL™

### DESCRIPTION

**MARICLEAN-POL** is a multi-purpose heavy duty cleaning water-based solution used as a common dirt remover in commercial and industrial cleaning processes. It may also be used to clean efficiently large surface areas and cargo tanks from animal oil, vegetable oil, fish oil, fat and waxes.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Very effective general-purpose cleaner.
  - ◆ Can be applied on all sensitive metal surfaces (Tin, Lead, Zinc and Aluminum) and their alloys as well as galvanized metals.
  - ◆ Ideal for use in the cleaning of animal oil, vegetable oil, fish oil, fat and wax deposits.
  - ◆ Acts as a bacteria controller.
  - ◆ pH stabilized, thus acts as a neutralizing agent.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use.
- ▶ According to MARPOL 73/78 chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **MARICLEAN-POL** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **MARICLEAN-POL** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**MARICLEAN-POL** is an aqueous concentrated liquid soap solution, able to control pH and bacteria growth.

Appearance/Color	: Light yellow, viscous liquid
Specific gravity	: 1.02 - 1.04 gr/cm <sup>3</sup> at 20°C
Solubility	: Appreciable
pH value)	: 7.0 - 8.0
Odor	: Lemon scent

### PACKAGING

Order Number	: 833020 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **MARICLEAN-POL** to be used depends on the degree of contamination to the affected area in question, along with the desired degree of cleaning required by the user. Thus, in cases of extreme soiling and heavy contamination **MARICLEAN-POL** solution of 10% -12% must be used, where as in less extreme situations it may be diluted to a concentration, appropriate for the deposited accumulation.

#### B. Cleaning Procedure

**MARICLEAN-POL** may be applied undiluted or dissolved in water by injection and/or circulation, when required. In simple cleaning procedures it can be used like any other common liquid soap with conventional ways such as a brush, sponge and/or a mop.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for several minutes. Seek immediate medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, remove contaminated clothes. Rinse and wash thoroughly with water and soap.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If swallowed</b>	Avoid ingestion. Otherwise, rinse mouth. Seek immediate medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## MUD CONDITIONER™

### DESCRIPTION

**MUD CONDITIONER** is a concentrated liquid solution formulated with special surfactants and a corrosion inhibitor in order to fight formations and disperse accumulations of mud and silt in ballast water tanks. Actually, **MUD CONDITIONER** reacts with mud and silt to form large non-adhering particles, which are dissolved in the tank and then discharged with the ballast water during de-ballasting.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Ideal for the removal, dispersion and prevention of heavy mud, loose scale, rust deposits, silt accumulates and other sediments in ballast water tanks.
  - ◆ Reacts with mud and silt molecules to form non-adhering particles, which are easily discharged during de-ballasting.
  - ◆ Terminates microorganisms harvested in the mud and silt sludge.
  - ◆ Effectively cleans the ballast water tank lines and pumping equipment.
  - ◆ Prevents extensive erosion from the ballast tank surfaces and cavities.
  - ◆ Acts quickly and efficiently and is water-soluble.
  - ◆ Non-flammable and non-toxic.
  - ◆ Can safely be applied to all metals except those galvanized and those made of tin, zinc and aluminum.
  - ◆ Cost effective, easy to apply and use.
- ▶ **MUD CONDITIONER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**MUD CONDITIONER** is a concentrated aqueous solution consisting of special surface-active agents and a specific corrosion inhibitor.

Appearance/Color	: Clear, red liquid
Specific gravity	: 1.15 - 1.17 gr/cm <sup>3</sup> at 20°C
Solubility	: Complete
pH value	: 1.0 - 2.0
Odor	: Pungent

### PACKAGING

Order Number	: 833019 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

Commonly, a quantity of 25–50 litres of **MUD CONDITIONER** per 1,000 tons of ballast water content is used every time the tanks are ballasted.

However, when we deal with heavy mud and silt accumulations, 150–250 litres per 1,000 tons of ballast water is recommended for fast and complete cleaning.

#### B. Cleaning Procedure

In the case where regular treatment is desired, the prescribed quantity of **MUD CONDITIONER** is added to ballast water, while ballasting, in order to make sure of the homogeneity of the formed mixture. Here, the treatment must be repeated every time the tanks are ballasted.

In the case of heavy mud and silt accumulation, the quantity of **MUD CONDITIONER** prescribed is poured in the de-ballasted tanks, which now are filled only with 20–30cm of their height capacity with water, being enough to ensure mud and silt removal by rapid agitation. Then, the mixture must be left to act for a period of 3–5 hours followed by complete removal.

- ▶ **Note** that a high-pressure water supply may be used to assist removal and further penetration into the mud and silt deposits. Also, the treatment may have to be repeated depending on the degree of contamination and accumulation we are dealing with.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## OIL & GREASE REMOVER™

### DESCRIPTION

**OIL & GREASE REMOVER** is an advanced mixture of biodegradable raw materials and a light aromatic solvent. It effectively removes all kinds and types of oil, grease, fat and light carbonaceous deposits from metal, plastic and rubber surfaces and parts. Acts quickly and thoroughly, and it can be effectively combined with a broad range of products. It is also applicable to plastic, rubber, epoxy and zinc compounds, as well as to painted, coated and varnished surfaces.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Consists of water-based raw materials.
  - ◆ Effectively removes all kinds and types of oil, grease, fat and light carbonaceous deposits from metal, plastic and rubber surfaces and parts.
  - ◆ Acts quickly and thoroughly.
  - ◆ Non-corrosive, non-toxic, non-chlorinated product.
  - ◆ Can be used efficiently as cleaning agent for engine rooms, decks, cargo holds and tanks.
  - ◆ Applicable to plastic, rubber, epoxy and zinc compounds as well as to painted coated and varnished surfaces.
  - ◆ Can be combined with a broad range of products.
  - ◆ Readily biodegradable.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **OIL & GREASE REMOVER** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.
  - ▶ **OIL & GREASE REMOVER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**OIL & GREASE REMOVER** is a liquid solution that contains aromatic solvent, non-ionic, surface-active agents and biodegradable, water-based raw materials.

Appearance/Color	: Light yellow liquid
Specific gravity	: 0.97 - 1.01 gr/cm <sup>3</sup> at 20°C
pH value	: 10.5 - 11.5
Odor	: Slight Aromatic
Stability	: Very Stable

### PACKAGING

Order Number	: 832521 (25 ltrs), 832121 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**OIL AND GREASE REMOVER** may be applied concentrated or diluted with water. The quantity to be used is proportional to the degree of contamination, the available downtime, the surface area to be covered and the desired degree of cleaning. Therefore, the user is the one to consider the necessary quantity. For heavy duty cleaning and degreasing, **OIL & GREASE REMOVER** can be used undiluted whereas for lighter contamination can be used diluted with water depending on the degree and nature of the contamination.

#### B. Cleaning Procedure

Once the quantity has been determined, apply using any of the following methods: brushing and soaking/immersion.

**Brushing** is applicable to situations with light accumulation, large and small surface areas and highly contaminated parts or engine components.

**Soaking/Immersion** is used in situations where we deal with dismantled parts, articles and engine components. Here, brushing may be applied in coordination with immersion to remove heavy accumulation.

- ▶ **After** the application, no matter which method is used, leave the solution to soak for as long as necessary and rinse with fresh water (in some cases, a high pressure water supply is recommended).



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.





## OIL SPILL EMULSIFIER™

### DESCRIPTION

**OIL SPILL EMULSIFIER** is a product of superior quality, specifically designed for oil dispersion at sea, at shore and in port, either on-board or off-board. High standards and specifications have been incorporated in engineering this environmentally safe product.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Non-toxic to marine life.
- ◆ Highly effective for oil spills at sea, on seashores and on solid surfaces such as docks, decks, piers, wharfs, ship hulls etc.
- ◆ Actively promotes oil-dispersion into microscopic droplets, so that the maximum surface area can be treated with rapid bacterial degradation.
- ◆ Has been tested and approved by the various regulatory agencies.
- ◆ Cost effective and economical.
- ◆ Applicable to all mineral oils, crude oils, fuel oils, kerosene, white spirit and lubricant oils.

### PHYSICAL PROPERTIES

**OIL SPILL EMULSIFIER** is a low viscosity liquid product containing surface active wetting agents and hydrocarbon solvents of very low toxicity, combined with a biodegradable oil-soluble, non-ionic emulsifying agent.

Appearance/Color	: Clear, colorless liquid
Odor	: Odorless
Specific gravity	: 0.77 - 0.81 gr/cm <sup>3</sup> at 20°C
Flash point	: 85°C
Aromatics	: <0.4%

### PACKAGING

Order Number	: 832523 (25 ltrs), 832123 (210 ltrs)
Container	: Steel drum



### APPLICATION AND USE

#### A. Dosing Procedure

##### At Sea

The quantity of **OIL SPILL EMULSIFIER** to be used depends on three main factors: the quantity of oil spilled, the type of oil spilled and the weather conditions (prevailing and forthcoming). However, experience and expertise have proved that an adequate volume of **OIL SPILL EMULSIFIER** to be used is 1 litre per 15–20 square meters (1 gallon per 75–100 square yards) as tested on a spillage of Kuwait crude oil.

##### At Shore

The quantity of **OIL SPILL EMULSIFIER** demanded in this case, depends on the size of contamination in the affected area. Repetition of the cleaning process may be necessary, until oil-spill elimination is complete.

**On Ship:** The quantity of **OIL SPILL EMULSIFIER** required here, is analogous to the case of shore contamination. That is, the application of the cleaning process should be carried out on the contaminated surface, as many times, as is required.

#### B. Cleaning Procedure

##### At Sea

1. Determine the size and kind of oil-spillage.
2. Prepare the tools necessary to apply the product, undiluted, as specified using the **MARICHEM OIL CLEAN KIT** equipment.
3. Spray the desired quantity of the product with the appropriate spraying equipment, over the oil spill.
4. Wait for a few minutes until oil spill has emulsified.
5. Is important to keep in mind that emulsification occurs when the **OIL SPILL EMULSIFIER**, the spilled oil and seawater are mixed.
6. In the case of a persistent/stubborn oil spill, repeat cleaning process until oil spill elimination is complete.

##### At Shore

1. Follow steps 1,2,3 as described in part **At Sea**.
2. Let it soak for a few minutes and remove from the treated area.
3. Rinse thoroughly by applying high pressure water source.
4. Repeat cleaning of contaminated area if necessary.

**On Ship**

1. Follow steps 1,2,3, as described in part **At Sea**.
2. After spraying and/or pouring, mix thoroughly using a brush, mop, sponge or any other stirring device feasible to move with rapid and irregular action.
3. Pour water over the treated surface and mix vigorously.

**▶ IMPORTANT INFORMATIONS****A. Toxicity**

The following test results justify the **OIL SPILL EMULSIFIER** to be of low toxicity to marine life.

Test Object	Exposure Time	LC 50 (mg/l)
Brown Shrimp A (Crangon Crangon)	48 hrs	3,300
Brown Shrimp B (Crangon Crangon)	96 hrs	3,300–10,000
Limpet (C)	24 hrs	75,000

4. Rinse thoroughly by applying high pressure water source.
5. Repeat cleaning if necessary.

**▶ IMPORTANT NOTICE:** The crew that will perform the oil spill dispersion must take all the precautionary measurements required before the beginning of the process.

**B. Tests and Licenses**

**OIL SPILL EMULSIFIER** has been tested by **EFFEH and Associates Research Analysis Consultation** (Houston, Texas) and has been found to be non-toxic to microbes.

**OIL SPILL EMULSIFIER** has been tested and approved for use by the Environmental Protection Department of Hong Kong.

Furthermore, it has been tested and approved for use by China's regulatory agencies; The **Tsing Tao City Analytical and Testing Society** and **Tsing Tao University of Oceanography**, while it is officially licensed by the **Tsing Tao Safety Supervision Bureau**.

**MARICHEM MARIGASES Worldwide Services** has won the **2000 Seatrade Dubai International Maritime Award** in the category Countering Marine Pollution for the technical excellence of **OIL SPILL EMULSIFIER**.

**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

** Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## PASSIVATION LIQUID™

### DESCRIPTION

**PASSIVATION LIQUID** is an innovative, concentrated liquid product specifically engineered to passivate pickled installations and tank surface areas made of austenitic stainless steel. It provides a protective oxide layer against corrosion contamination. Furthermore, when it is diluted with water, it can be safely used to clean aluminum surfaces, aluminum parts and their metal alloy compounds.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Efficiently binds to pickled austenitic stainless steel surfaces to deactivate erosive conditions and to protect against further corrosion.
  - ◆ Can safely be used to clean aluminum installations, parts and surface areas when diluted with water.
  - ◆ Provides a quick and thorough treatment.
  - ◆ Cannot be used until after the pickling process.
  - ◆ Non-flammable, non-conductive and non-toxic.
  - ◆ Has no known effect on rubber or plastic.
  - ◆ May be combined with a specific range of other products.
  - ◆ No heating is required upon application and it is water-soluble.
  - ◆ Cost effective, easy to apply and use.
- ▶ **PASSIVATION LIQUID** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**PASSIVATION LIQUID** is an aqueous concentrated liquid blend of strong acids, non-ionic surface-active agents and advanced corrosion inhibitors.

Appearance/Color	: Clear, colorless liquid.
Specific gravity	: 1.15 - 1.20 gr/cm <sup>3</sup> at 20°C
Solubility	: Appreciable
pH value	: 0.80 - 1.20
Odor	: Characteristic

### PACKAGING

Order Number	: 833024 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**Stainless Steel Treatment:** For this application, **PASSIVATION LIQUID** must be used undiluted in quantities proportional to cover the surface areas or installations under treatment. Note that 1 litre of the product may cover approximately an area of 12 sq. meters

**Aluminum Cleaning:** Here, **PASSIVATION LIQUID** may be diluted to a 1:1 proportion with water. The quantity of diluted solution required, corresponds to the area to be covered, the degree of contamination, the available down time and the desired degree of cleaning.

#### B. Procedure

##### Stainless Steel Treatment

**PASSIVATION LIQUID** may be applied by conventional means or by the circulation method.

Conventional methods such as a brush, hard sponge and or a thick mop can be used when stainless steel parts and/or components are to be treated. Application should be carried out for approximately 15 minutes. Afterwards, rinse thoroughly with distilled water and leave to dry.

Circulation is a method commonly used for pipeline systems and tanks. Here the system under consideration must be filled with **PASSIVATION LIQUID**, which must be circulated for approximately 2 hours. Then, the system must be drained and rinsed thoroughly with distilled water. Afterwards, leave the system to dry. Note that before discarding the liquid, it should be neutralized with slaked lime.

##### Aluminum Cleaning

For the cleaning of aluminum surfaces, pipe systems and parts, any of the cleaning methods for stainless steel, as described above, can be used. The cleaning time is approximately for 2 hours. Afterwards, rinse thoroughly with water. Note that, neutralization with slaked lime before draining is also applicable in circulation cleaning processes.

#### ▶ IMPORTANT INFORMATION

**PASSIVATION LIQUID** is considered highly corrosive. Operators must consult the Safety and Handling instructions table before use.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## PICKLING LIQUID™

### DESCRIPTION

**PICKLING LIQUID** is a concentrated liquid solution formulated with a blend of specific acids, surfactants and corrosion inhibitors. Its purpose is to attack, penetrate and remove weld slag, annealing scale, grinding dust from austenitic stainless steel constructions such as tanks, installations and components before the process of passivation.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Efficiently removes foreign substances from austenitic stainless steel surfaces and articles while preparing them for proper passivation.
  - ◆ Can only be used on austenitic stainless steel as it corrodes other metals.
  - ◆ Water soluble, acting quickly and thoroughly.
  - ◆ Non-flammable, non-conductive and non-toxic.
  - ◆ No heating is required upon application.
  - ◆ No known effect on rubber or plastic compounds.
  - ◆ May be combined with a specific range of other products.
  - ◆ Cost effective, easy to apply and use.
- **PICKLING LIQUID** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**PICKLING LIQUID** is an aqueous concentrated liquid mixture consisting of specific high quality acids, surface-active agents and advanced corrosion inhibitors.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.18 - 1.23 gr/cm <sup>3</sup> at 20°C
Solubility	: Appreciable
pH value	: 0.90 - 1.30
Odor	: Characteristic

### PACKAGING

Order Number	: 833025 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

**PICKLING LIQUID** must be used undiluted and in quantities proportional to the extent of contamination you are dealing with, the surface area to be covered, the number of articles being treated and the type/kind of stainless steel. Anyway, the user is the one responsible to determine the actual quantity needed for each situation at hand.

#### B. Cleaning Procedure

**PICKLING LIQUID** may be applied either by the circulation or the soaking/immersion method. However, before application, a pre-treatment process is necessary. Therefore, before commencing, clean and degrease the surfaces to be pickled with either **MARICHEM ELECTROCLEAN ECO QUICK** to remove felt pen ink marks, oils and light carbon deposits or with **MARICHEM ALCACTIVE LIQUID** to remove grease deposits that have accumulated on smaller metal surfaces and parts. Afterwards, use a high-pressure water supply to rinse well.

**Circulation** is a method mainly used for pipe systems. Here, the system is filled with **PICKLING LIQUID**, which it must be circulated for 2–6 hours depending on the degree of soiling and the type of the austenitic steel. Do not pickle longer than is necessary. Thereafter, drain the system and rinse thoroughly with water. Passivation must follow immediately. Note that before disposing of the liquid, it must be neutralized with slaked lime.

**Soaking/Immersion** is a method used for parts, components or other articles. The process is initiated by filling a plastic or plastic lined bath with **PICKLING LIQUID**. Then, place the articles to be pickled into the bath and leave them to soak for 1–6 hours depending on the degree of soiling and the kind of austenitic steel. Remove the articles from the bath and spray them with a powerful water jet. Passivation should follow immediately after spraying.

In any case, note that before disposing of the liquid effluent solution, it should be neutralized with slaked lime.

#### ► IMPORTANT INFORMATION

**PICKLING LIQUID** is considered highly corrosive. Operators must consult the Safety and Handling instructions table before use.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## PURIFIER DISC CLEANER™

### DESCRIPTION

**PURIFIER DISC CLEANER** is a concentrated liquid mixture especially designed to remove carbonaceous deposits from all types of lube and fuel oil separators and separator discs. It is formulated with active surfactants and inorganic acids. Its purpose is to act quickly and efficiently.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Highly effective in the removal of carbonaceous deposits from all types of separators and separator discs.
  - ◆ Does not contain any chlorinated hydrocarbons and is non-flammable.
  - ◆ Acts quickly and thoroughly and induces centrifuge efficiency.
  - ◆ Safe to use on stainless steel and all ferrous metals except Tin, Zinc, Aluminum, Lead and those galvanized.
  - ◆ Can be applied directly on the contaminated area without taking apart the separators and/or their disc components.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **PURIFIER DISC CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**PURIFIER DISC CLEANER** is a concentrated blend of active surfactants and inorganic acids. It is non-flammable and water soluble.

Appearance/Color	: Non-transparent colorless liquid
Specific gravity	: 1.05 - 1.10 gr/cm <sup>3</sup> at 20°C
pH value	: 1.0 - 2.0
Solubility in water	: Absolute
Flash Point	: None
Odor	: Slight ethereal

### PACKAGING

Order Number	: 833026 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The suggested proportion of **PURIFIER DISC CLEANER** is 1litre for every 2–3 litres of water. However, the strength of the solution is based on the degree of cleaning desired for the situation at hand. The factors to be considered are the deposit build-up, the heating conditions and the available downtime. These parameters are important and should be acknowledged by the user, as they will finally decide on the quantity and the concentration needed. Note, that the higher the concentration of the solution, the quicker and more efficient the cleaning.

#### B. Cleaning Procedure

The use of **PURIFIER DISC CLEANER** can be done by immersion of the separator parts. In this case you must not use a galvanized container.

Cleaning time may vary from 1 to 3 hours depending on the level of contamination.

After immersion, remove part/parts and wash thoroughly with fresh water in order to rinse off the **PURIFIER DISC CLEANER**, left over stains and dissolved deposits.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## RUST REMOVER™

### DESCRIPTION

**RUST REMOVER** is a concentrated aqueous liquid solution consisting of a blend of synergetic antioxidants and passivators. It is used to remove rust from any steel surface area and rust stains from brass, copper, stainless steel, wood, ceramic and aluminum surfaces, painted or not. Additionally, it contributes to the rust proofing of metals before any painting or coating application.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Readily removes rust and rust stains from metal and non-metal surfaces.
  - ◆ Protects and keeps surfaces free from corrosion.
  - ◆ Removes and prevents flash and light rust due to passivation.
  - ◆ Acts as a rust proofing agent before the application of paints or coatings.
  - ◆ Non-flammable, does not affect rubber or plastic compounds.
  - ◆ May be used with a specific range of other cleaning products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **RUST REMOVER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**RUST REMOVER** is a non-flammable mixture of special acids, passivators and surfactants.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.20 - 1.25 gr/cm <sup>3</sup> at 20°C
pH value	: 1.2 - 2.5
Solubility in water	: Complete
Odor	: Odorless

### PACKAGING

Order Number	: 833027 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **RUST REMOVER** to be used cannot be directly specified, since it depends on the cleaning results desired and the situation at hand. The user is the one responsible to regulate the quantity needed. However, when the cleaning application is determined, **RUST REMOVER** must be used diluted with fresh water with a percentage concentration ranging between 10–50% depending on the desired strength of the solution.

Note that a 10% solution is sufficiently strong and it can be used for most general/everyday situations involving rust.

The 50% solution is recommended when we have very difficult cases, involving areas that are very heavily encrusted with rust.

#### B. Cleaning Procedure

Before application, when the affected area has been determined, ensure the absence of oil, grease, dirt or other foreign matter. Then shake the **RUST REMOVER** well and prepare the desired concentration solution.

The solution may now be applied either by brushing and/or injection.

Smaller parts may be immersed directly into the prepared solution.

In all of the above situations, you must allow **RUST REMOVER** to act for 20–40 minutes and then rinse thoroughly with high or regular pressure fresh water.

- ▶ **Note** that in cases for where **RUST REMOVER** has been specifically used to rust proof an area, before it is to be painted or coated, there is no need to rinse with water.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## RUST SHIELD PHOS™

### DESCRIPTION

**RUST SHIELD PHOS** is a concentrated liquid solution specifically engineered to attack, remove and prevent corrosion as well as to maintain anti-corrosive properties thereon. It may be applied to all metal surface areas and metallic components as a preparatory anti-rust agent before painting, varnishing and/or coating jobs provided that these treated surfaces are free of water.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively attacks, penetrates, removes and controls rust on all metal surfaces and parts except those being galvanized and those made of Tin, Zinc, Aluminum and Lead.
  - ◆ Protects efficiently against corrosion.
  - ◆ Acts quickly and thoroughly and no heating upon application is needed.
  - ◆ No known effect on rubber & plastic compounds.
  - ◆ Water-soluble, non-flammable liquid mixture.
  - ◆ Cold protective and "phosphating" rust converter formulated to use on all steel surfaces before coating, re-coating, painting and varnishing applications.
  - ◆ Substitutes sandblasting and hot pickling methods, especially in the cases where they cannot be used.
  - ◆ May be combined with a specific range of other products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **RUST SHIELD PHOS** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**RUST SHIELD PHOS** is a concentrated acid-based aqueous solution containing a synergistic antioxidant, and a strong corrosion inhibitor, which result to rust removal and rust proofing on metal surfaces and articles.

Appearance/Color	: Clear, colorless liquid
Specific gravity	: 1.25 - 1.33 gr/cm <sup>3</sup> at 20°C
Solubility	: Adequate
pH value	: 1.5 - 2.5
Odor	: Odorless

### PACKAGING

Order Number	: 833028 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **RUST SHIELD PHOS** to be used cannot be prescribed, since this depends on the surface area and/or the number of the parts to be treated, the degree of contamination and the desired results wanted by the user.

In any case, **RUST SHIELD PHOS** must be used diluted at a proportion of 1 liter for every 1–2 liters of water.

#### B. Cleaning Procedure

The application of **RUST SHIELD PHOS** can be done by brushing with an elongated hard thick brush.

1litre of the diluted solution will cover 12–15 square meters of surface area.

After application, leave surface to dry completely for approximately 2–6 hours time.

- ▶ **Furthermore**, it is important to note that 1 litre of **RUST SHIELD PHOS** can cover approximately 12–15 square meters of light rusted surfaces, where water/sandblasting has been previously used.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## SANITATION A-CLEANER™ (BIOLOGICAL CLEANER)

### DESCRIPTION

**SANITATION A-CLEANER** is a biological active cleaning solution formulated to eliminate hazardous, toxic bacteria and its growth, as well as to dissolve and remove solid organic waste, natural oils, grease and tartar deposits. It has been designed for the cleaning of restrooms (toilets), bathrooms, storage rooms, kitchen sinks, collection lines and in general, the sewage/sanitary systems of the vessel.

Furthermore, its concentrated scent provides the added advantage of an odor eliminator.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively eliminates hazardous bacteria and readily removes organic waste and oil and grease deposits.
  - ◆ A multi purpose cleaner for toilets, drains, showers, storage rooms, quarter rooms, etc.
  - ◆ It unblocks and maintains clearways in pipelines and sewage sanitary systems.
  - ◆ It is an odor eliminator.
  - ◆ It acts quickly and efficiently, while being safe to use.
  - ◆ Can be used in combination with other cleaning products.
  - ◆ It does not affect rubber or plastic compounds.
  - ◆ Very cost effective, easy to handle and apply.
- ▶ **SANITATION A-CLEANER** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**SANITATION A-CLEANER** is a concentrated liquid blend containing powerful surfactants, bacterial strains and aqueous chemical cleaners.

Appearance/Color	: Clear, light yellow liquid
Specific gravity	: 1.05 - 1.10 gr/cm <sup>3</sup> at 20°C
pH (1% Solution)	: 12.0 - 13.5
Odor	: Mild Chlorine Scent

### PACKAGING

Order Number	: 833031a (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### A. Dosage

**SANITATION A-CLEANER** may be dosed in quantities sufficient to provide thorough and complete cleaning results. The user is the one capable to regulate the quantity used according to the situation at hand.

#### B. Cleaning Procedure

The application of **SANITATION A-CLEANER** does not differ from other general cleaners. Therefore, the ways to apply the product are conventional due to its safe characteristics. That is, for floors, walls, counters, etc, use a brush, sponge or mop. For drains, sinks, kitchen pipelines, bathroom pipelines, etc, use daily by pouring down a quantity, approximately between 250–500ml.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## SODIUM BISULPHITE SOLUTION 12% <sup>TM</sup>

### DESCRIPTION

**SODIUM BISULPHITE SOLUTION 12%** is a liquid compound consisting of Sodium Bisulphite. It is used as dechlorinating agent in various waste-water systems. The highly efficient results achieved, are based on its reaction time and its ability to act as a reducing agent in order to neutralize the chlorine excess in the water.

Chlorine is the most widely used disinfectant today, however, the release of chlorinated water into sensitive waterways can be detrimental to aquatic life. Regulations have mandated that the chlorine be removed prior to discharge into a receiving waterway.

**SODIUM BISULPHITE SOLUTION 12%** facilitates the reduction of chlorine as it reacts quickly in wastewater systems.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Protects against the release of excess chlorinated water into sensitive waterways.
- ◆ Very efficient and rapid chlorine reducing agent.
- ◆ Can be used in combination with other wastewater treatment products.
- ◆ Safe to use on any wastewater system.
- ◆ Cost effective, easy to handle and apply.

### PHYSICAL PROPERTIES

**SODIUM BISULPHITE SOLUTION 12%** is a liquid compound consisting of Sodium Bisulphite.

<b>Appearance/Color</b>	: Clear, colorless liquid
<b>Odor</b>	: Odorless
<b>Specific gravity</b>	: 1.08 - 1.10 gr/cm <sup>3</sup> at 20°C
<b>pH value</b>	: 9.0 - 10.0
<b>Solubility in water</b>	: Soluble

### PACKAGING

Order Number	: 833055 (30 ltrs)
Container	: Plastic jerrican

### APPLICATION AND USE

#### Dosing Procedure

The dosage of **SODIUM BISULPHITE SOLUTION 12%** is ca. 4-5 ppm for 1 ppm of free chlorine in the stream of wastewater. However, dosage may be increased or decreased based on actual conditions.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapour. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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**SOLBREAK™**

## DESCRIPTION

**SOLBREAK** is an innovative, powerful solvent, emulsifying product, engineered for use in general cleaning, degreasing and light carbonaceous deposits removal in engine rooms, bilges, cargo tanks and other installations. Furthermore, it may be used as a general degreaser in special situations where optimum results are sought. Its unique characteristics allows the quick break down of the after clean emulsions into two phases, a water phase and an organic (oil) phase. This provides us with the ability to dispose of the waste solution according to **MARPOL** and **IMO** regulations.

## ADVANTAGES AND CHARACTERISTICS

- ◆ A concentrated degreasing cleaning solution ideal for use in cleaning cargo tanks, deep tanks, bilges, engine rooms, decks etc.
  - ◆ Acts quickly and thoroughly - readily disperses in water.
  - ◆ Separates the waste emulsions and breaks down the water from the oil into two phases. That way, it provides the advantage to discharge the waste on land/on shore slop stations around the world.
  - ◆ Non-corrosive, non-toxic and non-conductive.
  - ◆ Alternatively, sometimes used as a general degreaser in difficult cleaning situations.
  - ◆ Can be safely applied to all kinds and types of metal surfaces (painted or not).
  - ◆ No known effect on rubber and plastic compounds.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use.
- ▶ **According to MARPOL 73/78** chemical tankers are only permitted to use tank cleaning agents, which had been approved and evaluated by the International Maritime Organisation (IMO).
  - ▶ **SOLBREAK** was evaluated in accordance with MEPC.1/Circ. 590 through IMO's Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH Working Group) and found to meet the requirements of regulation 13.5.2 of Annex II of MARPOL 73/78.

## PHYSICAL PROPERTIES

**SOLBREAK** is a blend of superior organic solvents, non-ionic and anionic surfactants and chemical advanced wetting agents.

<b>Appearance/Color</b>	: Pale liquid
<b>Specific gravity</b>	: 0.82 - 0.86 gr/cm <sup>3</sup> at 20°C
<b>Flash Point</b>	: >40°C
<b>Odor</b>	: Slight Aromatic Solvent Odor

## PACKAGING

Order Number	: 832535 (25 ltrs), 832136 (210 ltrs)
Container	: Steel drum

## APPLICATION AND USE

### A. Dosing Procedure

The quantity of **SOLBREAK** to be used is proportional to the degree of cleaning required, the available downtime and the level of residual contamination. As such, the appropriate quantity to be used should be based on the user's judgement. However, for light contamination, a 50% dilution with water is possible. For medium contamination a dilution with gas oil is feasible, where as for heavy contamination, it is suggested to use **SOLBREAK** undiluted. Note that in the two last cases, where water is absent and immersion/soaking method is being used, the remaining solution can still be used for further cleaning; this can be for the same immersion/soaking method or for another type of product application method i.e. for brushing.

### B. Cleaning Procedure

Once the quantity of **SOLBREAK** is determined, apply using any of the methods of brushing and/or soaking/immersion.

**Brushing** is used in situations where small areas have heavy deposition and on highly contaminated parts or engine components. Brushing is also good for the awkward areas.

**Soaking/Immersion** is used in situations where we deal with dismantled parts, articles and engine components. Here, brushing may be applied in coordination with immersion to remove heavy accumulation.

After the application, no matter what method has been used, you must rinse off with sea or fresh water (preferably warm and under high pressure).



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## SOLBREAK HFP™

### DESCRIPTION

**SOLBREAK HFP** is an innovative, powerful solvent, emulsifying product, engineered for use in general cleaning, degreasing and light carbonaceous deposits removal in engine rooms, bilges, cargo tanks and other installations. Furthermore, it may be used as a general degreaser in special situations where optimum results are sought.

**SOLBREAK HFP** contains biodegradable surfactants, advanced wetting agents and low toxicity solvents. Its unique characteristic allows the quick break down of the after clean emulsions into two phases, a water phase and an organic (oil) phase. This provides us with the ability to dispose of the waste solution according to MARPOL regulations. It contains substances not toxic for the environment.

### ADVANTAGES & CHARACTERISTICS

- ◆ A concentrated degreasing cleaning solution ideal for use in cleaning cargo tanks, deep tanks, bilges, engine rooms, decks etc.
  - ◆ Acts quickly and thoroughly - readily disperses in water.
  - ◆ Separates the waste emulsions and breaks down the water from the oil into two phases. That way, it provides the advantage to discharge the waste on land/on shore stop stations around the world.
  - ◆ Contains biodegradable surfactants, strong emulsifying agents and low toxicity solvents.
  - ◆ Non-corrosive, non-toxic, non-flammable and non-conductive.
  - ◆ Alternatively, sometimes used as a general degreaser in difficult cleaning situations.
  - ◆ Can be safely applied to all kinds and types of metal surfaces (painted or not).
  - ◆ Free of chlorinated solvents.
  - ◆ No known effect on rubber & plastic compounds.
  - ◆ May be combined with a specific range of products.
  - ◆ Cost effective, easy to apply and use.
- **SOLBREAK HFP** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**SOLBREAK HFP** is a blend of superior low toxicity solvents, non-ionic and anionic biodegradable surfactants and advanced wetting agents.

Appearance/Color	: Clear liquid / Colorless
Specific gravity	: 0.80 - 0.90 gr/cm <sup>3</sup> at 20°C
Flash Point	: >61°C
Odor	: Light Aromatic

### PACKAGING

Order Number	: 832548 (25 ltrs)
	: 832140 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

The quantity of **SOLBREAK HFP** to be used is proportional to the degree of cleaning required, the available downtime and the level of residual contamination. As such, the appropriate quantity to be used should be based on the user's judgement. However, for light contamination, a 50% dilution with water is possible. For heavy contamination, it is suggested to use **SOLBREAK HFP** undiluted.

Note that in the last case, where water is absent and immersion/soaking method is being used, the remaining solution can still be used for further cleaning. This can be for the same immersion/soaking method or for another type of product application method i.e. for brushing

#### B. Cleaning Procedure

Once the quantity of **SOLBREAK HFP** is determined, apply using any of the methods of brushing and/or soaking/immersion.

**Brushing** is used in situations where small areas have heavy deposition and on highly contaminated parts or engine components. Brushing is also good for the awkward areas.

**Soaking/Immersion** is used in situations where we deal with dismantled parts, articles and engine components. Here, brushing may be applied in coordination with immersion to remove heavy accumulation.

After the application, no matter what method has been used, you must rinse off with sea or fresh water (preferably warm and under high pressure).



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	IMMEDIATE ACTIONS
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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USC PLUS™

## DESCRIPTION

**USC PLUS** is a water solvent based liquid solution developed to attack and remove vegetable and animal fats and oils from epoxy coatings and from most of the common ferrous alloy metals. Moreover, it can safely be applied on Tin, Zinc and/or Zinc Silicate, Aluminum and galvanized surface coatings and materials. A biodegradable material that is very safe in handling. It is specially formulated for ultrasonic cleaning applications.

## ADVANTAGES & CHARACTERISTICS

- ◆ A non-toxic, non-flammable and non-corrosive liquid mixture.
  - ◆ Acts as an odor binder and eliminator while giving off a soft scent.
  - ◆ Effectively dissolves all fat, vegetable and animal oils, dry or not.
  - ◆ Can safely be used on Tin, Zinc, Aluminum and any galvanized or epoxy surface coatings.
  - ◆ Developed for ultrasonic cleaning applications.
  - ◆ Can be used as a general purpose cleaner to remove oil and grease deposits.
  - ◆ May be applied to any ferrous alloy metals.
  - ◆ Cost effective, easy to handle and apply.
- ▶ **USC PLUS** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

## PHYSICAL PROPERTIES

**USC PLUS** is a water based liquid solution, containing specific salts, detergents, wetting agents and corrosion inhibitors.

Appearance/Color	: White liquid
Specific gravity	: 1.00 - 1.02 gr/cm <sup>3</sup> at 20°C
Odor	: Soft
pH value	: 10.5 - 11.5

## PACKAGING

Order Number	: 833066 (30 ltrs)
Container	: Plastic jerrican

## APPLICATION AND USE

### A. Dosing Procedure

Firstly, fill the ultrasonic unit with 30 litres of clean fresh water.

Then, mix 1 litre of **USC PLUS** at the ultrasonic unit. For heavier deposits a bigger quantity (2 - 3 litres) may be added.

### B. Cleaning Procedure

**USC PLUS** is developed for use in cleaning of ultrasonic tanks.

Firstly, fill the ultrasonic unit with 30 litres of clean fresh water.

Before using the product, the ultrasonic bath must be degassed by following the procedure below:

Allow the bath to run for 2 minutes without any objects or cleaning agent involved until the evolution of gas bubbles ceases. That way the cleaning effect will be enhanced.

Then, mix 1 litre of **USC PLUS** at the ultrasonic unit. For heavier deposits a bigger quantity (2 - 3 litres) may be added.

The requested temperature for achieving best results is around 70°C.

Time required for best cleaning results depends on the degree and nature of the deposits. A time period of about 30 minutes will be sufficient for most applications.

For heavier contamination like aged or carbonized up to 4 hours may required.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. In case of insufficient ventilation, wear suitable respiratory equipment. Otherwise, seek fresh air source at once and ask for medical attention immediately.
<b>If Swallowed</b>	Avoid ingestion. If swallowed, do not induce vomiting; seek medical advice immediately and show the label of the product.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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# MARICHEM

Division  
MARINE CHEMICALS & EQUIPMENT

Section D  
**COATINGS**









## MARICOTE ALOX™

### DESCRIPTION

**MARICOTE ALOX** is a highly effective compound of selected oils and rust preventatives, which form a corrosion protective coating, capable of floating on ballast-deballast tanks. The main advantage of being able to coat ballast tanks by floating, is when the manual application methods are considered difficult, if not impossible, due to limited space, poor illumination and the humidity, which can make the following procedures very difficult, maneuvering, application and drying.

### ADVANTAGES AND CHARACTERISTICS

- ◆ It is an efficient ballast tank flotation coating inhibitor for corrosion protection.
- ◆ Odorless, non-toxic, non-oxidizing, non-corrosive and non-flammable.
- ◆ Forms a flexible, elastic and long lasting coating.
- ◆ Can safely be used on all metal surfaces and metal alloys.
- ◆ No effects on rubber or plastic compounds.
- ◆ It has insulating properties and can be easily removed when necessary.
- ◆ Harmless to macro and microorganisms.
- ◆ Provides quick and reliable results and is very stable
- ◆ Cost effective, simple to apply and use.

### PHYSICAL PROPERTIES

**MARICOTE ALOX** is a viscous liquid compound consisting of supreme quality oil and rust preventatives.

Appearance/color	: Dark brown liquid
Odor	: Odorless
Specific gravity	: 0.88 - 0.90 gr/cm <sup>3</sup> at 20°C
Dynamic Viscosity	: 30 mPas at 20°C
Flash Point	: >200°C

### PACKAGING

Order Number	: 922102 (210 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**MARICOTE ALOX** may be applied either by floating or by spraying.

**Floating Method:** For tank sides, about 70 microns of **MARICOTE ALOX** must be floated across the top of the water.

For coating the sides and ends of the tank as well as the determined single area of greatest surface, a coverage rate of 6–12 square meters/liter of **MARICOTE ALOX** is required, depending on the surface's condition.

**Spraying Method:** A single coat, double pass, should provide 70microns thickness, which is equivalent to spray coverage of 12 square meters on new construction and approximately 6 square meters/liter on rusty surfaces.

Internal structures may require up to 5 times the liters required for only the boundary (L, W, H) tank dimensions.

#### B. Application Procedure

**Floating Method:** All surfaces must be clean and free from scales, rust, silt and other sediment. Pour the required amount of **MARICOTE ALOX** onto the surface of the water. Fill tank slowly (max. 50mm/min), minimizing turbulence until it stops, to allow the product reform layer.

The product must be well distributed to spread evenly on lightening holes, holding the water level at a depth in the tank. Then press tank to coat overheads.

Areas that may not be coated because of air pockets should be sprayed. De-ballast gradually. Repeat ballasting and de-ballasting as mentioned above.

**Spraying Method:** Before spraying, all surfaces must be clean and free from scales, rust, silt and other sediment. Then according to dosage instructions, calculate the quantity needed. Wearing a protective, stain-proof, overall suit and a self breathing apparatus, spray **MARICOTE ALOX** on the desired tank surface areas by means of conventional spraying equipment or a more sophisticated high-pressure spraying machine at the rate prescribed in the dosing instructions.

This application might be necessary to be repeated depending on the desired film thickness, if any. Otherwise 70microns thickness is suggested. Allow 48 hours with normal ventilation before putting the tank into service.



► **Note** that for best results, always spray overheads of tanks. Also **MARICOTE ALOX** should not be applied by brush or roller because these applications disturb the uniformity of the platelet formation.

### APPROVED SPECIFICATIONS

It meets the requirements of **U.S. federal specification MIL-R-21006 "Rust Retarding Compound, Flotation Type, Ballast Tank Protective"**.

### ADDITIONAL INFORMATION

Depending on tank construction (framing, stiffeners, intercostals, etc.) use from 100–150% extra quantity of **MARICOTE ALOX** for these surfaces. In some extreme cases e.g. a forward double bottom, as much as 5 times the calculated quantity is required.

### ! SAFETY AND HANDLING

► **MARICOTE ALOX** should not be used in potable water tanks or tanks used for edible materials.

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.



## PLASTIC COATING™

### DESCRIPTION

**PLASTIC COATING** is a revolutionary bituminous highly viscous product, engineered to satisfy extremely demanding conditions. It is formulated with specific wetting agents, special inert additive compounds and advanced surface-active agents that form together to create, an adherent protective, homogeneous and elastic dense layer, that will protect all metal surfaces and spaces such as ballast tanks, bulk holds, dry holds, decks, docks, etc, against corrosion.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Once applied it protects and keeps the coated surface free from corrosion.
- ◆ Enriched with fine rubber powder and is 100% water-soluble.
- ◆ Can safely be used on all metal surfaces and metal alloys.
- ◆ No negative effects on rubber or plastic compounds.
- ◆ Forms a flexible, elastic and long lasting coating with insulating properties
- ◆ Harmless to macro and microorganisms.
- ◆ Provides quick and reliable results, whilst being very stable.
- ◆ Cost effective, simple to apply and use.

### PHYSICAL PROPERTIES

**PLASTIC COATING** is a concentrated, bituminous base coating material consisting of special inert additives, wetting agents and surface-active agents.

Appearance/Color	: Viscous, Black color
Odor	: Odorless
Specific gravity	: 0.94 - 0.98 gr/cm <sup>3</sup> 20°C
Water content	: 48%
Solids content	: 52%
Oxygen uptake (mg/g)	: 0.97

### PACKAGING

Order Number	: 922001 (20 ltrs)
Container	: Steel drum

### APPLICATION AND USE

#### A. Dosing Procedure

**PLASTIC COATING** is applied in quantities proportional to the surface area to be covered, and should be diluted with 8–12% water.

Note that 1 liter of **PLASTIC COATING** can cover an area of approximately 2–3m<sup>2</sup> at a layer thickness of 220microns. However, in cases where the surface to be treated is new build then the quantity to use is smaller than for high pitting surfaces.

#### B. Preparation

**PLASTIC COATING** must be applied to a clean, dry surface, free of rust and any loose particles. Therefore the following steps must be taken:

1. Initially, remove loose rust scales and rust blisters either by a high-pressure water supply and/or by water/sand blasting, for heavy accumulation, use a high-pressure machine.
2. Apply under pressure, a **RUST SHIELD PHOS** solution with water at a ratio of 1:2, by use of spraying equipment.
3. Leave solution to act for 15 minutes and then wash thoroughly with a high pressure water source.
4. Let surface dry completely before applying the **PLASTIC COATING**. To assist with quicker drying, use a hot air fan.

#### C. Application Procedure

1. Make sure that the surface to be coated is dry and clean.
2. Dilute **PLASTIC COATING** with 8–12% water and mix very well.
3. Apply on the surface by a brush, after the product has been strained, so that to avoid any possible clogging.
4. Allow the coated surface to dry completely for at least 48 hours in dry environment and for at least 96 hours in a humid environment. However, always check the coating on daily basis. Longer time periods may be needed for drying, than those prescribed above.
5. After drying, ballasting is possible.



## TESTS AND APPROVALS

PLASTIC COATING has been tested and approved as specified by international testing methods by:

- ◆ BUREAU VERITAS
- ◆ DET NORSKE VERITAS
- ◆ HELLENIC REGISTER OF SHIPPING
- ◆ EFEH AND ASSOCIATES (non toxicity certificate)

## ! SAFETY AND HANDLING

HANDLING	Handle with care. Store in a dry, cool and well ventilated environment.
SAFETY	IMMEDIATE ACTIONS
Eye Contact	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
Skin Contact	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
Inhalation	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
If Swallowed	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
GENERAL INSTRUCTIONS	Avoid spillage, splashing and mishandling. Precautionary measures for body protection are strongly recommended before use.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## PRELOAD 300™

### DESCRIPTION

**PRELOAD 300** is a revolutionary water based coating, engineered to leave a thin, temporary film on cargo hold surfaces. It is a highly effective product, formulated with specific water-based solvents and special inert additive compounds, that, when applied to cargo holds and left to dry, create a thin, homogeneous and temporary film, that will protect all cargo hold surfaces from the different types of cargo loaded.

The main advantage of **PRELOAD 300** is that it forms a water soluble cargo hold barrier that can be removed very easily, even with the use of cold sea water.

It can be used for vessels carrying cargoes such as cement, sulphur, salt, petcoke, coal and concentrates.

### ADVANTAGES AND CHARACTERISTICS

- ◆ It protects metal against corrosive cargoes.
  - ◆ Water based barrier solution - easily removed with the use of water.
  - ◆ Odorless, non-toxic, non-oxidizing, non-corrosive and non-flammable.
  - ◆ Forms a thin, protective and temporary film.
  - ◆ Can safely be used on all metal surfaces and metal alloys.
  - ◆ No effects on rubber, plastic compounds and on all coatings.
  - ◆ Protects paint against cargo penetration.
  - ◆ Complies with all environmental regulations.
  - ◆ Cost effective, simple to apply and use.
- **PRELOAD 300** is not harmful to the marine environment as per MARPOL MEPC 63 Annex V Amendment [MEPC. 71/17/Add.1 Annex 21, Resolution MEPC 295 (71)].

### PHYSICAL PROPERTIES

**PRELOAD 300** is a clear, pale liquid compound consisting of supreme quality oil and rust preventatives.

Appearance/color	: Clear, pale liquid
Odor	: Slight ethereal odor
Specific gravity	: 1.00 - 1.02 gr/cm <sup>3</sup> at 20°C
pH value	: 6.5 - 7.5
Flash Point	: Not Applicable

### PACKAGING

Order Number	: 923004 (30 ltrs), 922104 (210 ltrs)
Container	: Plastic jerrican, Plastic drum

### APPLICATION INSTRUCTIONS

1. Residues from previous cargo must be removed before applying **PRELOAD 300**.
2. The paint on the surface must be cured properly before applying **PRELOAD 300**.
3. Use suitable low-pressure application equipment to spray onto the cargo hold surface.
4. Start the application of the product at the bottom of bulkheads and then work the way up. The nozzle must be held half a meter away from the surface. Side step along the bulkhead and move slowly. After completion of the tank sides, also apply the product to the tank tops. 1 litre of **PRELOAD 300** will cover 16–18m<sup>2</sup> of surface area.
5. After drying, **PRELOAD 300** creates a thin, temporary film on the surfaces of the cargo hold. This film fills the pores in the surface and, at the same time, prevents the small particles being trapped in those pores. Leave the film to dry completely before loading cargo. Depending on air temperature and humidity this will take 1–2 hours.
6. The temperature of the loading cargo must not exceed 140°C.
7. After unloading the cargo, the film can easily be removed even with the use of cold sea water under pressure.

### ► PRECAUTIONS

Although **PRELOAD 300** is safe to use, it may cause skin or eye irritation with prolonged contact. As a precaution protective gloves, goggles and a mask should be worn.

Do not spray directly onto skin or eyes.

Avoid breathing of mist.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Do not breathe gas/vapors. Otherwise, seek fresh air source at once. Seek medical attention. In case of insufficient ventilation, wear suitable respiratory equipment.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## STRONG PLASTIC RESISTANT™

### DESCRIPTION

**STRONG PLASTIC RESISTANT** is an innovative liquid product engineered to coat small surface areas, installations and constructions made of steel, cast iron, aluminum, copper, bronze, etc. Its purpose is to protect areas from highly erosive conditions and strong chemical attacks. Its high quality manufacturing standards and specifications provide 100% efficient and reliable results. **STRONG PLASTIC RESISTANT** is considered to give the highest protection and insulation available; this is due to its two-component nature (see below for details).

### ADVANTAGES AND CHARACTERISTICS

- ◆ Effectively protects all surfaces, installations, parts and unit components from corrosion and chemical oxidation and/or reduction reactions.
- ◆ Can safely be used on all metal surfaces and metal alloys.
- ◆ No negative effects on rubber and plastic compounds.
- ◆ Provides quick and reliable results and has insulating properties.
- ◆ Non-corrosive, non-conductive, non-flammable and non-toxic.
- ◆ A two-component product: the resin base substance (A) and the hardener (B), which must be mixed before application.
- ◆ Cost effective, simple to apply and use.

### PHYSICAL PROPERTIES

**STRONG PLASTIC RESISTANT** is a thick, white-color liquid product consisting of acid and alkali-proof compounds able to withstand long contact with alcohols, oils, fuels, solvents, detergents, salt compounds etc. Moreover, its abrasive and high resistance character withstands temperatures up to 120°C.

### PACKAGING

Order Number : 920103 (1 ltr)  
 Container : 2 Tin cans  
                   one of 750 ml resin material (A)  
                   and one of 250 ml hardener (B)

### APPLICATION AND USE

#### A. Dosing Procedure

**STRONG PLASTIC RESISTANT** must be applied, after the components (A) and (B) are mixed, undiluted and in quantities proportional to the surface area to be covered.

- ▶ **Note** that 1ltr of **STRONG PLASTIC RESISTANT** can cover approximately an area of 5m<sup>2</sup>.

#### B. Preparation

**STRONG PLASTIC RESISTANT** must be applied on a clean and dry surface free of any loose particles. Therefore, the surface to be coated must be acid etched, washed and dried. This may be accomplished by mixing one part of **CEMENT REMOVER** with two parts of water, which is then applied onto the surface in question. Leave it to act for 15 minutes and wash thoroughly with large quantities of water and a brush, in order to remove all loose particles, salt and rust deposits.

Then, leave the cleaned surface to dry completely.

#### C. Application Procedure

Before applying **STRONG PLASTIC RESISTANT** on the dry and clean surface to be coated, mix component A (base material) and component B (hardener) very well for 2 minutes. Then, apply the product onto the surface, up to a maximum of 3 layers.

However, the time period for each layer of the application, is dependent on the temperature, each layer is only good to applied, after intervals of between 4–24 hours have passed, this will ensure appropriate drying of each layer. Thus for higher temperatures the intervals are smaller than for lower temperatures.

- ▶ **Note** that the product will fulfill its properties and be operational only after 4–7 hours since the last layer coat application.



**! SAFETY AND HANDLING**

<b>HANDLING</b>	Handle with care. Store in a dry, cool and well ventilated environment.
<b>SAFETY</b>	<b>IMMEDIATE ACTIONS</b>
<b>Eye Contact</b>	Avoid Eye contact. Otherwise, flush with plenty of water for a few minutes. Seek medical attention.
<b>Skin Contact</b>	Avoid Skin contact. Otherwise, wash contaminated area thoroughly with water. Seek medical attention.
<b>Inhalation</b>	Avoid inhalation of vapors. Otherwise, seek fresh air source at once. Seek medical attention.
<b>If Swallowed</b>	Avoid ingestion. Otherwise, consume a considerable quantity of water. Do not induce vomiting. Seek medical attention.
<b>GENERAL INSTRUCTIONS</b>	Avoid spillage, splashing and mishandling. Wear suitable protective clothing, gloves and eye/face protection before using the product.

 **Read the Material Safety Data Sheet before using this product.**

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**Division**  
**MARINE CHEMICALS & EQUIPMENT**

**Section E**  
**CHEMICAL EQUIPMENT**

**Part 1**  
**BOILER WATER TREATMENT TEST KITS**

**Part 2**  
**DIESEL COOLING WATER TREATMENT TEST KITS**

**Part 3**  
**OIL TEST KITS & SAMPLING EQUIPMENT**

**Part 4**  
**DOSING SYSTEMS**

**Part 5**  
**ANTI-POLLUTION KITS & EQUIPMENT**

**Part 6**  
**CLEANING SYSTEMS**







## CONDUCTIVITY TEST KIT™

### DESCRIPTION

MARICHEM CONDUCTIVITY/TDS, TEMPERATURE & pH TESTER is sturdy, economical, waterproof and perfect for basic and advanced water testing needs. It is a high accuracy multi-tester with easy to replace pH electrode cartridge & EC/TDS graphite electrode that resists contamination by salts and other substances, which gives extended life.

### FEATURES

Marichem's CONDUCTIVITY/TDS, TEMPERATURE & pH TESTER housing has been completely sealed against humidity and designed to float. All pH and EC/TDS readings are automatically temperature compensated (ATC), and temperature values can be displayed in °C or °F units. For EC/TDS readings, the EC/TDS conversion factor (CONV) is selectable by the user, as well as the temperature compensation coefficient  $\beta$  (BETA). The tester can be calibrated at one or two points for pH (with auto-buffer recognition and against five memorized buffer values), and at one point for EC/TDS. Measurements are highly accurate with a unique stability indicator right on the LCD. A low battery symbol warns the user when the batteries are to

be replaced. In addition, the Battery Error Prevention System (BEPS) avoids erroneous reading caused by low voltage level by turning the meter off. The pH electrode, supplied with the meters, is interchangeable and can be easily replaced by the user. The stainless steel encapsulated temperature sensor facilitates faster and more accurate temperature measurement and compensation.

### ADVANTAGES

- ◆ High accuracy pH, EC/TDS and temperature measurements, in a single tester. No need for switching between meters for routine measurements.
- ◆ Fast, efficient and accurate measurements. Fully waterproof housing.
- ◆ Easy calibration with buffer solution for greater accuracy.
- ◆ Choice of different Conductivity to TDS conversion ratios.
- ◆ Dual level display showing pH or Conductivity/TDS with temperature.

SPECIFICATIONS	EC	TDS	pH	TEMPERATURE
Range	0 - 3999 $\mu\text{S} \cdot \text{xc}^{-1}$	0 - 2000ppm	0 - 14	0 - 60°C
Accuracy (at 20°C)	$\pm 2\%$	$\pm 2\%$	$\pm 0.05$	$\pm 0.5^\circ\text{C}$
Calibration	Automatic			
Temp. Compensation	Automatic			
Probe	Included			
Battery type/life	4 x 1.5V, 100hrs of continuous use			
Environment	0 - 50°C, RH max 100%			
Battery type / Life	4 x 1.5V / 100 hours			
Auto-off	After 8 minutes			
Dimensions	163 x 40 x 26 mm			
Weight	100 gr			
Order No.	700232			



## APPLICATIONS

**MARICHEM CONDUCTIVITY TEST KIT** is designed to measure the conductance of boiler water, condensate and other types of water.

It is ideal for quick and accurate conductivity/TDS measurements, pH and temperature in all types of quality assurance and water quality testing.

## CALIBRATION SOLUTION 1413 $\mu$ S

The buffer solution is used for calibration of the conductivity electrode. It enables quick and easy calibration with no mistakes.



Order No. 350252

 **Read the Material Safety Data Sheet before using this product.**

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## DEHA TEST KIT™

### DESCRIPTION

**MARICHEM DEHA TEST KIT** is used for the determination of **DEHA** chemical compound in the Marine Boilers. The test is performed when **Oxyblock D** is used in the Boiler's Water as an Oxygen scavenger. The water sample tested is received from the condensate, as this way we can ensure that the product has been distributed into the system. The measurement is very simple and a residual of **DEHA** is necessary to be maintained in the condensate's water. This indicates that dissolved Oxygen has been effectively removed and passivation has been occurred on the metallic surfaces of the boiler system.

### TEST KIT CONTENTS

Contents of the test kit are sufficient for 125 measurements with a range between 0.01-0.30 ppm.

#### A. Accessories

- ◆ 2 Screw-plug measuring glasses
- ◆ 1 Slide comparator.
- ◆ 1 Color Chart.
- ◆ 1 Plastic Syringe of 5 ml

#### B. Reagents

- ◆ 1 bottle of 30ml DEHA-1
- ◆ 1 bottle of 25ml DEHA-2

### PACKAGING

Order Number : 700120

Container : Plastic Case

### TESTING PROCEDURE

**1.** Collect the Water sample from the Condensate System and cool it to 20-25°C. Please consider that it is critical for the determination of **DEHA** to perform immediately the test after sample's receipt. The reagents below should be added within a period of 2-3 minutes to get an accurate and real result. Do not leave the sample for long time open to the atmosphere as the **DEHA** will be lost.

**2.** Pour a 5 ml water sample into each of the measuring glasses using the plastic syringe. Place a measuring glass on position A in the comparator.

**3.** Add 4 drops of **DEHA-1** reagent, seal the glass and mix.

**4.** Add 4 drops of **DEHA-2** reagent, seal the glass and mix.

**5.** Open the glass after 10 minutes and place it on position B in the comparator.

**6.** Slide the comparator until the colors match in the inspection hole on top. Check the measurements reading in the recess on the comparator reed.

Mid values can be estimated.

### EVALUATION OF THE TEST RESULT

The test will give us the **DEHA** concentration in ppm in the condensate water and considering its value we can increase or decrease **Oxyblock D** dosage. Test is performed in the condensate water as we wish to ensure that **DEHA** has been distributed into the system.

The product has the ability to passivate the metallic surfaces of the condensate system. For the application of the product follow the following recommendations: Initial Dosage: 150ml/day in **DEHA** for untreated Boiler systems.

**DEHA** residual in the Condensate System:  
0.15-0.25ppm.

Maintenance dosage: 100-200ml/day depending in condensate **DEHA** concentration value.

After initial dosage has been introduced into the system, the test must be performed after 3-6 hours. Then the test must be performed on a daily basis. Once the system stabilized the number of measurements could be switched to 3 measurements per week.

Successful **DEHA** treatment requires the Boiler's Feedwater Temperature to be close to its boiling point



TABLE 1

ppm DEHA in the condensate sample	0 – 0.15	0.15 – 0.25	0.25 – 0.30 or higher
Dosage Oxyblock D product	Increase dosage by 25%	Satisfactory	Reduce dosage by 25%

(90°C - 95°C) as in this manner the water releases most of its dissolved Oxygen. **DEHA** in this case remains free

to act in the Boiler's Water, distributed with the steam and could easily passivate the metallic surfaces.

### ADDITIONAL INFORMATION

For higher **DEHA** concentrations the dilution of the sample should be done by Deaerated water (no Dissolved Oxygen). The De ionized water contains dissolved Oxygen and during the dilution could decrease **DEHA** in the final solution giving a wrong result. For further information on the above please come in contact with Marichem Marigases Technical Department.

After the test results are obtained must be recorded in the **Marichem Boiler Water Treatment Log Sheet**. At the end of every month, these Log Sheets should be

submitted by the head engineer to the owner company, who in turn should send them to **MARICHEM MARIGASES WORLDWIDE SERVICES** for further evaluation and technical analysis.

For more information and literature concerning the **DEHA TEST KIT** measurements and the **Boiler Water Treatment** program you also may contact **Marichem Marigases Technical Department**.

#### Read the Material Safety Data Sheet before using this product.

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## HARDNESS TEST KIT™

### DESCRIPTION

The **HARDNESS TEST KIT** is engineered for the determination of residual hardness in the boiler water systems. **HARDNESS TEST KIT** provides a safe and easy method for determining the boiler water.

### TEST KIT CONTENTS

Contents of the test kit are sufficient for 200 tests with an average Hardness value of 1.0°d (German degrees).

#### A. Accessories

- ◆ 1 piece of Test tube with a ring mark
- ◆ 1 piece of Titration syringe 0-2.0 °d resp. 0-0.36 mmol/L (1 graduation mark = 0.05 °d resp. 0.01 mmol/L)
- ◆ 2 pieces plastic dropping tips

#### B. Reagents

- ◆ 1 bottle of 15mL indicator solution H 2
- ◆ 1 bottle of 100mL titration solution TL H 2

### PACKAGING

Order Number : 700115

Container : Plastic Case

### TESTING PROCEDURE

1. Rinse the test tube several times with the test sample and fill it up to the ring mark.
2. Add 2 drops indicator solution H 2 and mix by shaking. The test sample turns red. If sample turns green, no hardness is present (< 0.05 °d).
3. Put dropping tip onto the titration syringe, press down plunger, dip the tip into the titration solution TL H 2 and draw up plunger slowly, until the lower rim of the black plunger O-ring agrees with value 0 (zero) on the barrel scale. The small air pocket below the plunger tip does not disturb the determination.
4. Addition of the titration solution: We recommend taking the syringe in the left hand and the test tube in the right hand and adding titration solution dropwise while smoothly shaking the test tube. As soon as the red color turns lighter, drop more slowly until the solution turns completely green. Read off total hardness in °d or mmol/L from the syringe barrel (lower rim of the black plunger O-ring). Color change is followed easily when holding test tube before a light background (e.g. sheet of white paper).
5. If the first syringe filling isn't enough to reach color change (hardness > 2 °d), fill syringe once more with titration solution TL H 2 and titrate to color change (as above). Read off total hardness and add for each used syringe filling 2 °d.
6. For the conversion of Hardness value from od (German Degrees) to parts per million (ppm) as CaCO<sub>3</sub>, you may consider the following:

$$1 \text{ °d (German Degrees)} = 10\text{mg/L CaO} = 17,8 \text{ mg/L CaCO}_3 = 17.8 \text{ ppm CaCO}_3$$

$$1 \text{ mmol/l} = 5.6 \text{ °d (German Degrees)}$$

#### Interferences

Copper (II) ions may delay the indicator change, or even block this change if higher levels are present.

Therefore, in the case of copper pipes, let the water run for a sufficient amount of time before taking the sample.



 **Read the Material Safety Data Sheet before using this product.**

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## HYDRAZINE TEST KIT™

### DESCRIPTION

**HYDRAZINE TEST KIT** is used for the determination of Hydrazine content in the Boiler's Water. The test must be performed when in the vessel's Boiler Water Treatment program **MARZINE PLUS** is used. This is an activated hydrazine solution (Hydrazine with a catalyst for faster reaction with Dissolved Oxygen,) and applied for marine and industrial Boilers in low, medium and high pressures.

### TEST KIT CONTENTS

Contents of the **HYDRAZINE TEST KIT** are sufficient for 130 test with a measurement range of 0.05-0.40mg/l  $N_2H_4$

### ACCESSORIES

- ◆ 2 Screw-plug measuring glasses with a ring of 5ml
- ◆ 1 Slide Comparator
- ◆ 1 Color Chart
- ◆ 1 Plastic Syringe of 5ml

### REAGENTS

- ◆ 1 bottle of 30ml  $N_2H_4$  - 1
- ◆ 1 bottle of 27ml  $N_2H_4$  - 2

### PACKAGING

Order Number : 700114  
 Container : Plastic case

### TESTING PROCEDURE

#### Pre-treatment

Before testing, samples must be cooled to 25°C by passing them through a cooler.

1. Take a characteristic sample from the boiler's water and cool it to a temperature of 20°C -25°C, if necessary. Turbid samples are to be filtered with a filter paper.
2. Pour 5ml water sample into each of the measuring glasses using the plastic syringe and place a measuring glass on position A in the comparator. Only add the reagents to measuring glass B.
3. Add 5 drops of  $N_2H_4$  - 1 seal the glass and mix thoroughly.



4. Add 5 drops of  $N_2H_4$  - 2 seal the glass and mix thoroughly.
5. Open the glass after 5 min and place it on the position B in the comparator.
6. Slide the comparator until the colors match in the inspection hole on the top. Check the measurement reading in the recess on the comparator reed. Mid values can be estimated
7. After use, rinse out both measuring glasses thoroughly and seal them.

#### Interferences

Strictly observe the temperature and reaction time since they strongly affect the color intensity. The measurement must be taken in 5 min and not before or later, and preferably at the temperature of 20°C - 25°C.

### EVALUATION OF THE TEST RESULTS

Following the procedure above, the concentration in ppm of Hydrazine in the Boiler Water will be obtained. According to the Boiler's working conditions, and the results obtained the dosage of Marzine Plus must be adjusted considering the following chart. For effective boiler water treatment with Hydrazine and in order to avoid any problem of Oxygen corrosion, the test at the initial period of use of **MARZINE PLUS** must be performed every day. Once a small concentration of Hydrazine obtained in the Boiler water then the test could be repeated every 2-3 days.



## MARZINE-PLUS TESTING CHART

Pressure Range	Hydrazine test result in ppm					Standard ppm of Hydrazine
	0 – 0.05	0.05 – 0.10	0.10 – 0.15	0.15 – 0.20	> 0.20	
0 – 40 bar (low pressure boiler)	Increase dosage by 25%	Increase dosage by 25%	<b>Satisfactory</b>	<b>Satisfactory</b>	Decrease dosage by 25%	0.10 – 0.20
41 – 60 bar (medium pressure boiler)	Increase dosage by 25%	Increase dosage by 25%	<b>Satisfactory</b>	Decrease dosage by 25%	Decrease dosage by 25%	0.10 – 0.15
> 60 bar (high pressure boiler)	Increase dosage by 25%	<b>Satisfactory</b>	Decrease dosage by 25%	Decrease dosage by 25%	Decrease dosage by 25%	0.05 – 0.10

## ADDITIONAL INFORMATION

Hydrazine or an alternative Oxygen Scavenger is very important to properly protect feed water and boiler components. However, precautions must be taken to prevent overfeed of chemical as excess hydrazine will begin to decompose at temperature above 200°C to form Ammonia. This can interfere with supplemental amine compounds that are used for pH control in condensate system. Breakdown of excess hydrazine can raise ammonia concentration to levels that significantly increase copper alloy corrosion. After the test results are obtained they must be recorded in

the Marichem Boiler Water Treatment Log Sheet. At the end of every month, these Log Sheets should be submitted by the head engineer to the owner company, who in turn should send them to MARICHEM MARIGASES WORLDWIDE SERVICES for further evaluation and technical analysis.

- For more information and literature concerning the **HYDRAZINE TEST KIT** measurements and the Boiler Water Treatment program you also may contact MARICHEM MARIGASES technical department.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## WT ALKA TEST KIT™

## DESCRIPTION

The WT ALKA TEST KIT is engineered for the determination of P & M Alkalinity value in the water treatment systems. The P & M Alkalinity's value is expressed in parts per million (ppm) in the Boiler System. The test results enable us to define any time the quantity of ALKALINITY CONTROL necessary or not in order to regulate the water properties, as they must be adjusted to the boiler's efficiency and effective operation.

## TEST KIT CONTENTS

Contents of the test kit are sufficient for 200 tests with an average Alkalinity value of 10°d (German degrees) or 4mmol/lit HCl.

## A. Accessories

- ◆ 1 piece of Test tube with a ring mark of 5ml
- ◆ 1 piece of Titration syringe 0–7.2mmol/lit HCl or respectively 0–20°d (1 graduation mark = 0.5°d or 0.2mmol/lit)

## B. Reagents

- ◆ 1 bottle of 100ml titration solution Carbonate Hardness TL C 20
- ◆ 1 bottle of 10ml of indicator P
- ◆ 1 bottle of 10ml of indicator M

## PACKAGING

Order Number : 700107

Container : Plastic Case

## TESTING PROCEDURE

## Pre-treatment

Before testing, samples must be cooled to 25°C by passing them through a cooler.

## A. Determination of P-Alkalinity value

1. Rinse the test tube several times with the test sample and fill it up to the mark of 5ml.
2. Add 1 drop of the indicator P and mix by shaking.
3. a. If the test sample remains colorless the P-Alkalinity value is 0. Then you have to continue from the part B for the determination of M-Alkalinity's value, by following the steps B.1–B.5.



3. b. If the test sample color turns red, fill the titration syringe with the solution Carbonate Hardness TL C 20 till the indication 0.

4. Add the titration solution Carbonate Hardness TLC 20 drop wise and when red color has completely vanished, you must immediately start to gently shake the test tube.

5. Read off the P-Alkalinity value in °d (German Degrees) or in mmol/lit HCl and convert it in parts per million (ppm) CaCO<sub>3</sub>, for that purposes you may be advised by the part C.

## B. Determination of M-Alkalinity value

1. Keep the water sample of the P-Alkalinity test for the determination of the M-Alkalinity's value.
2. Add 1 drop of indicator M and mix by shaking.
3. a. If test sample color turns orange the M-Alkalinity value is identical with the P-Alkalinity value.
3. b. If test sample color turns blue, then continue with below Step 4.
4. Add the titration solution Carbonate Hardness TL C 20, that has remained in the syringe from the P-Alkalinity determination, drop wise, till the solution turns orange. In case the syringe filling is not sufficient to reach color change fill up the syringe once more with the solution Carbonate Hardness TL C 20 and continue titration till the color change as described above.



5. Read off the M-Alkalinity's value in °d (German Degrees) or mmol/lit HCl and convert it to parts per million (ppm) as Calcium Carbonate (CaCO<sub>3</sub>). The quantity of titration solution that used in all the procedure corresponds with the M-Alkalinity value.

### C. Evaluation of the test result

For the conversion of the P & M-Alkalinity value from mmol/lit HCl or °d (German Degrees) to parts per million (ppm) as CaCO<sub>3</sub>, you may consider the following:

$$1 \text{ od (German Degrees)} = 17.8\text{mg/lit CaCO}_3$$

or

$$1\text{mmol/lit HCl} = 49.8\text{mg / lit CaCO}_3 = 50\text{ppm CaCO}_3$$

For samples less than 100ppm CaCO<sub>3</sub> of the P-Alkalinity supply the system with the dosage of **ALKALINITY CONTROL** as presented in the following table.

For samples greater than 150ppm CaCO<sub>3</sub>, perform blowdown and replenish with distilled or fresh water and determine the P and M-Alkalinity after the system's replenishment.

The **ALKALINITY CONTROL** dosage which has to be applied anytime you perform the test in the Boiler System is described by the table.

**Initial dosage of ALKALINITY CONTROL:**

150ml/ tones of fresh water

After initial dosage has been introduced into the system, you have to perform the tests twice every 3–6 hours and on a daily basis, until stabilization of the system.

Thereafter tests may be conducted in two to three days intervals or so.

### D. Additional Information

The M-Alkalinity value should be less than twice the P-Alkalinity value. If not, then add 1 liter of **ALKALINITY CONTROL** and repeat the test again after 3 hours time.

After the test results are obtained, they must be recorded in the **MARICHEM Boiler Water Treatment Log Sheets**. At the end of every month, these Log Sheets should be submitted by the engineer responsible to the owner company, who in turn should send them to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical analysis.

For more information and literature concerning the **WT ALKA TEST KIT** measurements and the Boiler Water Treatment program, feel free to contact the **MARICHEM MARIGASES Worldwide Services** technical department.

**TABLE 1 : P-Alkalinity, ppm CaCO<sub>3</sub> or mmol/lit HCl in the Boiler Water Treatment**

Quantity of Solution TL C 20, mmol/lit HCl	0–0.6	0.8–1.4	1.6–1.8	2.0–3.0	Over 3.0
ppm CaCO <sub>3</sub>	0–30	40–70	80–90	100–150	Over 150
Dosage of ALKALINITY CONTROL per tone of water	0.15lt	0.10lt	0.05lt	Satisfactory	Blowdown required

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## WT CHLORI TEST KIT™

### DESCRIPTION

The **WT CHLORI TEST KIT** is designed to count the concentration of Chloride ions in water. Specifically, its purpose is to check and control the Chloride ions in high and low pressure water boilers. The test results obtained in coordination with the other water tests (**WT PHOSP**, **WT ALKA**, and **WT SULFI**) provide us with relevant information about the water conditions.

### CONTENTS OF THE TEST KIT

Contents of the test kit are sufficient for 300 tests with an average Chloride concentration content of 200mg/lit Cl<sup>-</sup>.

### ACCESSORIES

- ◆ 1 piece of Plastic test tube with a ring mark of 5ml.
- ◆ 1 piece of Titration syringe 0–500mg/lit Cl<sup>-</sup> (1 graduation mark = 5mg/lit).

### REAGENTS

- ◆ 1 Bottle of 10ml indicator solution, Indicator CL 500
- ◆ 1 Bottle of 30ml reagent solution 4% Nitric Acid
- ◆ 1 Bottle of 100ml titration solution Chloride TL CL 500

### PACKAGING

Order Number : 700108  
 Container : Plastic Case

### TESTING PROCEDURE

#### Pre-treatment

Before testing, samples must be cooled to 25°C by passing them through a cooler.

#### A. Determination of Chloride Ions (Cl<sup>-</sup>) concentration

1. Rinse the test tube several times with the sample you wish to determine the Chloride ions concentration Cl<sup>-</sup> and fill the test tube with the sample, up to the ring mark of 5ml.
2. Add 1 drop of the solution, Indicator CL 500 and dissolve while shaking. The test sample color must turn blue or violet.
3. Add slowly, drop wise, the Solution Nitric Acid 4% until the color turns yellow while continuously shaking.



Normally 2–3 drops are sufficient for the change in color.

4. Use the titration syringe and fill it with the solution **Chloride TL CL 500** till the value of 0mg/lit. Add the titration solution drop wise while lightly swirling the test tube until the color turns from yellow to violet.

5. Read off the sample Chloride content in mg/lit Cl<sup>-</sup> (lower rim of the black plunger) from the titration syringe in parts per million. That value corresponds to the chloride concentration into the water sample.

#### B. Evaluation of the Test Results

Using this testing method we can determine the concentration of Chloride ions in ppm without any conversion in the unit.

For the Boiler Water samples (**BOILER WATER TREATMENT**) which contain more than 300ppm of Chloride Cl<sup>-</sup> concentration you have to perform blow-down and replenish with distilled or fresh water.

It is worth noting that there does not exist nor has it been suggested of any other way of reducing the Chloride ions concentration, except by blowdown and replenishment of the system with distilled or fresh water. Considering the procedure of water replenishment for Boiler water system you may be advised by the following table.

#### C. Additional Information

Chlorides have no effect on scale formation, but do contribute to corrosion because of their conductivity and because the small size of the Chloride ion permitting the continuous flow of corrosion current when surface films are porous.



TABLE: Chloride Ions Concentration (Cl<sup>-</sup>) in Boiler System

ppm Cl <sup>-</sup> ions (Boiler System)	5	10	20	40	75	150	300	Over 300
Procedure	Blowdown not required							Blowdown and system's replenishment required

The amount of Chloride in the water is a useful tool in evaporation systems. Virtually all other constituents in the water increase or decrease when common treatment chemicals are added or because of chemical changes that take place.

With very few exceptions, evaporation only affects Chloride concentration, and so the ratio of Chloride in water sample from an operating system to those of the make-up water provides a measure of how much the water has been concentrated.

Take also into consideration that the Chloride concentration will change if the system is continuously

chlorinated.

After the test results are obtained, they must be recorded in the **Marichem Boiler Water Treatment Log Sheets**. At the end of every month, these Log Sheets should be submitted by the engineer responsible to the owner company, who in turn should send them to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical analysis.

For more information and literature concerning the **WT CHLORI TEST KIT** measurements and the Boiler Water Treatment program, feel free to contact the **MARICHEM MARIGASES Worldwide Services** technical department.

 **Read the Material Safety Data Sheet before using this product.**

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## WT PHOSP TEST KIT™

### DESCRIPTION

The **WT PHOSP TEST KIT** is designed for the determination of Phosphate ion concentration in the water. The Phosphate ions act as scale inhibitors in the water systems while preventing the precipitation of salts which result in scale formation. At the same time they also act as corrosion inhibitors by the formation of a thin film on the metallic surfaces. With the determination of the Phosphate ion concentration, the proper dosage of **PHOSPHATE, BWT NEW FORMULA** or **BWT POWDER** can be defined, which is necessary to adjust the water conditions of the Boiler System.

### TEST KIT CONTENTS

The contents of the test kit are sufficient for 100 tests as many as the number of the sticks which can be found in the metallic package.

### ACCESSORIES

- ◆ 1 piece of test tube with a ring mark of 5ml
- ◆ 2 pieces of small test tubes
- ◆ 1 piece of metallic package with 100 test sticks and a color indicator

### REAGENTS

- ◆ 1 bottle of 30ml reagent solution Phosphate-1
- ◆ 1 bottle of 30ml reagent solution Phosphate-2

### PACKAGING

Order Number : 700109

Container : Plastic Case

### TESTING PROCEDURE

#### Pre-treatment

Before testing, samples must be cooled to 25°C by passing them through a cooler.

#### A. Determination of Phosphate Ions ( $\text{PO}_4^{-3}$ ) concentration

1. Rinse the test tube several times from the sample you wish to determine the Phosphate ions concentration  $\text{PO}_4^{-3}$  and fill it with the sample water to the ring mark of 5ml mark.
2. Add 5 drops of the reagent solution Phosphate-1 (Nitric Acid 19%) and shake it carefully.



3. Take one of the two small test tubes and fill it carefully with 6 drops of the reagent solution Phosphate-2 and keep the solution. You may put it in the recess of the test kit plastic package.
4. Remove from the metallic package as many sticks as required for the measurement and reseal the container after use. Do not touch the test paper zone.
5. Place the test stick into the prepared sample from the step 2 and leave it in the solution for about 15 seconds while shaking carefully.
6. Then place the test stick into the small test tube which filled with the solution Phosphate-2 from the step 3, for about 15 seconds.
7. Remove the stick from the small tube and after 60 seconds compare the color of the stick with the color scale on the metallic package. If the Phosphate ions are present the colour changes to blue green.

#### B. Evaluation of the Test Results

With this procedure we can determine directly the Phosphate ions concentration in the Boiler System.

For samples less than 20ppm of Phosphate ions concentration the Boiler System has to be supplied with the relevant **PHOSPHATE, BWT NEW FORMULA** or **BWT POWDER** dosage according to the following table.

For samples greater than 40ppm of Phosphate ions concentration perform blowdown, replenish with fresh water and check again the Phosphate ions concentration.



TABLE: Concentration of Phosphate ions ( $\text{PO}_4^{-3}$ ) in ppm (Boiler System)

ppm $\text{PO}_4^{-3}$	0–10	10–20	20–40	40+
PHOSPHATE	30gr /tn of water	15gr /tn of water	Satisfactory	Blowdown

The PHOSPHATE dosage that has to be applied anytime the test performed in the Boiler System is described by the table above.

### Initial dosage of PHOSPHATE

50gr/tn of water

### C. Additional Information

Making treatment in the Boiler system by the introduction of **BWT NEW FORMULA** or **BWT POWDER** to adjust the Phosphate, will significantly affect the Alkalinity and Sulfite concentrations. So it is recommended when you treat the system with these products you check all the concentrations in the Boiler system and the pH value as well.

Should you need to adjust only the Phosphate concentration then you have to make treatment using Phosphate. In this case however it will affect the alkalinity but it shouldn't cause a significant change in the alkalinity's value.

After the test results are obtained, they must be recorded in the **Marichem Boiler Water Treatment Log Sheets**. At the end of every month, these Log Sheets should be submitted by the engineer responsible to the owner company, who in turn should send them to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical analysis.

- For more information and literature concerning the **WT PHOSP TEST KIT** measurements and the **Boiler Water Treatment program**, feel free to contact the **MARICHEM MARIGASES Worldwide Services** technical department.

 **Read the Material Safety Data Sheet before using this product.**

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## WT SULFI TEST KIT™

### DESCRIPTION

The **WT SULFI TEST KIT** is engineered to detect Sodium Sulfite concentration in re-circulating Boiler Water systems by testing Boiler Water samples. This way we can determine the effectiveness of the system against free Oxygen. We may also specify the quantity of **OXYCONTROL** needed or not in order to stabilize the system being at either low or high pressure.

### CONTENTS OF THE TEST KIT

Contents of the test kits are sufficient for 200 tests with an average Sulfite concentration up to 50 mg/lit  $\text{SO}_3^{-2}$ .

#### A. Accessories

- ◆ 1 piece of Plastic test tube with a ring mark of 5ml
- ◆ 1 piece of Graduated syringe 0–1ml
- ◆ 1 piece of Titration syringe 0–100mg/lit (1 graduation mark = 2mg/lit)

#### B. Reagents

- ◆ 1 Bottle of 100ml reagent solution, Sulfite–1
- ◆ 1 Bottle of 30ml reagent solution, Sulfite–2
- ◆ 1 Bottle of 10ml indicator solution, Sulfite–3
- ◆ 1 Bottle of 100ml titration solution, Sulfite TL SU100

### PACKAGING

Order Number : 700110

Container : Plastic Case

### TESTING PROCEDURE

#### Pre-treatment

Before testing, samples must be cooled to 25°C by passing them through a cooler.

#### A. Determination of Sulfite ions ( $\text{SO}_3^{-2}$ )

1. Rinse the test tube several times from the sample you wish to determine the Sulfite ions concentration  $\text{SO}_3^{-2}$  and fill it with the sample till the ring mark of 5ml.
2. Use the dosage syringe and fill it with 1ml of the reagent solution Sulfite–1 and add the content of the syringe to the sample of water and mix.
3. Add 2 drops of the reagent Sulfite–2 and shake lightly the sample. The solution turns yellow. In case the solution remains colorless then the Sulfite ions  $\text{SO}_3^{-2}$  concentration is more than 100mg/lit and proceed to



point 6 for the determination of the Sulfite concentration.

4. Add 1 drop of Sulfite–3, then the solution turns greyish to yellowish blue.

5. Use the titration syringe and fill it with the solution Sulfite TL SU100 till the value of 100mg/lit. Add the titration solution dropwise while lightly swirling the test tube at the same time. Continue slowly adding the titration solution until the test solution is completely colorless. Read off the sample Sulfite content in mg/lit  $\text{SO}_3^{-2}$  from the titration syringe (lower rim of the black plunger).

6. Should the test solution not change the color to yellow after the addition of two drops of Sulfite–2 then the Sulfite concentration is higher than 100mg/lit  $\text{SO}_3^{-2}$ . In this case repeat the test and add 2 ml of the reagent Sulfite–1 instead of just 1ml. Then the range of titration syringe changes from 0–100mg/lit to 100–200mg/lit. In the case of even higher Sulfite concentration add correspondingly larger amounts of Sulfite–1 to the sample until the addition of Sulfite–2 changes the color to yellow. Please note results at such high levels are not normally found in closed Boiler systems.

#### B. Evaluation of the Test Results

With above procedure we can determine the Sulfite concentration in the Boiler System. If the Sulfite levels are observed to be higher or lower than what is advised, then you have to consult the following evaluation table in order to decrease or to increase the daily dosage by 25% respectively.



TABLE: Sulfite Ions Concentration ( $\text{SO}_3^{-2}$ ) in ppm (Boiler System)

ppm $\text{SO}_3^{-2}$ 0–450 psi	0–20	20–30	30+
ppm $\text{SO}_3^{-2}$ 450–850 psi	0–10	10–15	15+
Dosage	Increase 25%	Satisfactory	Decrease 25%

**Initial Oxycontrol Dosage: 1.2 lts per ton of water**

When for any reason blowdown is performed in the Boiler system then the initial **OXYCONTROL** dosage of 1.2lts per tone of water has to be introduced into the system until stabilization of the Sulfite concentration to the satisfactory levels. That could be easily achieved by performing the Sulfite Test on a daily basis and at anytime applying the appropriate **OXYCONTROL** dosage. Regarding the **OXYCONTROL** dosage you have to apply at anytime please be advised by the Table.

**C. Additional Information**

Most of the corrosion damage to boilers and associated equipment occurs during idle periods. While Boilers can corrode as the results of low boiler water pH or misuse of certain chemicals, corrosion is primarily caused by Oxygen. The corrosion is caused by the exposure of wet metals to Oxygen in the air or in water (pitting corrosion).

Oxygen scavengers are chemical compounds that react with the residual Oxygen and they not only provide added protection to the Boiler but to the condensate system as well.

After the test results are obtained, they must be recorded in the **Marichem Boiler Water Treatment Log Sheets**. At the end of every month, these Log Sheets should be submitted by the engineer responsible to the owner company, who in turn should send them to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical analysis.

- For more information and literature concerning the **WT SULFI TEST KIT** measurements and the **Boiler Water Treatment program**, feel free to contact the **MARICHEM MARIGASES Worldwide Services** technical department.

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## pH MEASURING TAPE™

### DESCRIPTION

**pH MEASURING TAPE** measures the negative logarithm of the effective hydrogen-ion concentration or hydrogen-ion activity in gram equivalents per liter of aqueous solutions used in expressing both acidity and alkalinity on a scale whose values run from 0–14 with 7 representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Round shape plastic tape holder with removable head.
- ◆ Includes a 0–14 built-on color indicator/test evaluation table.
- ◆ 4.8m of paper tape (yellow color) - sufficient for 120 tests approximately.
- ◆ Tape is easy to pull and cut, thus achieving quick and easy results.
- ◆ Carton box packaging for extra protection.

### PACKAGING

Order Number : 700201  
 Container : Carton Box

### TESTING PROCEDURE

1. Tear off a strip of paper measuring tape and insert for a few seconds into the solution that is to be tested. In cases with highly viscous or stained liquids and suspensions, the substance should be dripped onto the paper tape.
2. The wet paper tape should now be compared with the color scale.
3. Note that possible discoloration of the dry new papers may be caused by their high sensitivity against pH action. This does not impair the efficacy of the measuring paper tapes for pH determinations.
4. With very weak buffered or non-buffered solutions, the so-called indicator error occurs. This may be compensated up to a certain point in the following manner: Place the paper tape against the inner wall of the test tube, fill the test tube with the liquid solution, enough so, that the liquid reaches to the top edge of the paper strip. Leave the test paper in the test tube and let it stand submerged for approximately 30 to 60 seconds. At the end, compare the color of the test paper with the color scale through the test tube glass.



### TEST RESULTS EVALUATION CHART

<b>0</b> Absolute Acidic	<<<<<<	<<<<<	<<<<	<<<	<<	<	<b>7</b> Neutral	>	>>	>>>	>>>>	>>>>>	>>>>>>	<b>14</b> Absolute Alkaline
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Division  
MARINE CHEMICALS & EQUIPMENT

Section E  
CHEMICAL EQUIPMENT

Part 1  
BOILER WATER TREATMENT TEST KITS

Part 2  
DIESEL COOLING WATER TREATMENT TEST KITS

Part 3  
OIL TEST KITS & SAMPLING EQUIPMENT

Part 4  
DOSING SYSTEMS

Part 5  
ANTI-POLLUTION KITS & EQUIPMENT

Part 6  
CLEANING SYSTEMS







## CHLORICOOOL WT TEST KIT™

### DESCRIPTION

The **CHLORICOOOL WT TEST KIT** is designed to count the concentration of Chloride ions in water. Specifically its purpose is to check and control the Chloride ions in the Marine Engines Cooling Systems.

The test results obtained in coordination with the other water tests (**NITRITE**, **pH**) provide us with relevant information about the water conditions in the Cooling System.

### CONTENTS OF THE TEST KIT

Contents of the test kits are sufficient for 90 test with Chloride concentration range 1–60mg/lit Cl<sup>-</sup>.

### ACCESSORIES

- ◆ 2 pieces of Screw–plug measuring glasses with a ring mark of 5ml.
- ◆ 1 piece of Slide comparator.
- ◆ 1 piece of Color Chart with a color range 0–60 mg/lit.
- ◆ 1 piece of Plastic Syringe of 5ml.

### REAGENTS

- ◆ 2 plastic bottles of 20ml solution, Cl–1
- ◆ 1 plastic bottle of 24ml solution, Cl–2

### PACKAGING

Order Number : 700112  
 Container : Plastic Case

### TESTING PROCEDURE

#### A. Determination of Chloride Ions (Cl<sup>-</sup>) concentration

For the instructions for use also refer to the pictogram on the back of the color chart.

1. Fill both glasses with a quantity of 5ml of the sample you wish to determine the Chloride concentration using the syringe and place measuring glass on position A in the comparator.
2. You will only add the reagents to measuring glass B. Add 10 drops of Cl–1 in the glass B and seal the glass and mix.
3. Add 10 drops of Cl–2 in the glass B and seal the glass and mix.



4. Open the glass after 1 min and place it in the position B in the comparator.

5. Slide the comparator on the color chart until the colors match in the inspection hole on top. Check the measurement reading in the recess on the comparator reed. Mid values can be estimated. A higher than 60mg/lit measurement is also apparent.

6. After use, rinse out both measuring glasses thoroughly and seal them.

#### B. Evaluation of the Test Results

With that procedure we can determine the concentration of Chloride ions in ppm without any conversion in the unit.

For the Cooling Water samples (Cooling Water Treatment) which contain more than 60ppm of Chloride Cl<sup>-</sup> concentration you have to perform partial draining and replenish with distilled water.

It is worth being noted that it does not exist nor has it been suggested any other way of reducing the Chloride ions concentration except by blowdown and system's replenishment by distilled or fresh water.

Considering the procedure of water replenishment for cooling water system you may be advised by the following table.



**Chloride Ions Concentration (Cl<sup>-</sup>) in Cooling Systems**

ppm Cl <sup>-</sup> ions (Cooling System)	5	10	30	60	Over 60
Procedure	Partial Draining not required				Partial Draining Required

The method could not be applied to Sea Water due to high level of Chloride concentration.

The test kit could also be applied in the water which comes from Evaporation to check whether it could be applied as Feed Water in the Cooling or Boiler Systems. In that case the water must have a Chloride concentration less than 20ppm.

One of the great advantages of the test kit is that it is more sensitive in the range of the measurements 0–20ppm.

**C. Additional Information**

The test kit could also be used for measurements up to 300mg/l of Chloride, for that purpose you must proceed as follows:

1. Pour 1 ml water sample and 4ml of distilled water (no Chloride content) into each of the measuring glasses. That way we have a dilution 5 times of the initial sample.

2. Follow the same procedure as described in the previous page and determine the Chloride concentration in the prepared sample. You have to multiply the value by 5 to take the result in the initial sample.

After the test results are obtained must be recorded in the **Marichem Cooling Water Treatment Log Sheets**. At the end of every month, these Log Sheets should be submitted by the head engineer to the owner company, who in turn should send them to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical analysis.

► For more information and literature concerning the **CHLORICOOOL WT TEST KIT** measurements for the Cooling Water Treatment program you also may contact **MARICHEM MARIGASES Worldwide Services** technical department.

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## NITRITE TEST KIT™

### DESCRIPTION

**NITRITE TEST KIT** has been specifically designed to count the nitrite ions concentration in cooling recirculating water systems in marine diesel engines. Its purpose is to test water sample(s), so we can evaluate the results and determine the required use of **DIESEL COOLING WATER TREATMENT (D.C.W.T.) NON CHROMATE** or **D.C.W.T. POWDER**, for the treatment of the water.

### TEST KIT CONTENTS

- ◆ One piece of 1ml plastic syringe.
- ◆ One piece of 100ml graduated glass volumetric beaker.
- ◆ One piece of 1 container reaction zone graduated test strips.

### PACKAGING

Order Number : 700104

Container : Carton Box

### TESTING PROCEDURE

1. Extract water sample from the system in question.
2. With the syringe, draw 1ml of the sample and empty into the graduated beaker.
3. Fill up to 60ml of the cylinder's capacity with fresh water.
4. Remove a test strip and seal back the container immediately.
5. Immerse the test strip in the sample solution for one second such that the reaction zone is properly dampened.
6. Remove the strip out from the solution, shake off any excess liquid observed and leave it to dry for 15 seconds.
7. Compare the dry strips' to the color scale and read off the nitrite concentration in ppm.
8. Evaluate the founded results against the Test Results Evaluation Table and determine the quantity of **D.C.W.T. NON CHROMATE** or **D.C.W.T. POWDER** to be used.

- **IMPORTANT INFORMATION** The contents of **NITRITE TEST KIT** are sufficient for 100 tests.



- **NOTE:** For samples less than 20ppm nitrite concentration, supply the system with the prescribed dosage as in the chart above. For samples greater than 80ppm nitrite concentration, drain some quantity of the old water out and make up for that amount with fresh water in order to bring the system's Nitrite concentration down to satisfactory levels.

### INITIAL DOSAGE

D.C.W.T. Non Chromate : 7litres/ton of fresh water

D.C.W.T. Powder : 3kgs/ton of fresh water

### TEST RESULTS FOLLOW UP

After the test results are obtained, must be recorded in the **Marichem Cooling Water Treatment Graphic Log Book**. Note that, at the end of every month, the vessel's head engineer must submit these Log Books to the owner company, who in turn should submit Log Books to **MARICHEM MARIGASES Worldwide Services** for further evaluation and technical instructions.



## TEST RESULTS

Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm as appearing in the Nitrite test kit, in a dilution of the cooling water	1–5	5–10	10–15	15–20	20–60	Over 60
Quantity of Nitrite (NO <sub>2</sub> <sup>-</sup> ) ppm in the cooling water	0–300	300–600	600–900	900–1,200	1,200–3,600	Over 3600
D.C.W.T. NON CHROMATE dosage per ton of water	6 litres	4 litres	2 litres	1 litre	Satisfactory	Partial Drain required
D.C.W.T. POWDER dosage per ton of water	2.5 kgrs	2 kgrs	1.5 kgrs	1 kgr	Satisfactory	Partial Drain required

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## pH MEASURING TAPE™

### DESCRIPTION

**pH MEASURING TAPE** measures the negative logarithm of the effective hydrogen-ion concentration or hydrogen-ion activity in gram equivalents per liter of aqueous solutions used in expressing both acidity and alkalinity on a scale whose values run from 0–14 with 7 representing neutrality, numbers less than 7 increasing acidity, and numbers greater than 7 increasing alkalinity.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Round shape plastic tape holder with removable head.
- ◆ Includes a 0–14 built-on color indicator/test evaluation table.
- ◆ 4.8m of paper tape (yellow color) - sufficient for 120 tests approximately.
- ◆ Tape is easy to pull and cut, thus achieving quick and easy results.
- ◆ Carton box packaging for extra protection.

### PACKAGING

Order Number : 700201

Container : Carton Box

### TESTING PROCEDURE

1. Tear off a strip of paper measuring tape and insert for a few seconds into the solution that is to be tested. In cases with highly viscous or stained liquids and suspensions, the substance should be dripped onto the paper tape.
2. The wet paper tape should now be compared with the color scale.
3. Note that possible discoloration of the dry new papers may be caused by their high sensitivity against pH action. This does not impair the efficacy of the measuring paper tapes for pH determinations.
4. With very weak buffered or non-buffered solutions, the so-called indicator error occurs. This may be compensated up to a certain point in the following manner: Place the paper tape against the inner wall of the test tube, fill the test tube with the liquid solution, enough so, that the liquid reaches to the top edge of the paper strip. Leave the test paper in the test tube and let it stand submerged for approximately 30 to 60 seconds. At the end, compare the color of the test paper with the color scale through the test tube glass.



### TEST RESULTS EVALUATION CHART

<b>0</b> Absolute Acidic	<<<<<<	<<<<<	<<<<	<<<	<<	<	<b>7</b> Neutral	>	>>	>>>	>>>>	>>>>>	>>>>>>	<b>14</b> Absolute Alkaline
--------------------------------	--------	-------	------	-----	----	---	---------------------	---	----	-----	------	-------	--------	-----------------------------------



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## REFRACTOMETER™

### DESCRIPTION

The Refractometer is a measuring instrument for determining the refractive index of transparent substances in the liquid or the solid state. It is used to observe the behavior of light as it passes from a prism with known properties to the substance being tested.

Use of the Refractometer for other purposes is contrary to its intended use and may be hazardous. The manufacturer shall not be liable for any damages caused by improper use.

### CONTENTS OF THE TEST KIT

After unpacking and before using the device for the first time, check that all listed parts have been supplied. Replace damaged or faulty parts immediately and do not put them into operation.

- ◆ Refractometer
- ◆ Storage box
- ◆ Pipette
- ◆ Adjustment tool
- ◆ Cleaning cloth
- ◆ Calibration liquid (Distilled water)

### BEFORE THE FIRST USE

Remove the protective film (if present) from the prism surface [2] and check that the rubber eye – cup [4] is fitted correctly. plastic bottles of 20ml solution, Cl-1.

### USE / MEASUREMENT

The Refractometer can be used to quickly and accurately determine the refractive index of transparent substances, liquid or solid ones. To ensure correct measurement, the measuring device should be adjusted before measurements are carried out. Please make sure your hands are dry before handling the measuring device.

The Refractometer cannot be used for the measurement of oil – based liquids.

### ZERO POINT CALIBRATION

- ◆ Hold up the Refractometer against a sufficiently bright light source and look through the eyepiece [5], holding the rubber eyeshade [4] closely against your eye/glasses.



- ◆ Rotate the eyepiece [5] to adjust it for your eyesight, until you can see the scale sharply.
  - ◆ Open the prism cover [1].
  - ◆ Thoroughly clean the prism [2] and the underside of the prism cover [1] using a soft cloth or soft paper (with alcohol if necessary) and wipe dry.
  - ◆ Now apply a few drops of the calibration liquid [10] onto the prism surface [2].
  - ◆ Close the prism cover [1]. The amount of liquid should be sufficient to moisten most of the prism surface. There should not be any air bubbles between the measuring prism [2] and prism cover [1].
  - ◆ Wait about 30 seconds to allow the temperature of the fluid and prism to equalize.
  - ◆ Look through the eyepiece [4], while pointing the refractometer's prism surface [2] at a bright light source.
  - ◆ Through the eyepiece [4], you will see a bright and a blue field. The boundary line between them shows the measured value on the scale which is also visible through the eyepiece [4].
  - ◆ Use the supplied adjustment tool [11] to turn the adjustment screw [3] behind the prism surface [2] (under the rubber cap), and adjust the scale so that the measuring device is optimally set up by moving the boundary line upwards or downwards.
- Calibration value: 0% (Brix)**
- ◆ Repeat step 4 (cleaning).



### ADDITIONAL ADVICE

It is important that the samples being measured are representative samples. For samples that evaporate easily, measurements should be carried out quickly. The samples should be at the same temperature as the measuring instrument in order to achieve an accurate result.

### TESTING PROCEDURE

- ◆ Make sure your hands are dry before handling the Refractometer.
- ◆ Open the prism cover [1] and use the supplied pipette [8] to apply a few drops of the sample liquid [8] onto the prism surface [2]. Close the prism cover [1]. Spread the liquid evenly by pressing down on the prism cover [1] and eliminate any air bubbles present.
- ◆ Hold the device horizontally and wait about 30 seconds (for optimal temperature equalization between the sample and device).
- ◆ View the measurement scale through the eyepiece [4]. Point the prism surface [2] of the Refractometer at a bright light source while doing this.
- ◆ Rotate the adjustment ring [5] on the eyepiece [4] to adjust the focus.
- ◆ The boundary line will move on the measurement scale depending on the concentration. This bright/dark boundary line shows the result on the scale.
- ◆ Carefully clean the supplied pipette [8] and the Refractometer after carrying out the measurement.

### TEST RESULTS EVALUATION

The permissible concentration for GLYSACORR G93 green is 10% - 12% by volume. By using the Table 1 the concentration of GLYSACORR G93 green can be determined, when using the Refractometer.

**Table 1: Calculation table for Glysacorr G93 green**

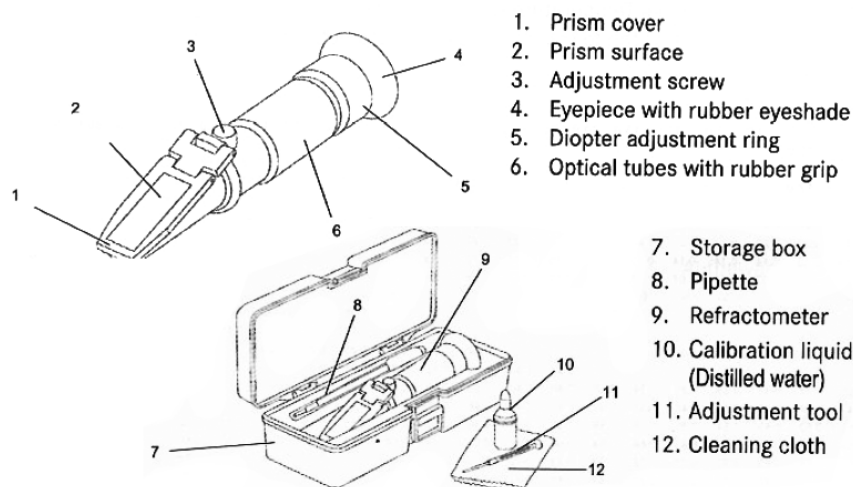
Reading on hand Refractometer at 20°C (= degrees Brix)	Corresponds to a concentration of
3.5	7% by volume
4.0	8% by volume
4.5	9% by volume
5.0	10% by volume
5.5	11% by volume
6.0	12% by volume
6.5	13% by volume
7.0	14% by volume

Depending on the test result the dosage of GLYSACORR G93 green can be accordingly adjusted.

### PACKAGING

Order Number : 700146

Container : Carton Box



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**Division**  
MARINE CHEMICALS & EQUIPMENT

**Section E**  
CHEMICAL EQUIPMENT

**Part 1**  
BOILER WATER TREATMENT TEST KITS

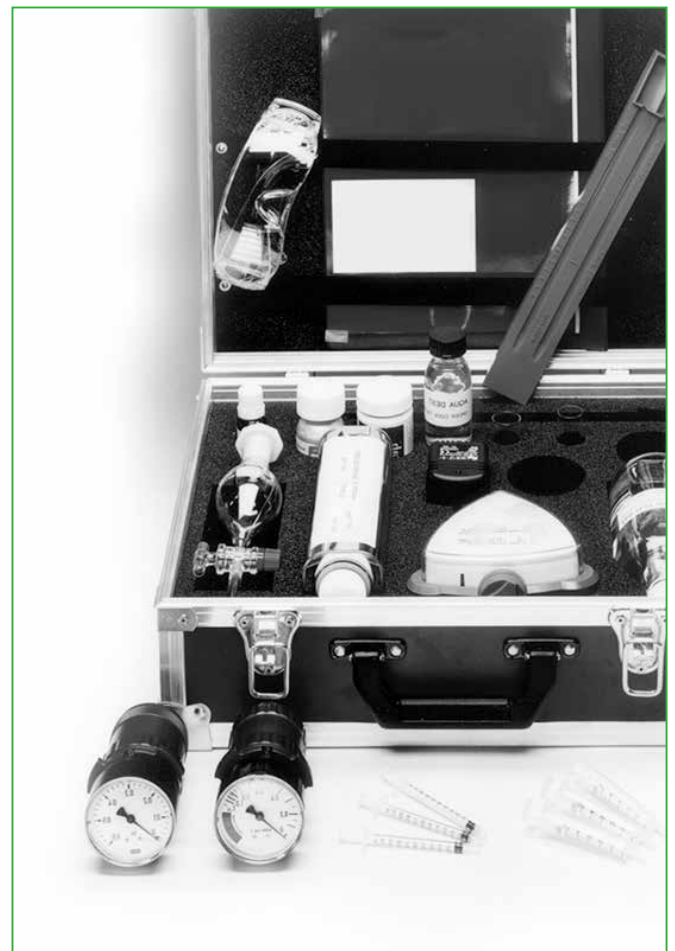
**Part 2**  
DIESEL COOLING WATER TREATMENT TEST KITS

**Part 3**  
OIL TEST KITS & SAMPLING EQUIPMENT

**Part 4**  
DOSING SYSTEMS

**Part 5**  
ANTI-POLLUTION KITS & EQUIPMENT

**Part 6**  
CLEANING SYSTEMS









## BUNKER SAMPLER™

### DESCRIPTION

In accordance with the **IMO** regulations, bunker samplers should be available on board the vessels, to ensure safe fuel sampling during bunkering.

More specifically, **MARPOL's Annex VI/Regulation 18** dictates that a sample of fuel oil should be obtained at the ship's fuel receiving pipe line. The **MARICHEM BUNKER SAMPLER** is approved by the Classification (**BVQI**) and has been manufactured in compliance with the above regulations.

Bunker Samples should be taken at a continuous rate during the entire period of bunkering. When bunkering has been completed, the sample bottle filled with the bunker sample should be sealed with the specific security seal supplied by the bunker supplier in the presence of the ship's representative.

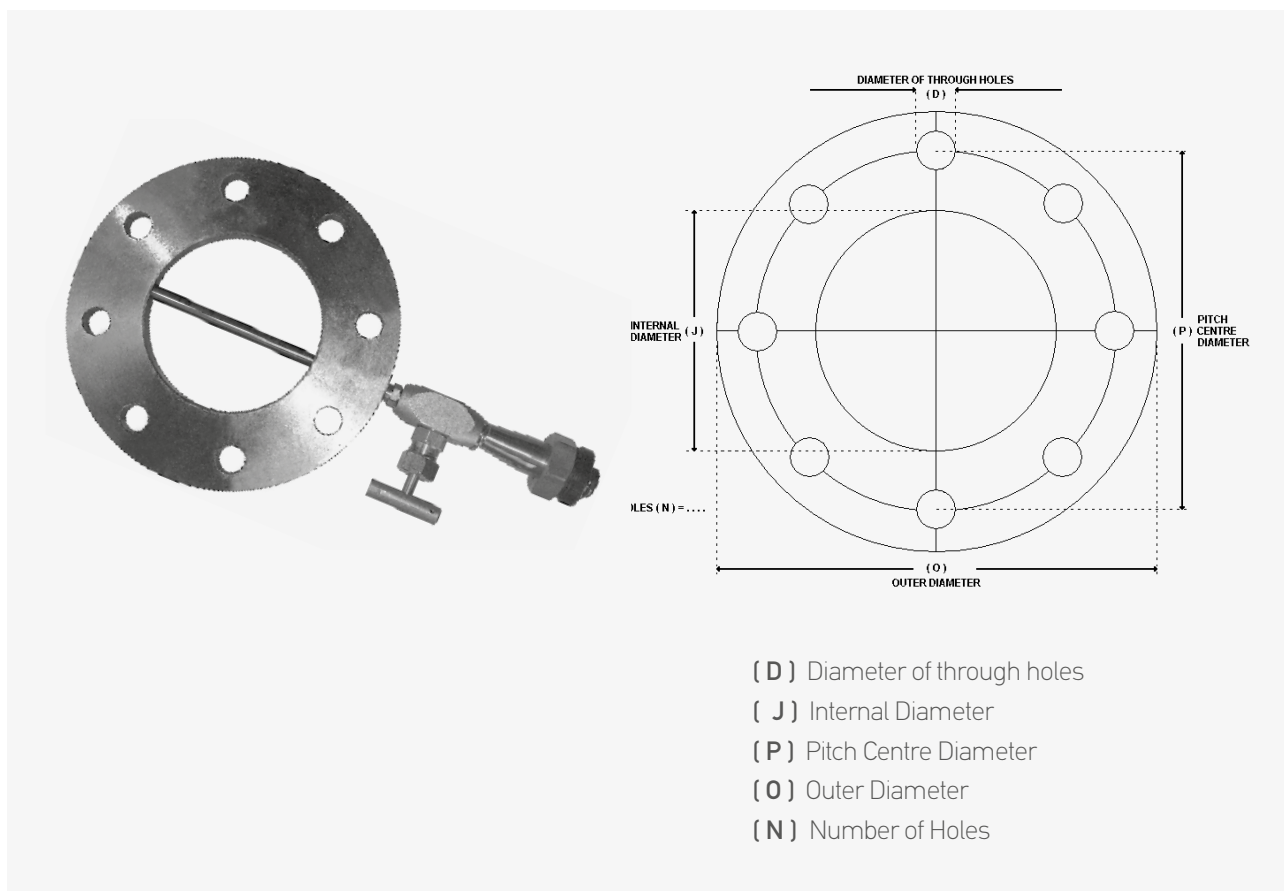
The sample bottle with the bunker sample should be kept under the ship's control until the consumption of the fuel oil, and for a period of at least 12 months from the day of delivery.

### ADVANTAGES AND CHARACTERISTICS

- ◆ Bureau Veritas (**BVQI**'s) Type Approval.
- ◆ Applicable for pipes with an inner diameter of 3" to 12".
- ◆ Complete unit includes mounting materials and joint.
- ◆ Complies with **ASTM D 4057** & **PSA** regulations.
- ◆ Light weight.
- ◆ Easy to install and to operate.
- ◆ The actual sampler is a Stainless Steel pipe with small holes.
- ◆ Can be used within the bolt ring of any flange.
- ◆ Cost effective.

### SELECTING THE CORRECT SIZE OF MARICHEM BUNKER SAMPLER

When ordering the **MARICHEM BUNKER SAMPLER** the following technical information should be provided by the ship – as it can be seen from the drawing below.



### MARICHEM BUNKER SAMPLER SELECTION CHART

The table below gives guidance for selecting the correct **BUNKER SAMPLER** for a range of standard pipe flanges. Marichem Bunker Samplers are manufactured to fit within the bolt ring of standard flange sizes as listed below.

Internal Diameter (mm)	Outer Diameter (mm)	Pitch Center Diameter (mm)	Number of holes	Sampler Size (inches)	Approximate Weight (kgrs)	Product Code
91	200	160	4	3"	4.0	740103
116	220	180	8	4"	4.5	740104
141	250	210	8	5"	5.0	740105
170	285	240	8	6"	5.5	740106
196	315	270	8	7"	6.0	740107
222	340	295	8	8"	6.4	740108
276	395	350	12	10"	7.0	740110

► **REMARK:** For other sizes please contact MARICHEM MARIGASES Worldwide Services.

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## COMPATIBILITY/STABILITY TEST KIT™

### DESCRIPTION

**COMPATIBILITY/STABILITY TEST** is a modified version of the ASTM D4740-94 test method. The test methods list two separate procedures for determining the compatibility of two fuel oils, prior to mixing them together, and stability of residual fuel oil. When performing compatibility and stability tests separation of blending/mixing components in various tanks and centrifuge can be avoided.

Also, blockage of fuel systems will not occur.

These test methods are simple and accurate and provide quick and valuable test results.

### ADVANTAGES & CHARACTERISTICS

- ◆ Available in small and compact sturdy case.
- ◆ The test method used by conventional laboratories.
- ◆ No dangerous solvents involved for washing the spot.
- ◆ Quick and reliable determination.
- ◆ Designed specifically for on-board use.
- ◆ Separation of blending/mixing components in various tanks and centrifuge can be avoided.
- ◆ Cost effective, easy to apply and use.

### TEST KIT CONTENTS

**COMPATIBILITY/STABILITY TEST KIT** consists of the following parts:

- ◆ 1 pc Chromatographic paper (filter paper), box of 100
- ◆ 1 pc Holder for filter paper
- ◆ 1 pc Magnetic heater/stirrer
- ◆ 1 pc Pair of tweezers
- ◆ 2 pcs Magnets, 20x6mm
- ◆ 1 pc PTFE/Aluminium oven
- ◆ 1 pc Reference spot sheet ASTM D4740
- ◆ 1 pc Digital Thermometer -5°C to 150°C
- ◆ 1 pc Erlenmeyer 100ml (conical flask)
- ◆ 1 pc Carrying case with interior

### PACKAGING

Order Number : 720104

Container : Sturdy Case

### TESTING PROCEDURE

#### STABILITY (on fuels as received)

1. Pour approx. 60ml of fuel into the 100ml conical flask and add one magnet.
2. Turn on the heater to 100°C and place the conical flask on the heater. Proper temperature is reached after approx. 15 minutes.
3. Place the oven on the heater and put the conical flask in the oven back and let it warm up again. Temperature can be measured by putting the sensor of the digital thermometer in the small hole of the oven.
4. If needed adjust the temperature to 100°C.
5. As soon as the oil has reached a stable temperature of approx. 100°C remove the conical flask from the oven.
6. Let a drop of the oil fall on the filter paper by using the pin.
7. By using the tweezers, place the filter paper on the filter holder and place the holder in the oven and allow drying for approx. 20 minutes.
8. Compare the spot with the reference spot chart.

#### COMPATIBILITY (different, new fuel and remainder of stock)

1. Pour equal quantities of the stock to be mixed into the conical flask (say 30ml of each) and add one magnet.
2. Turn on the heater to 100°C and place the oven on the heater.
3. Put the conical flask in the oven, and put the sensor of the digital thermometer into the small hole at the side of the oven.
4. If needed adjust the temperature to 100°C. Proper temperature is reached after approx. 15 minutes.
5. As soon as the oil has reached a stable temperature of approx. 100°C remove the conical flask from the oven.
6. Let a drop of the oil mixture fall on the filter paper by using the pin.
7. By using the tweezers, place the filter paper on the filter holder and place the holder in the oven and allow to dry for approx. 20 minutes.
8. Compare the spot with the reference spot chart.



## INTERPRETATION

1. Homogeneous spot (no inner ring), reference spot 1.
2. Faint or poorly defined inner ring, reference spot 2.
3. Well-defined inner ring, only slightly darker than the background, reference spot 3.
4. Well-defined inner ring, thicker than the ring in reference spot no. 4 and somewhat darker than the background.
5. Very dark solid or nearly solid area in the centre, the central area is much darker than the background, reference spot 5.

## WARNING !

**DO NOT TOUCH THE OVEN MANTLE WHEN IN OPERATION, ALTHOUGH THE EXTERIOR OF THE OVEN IS MADE FROM TEFLON, IT CAN BE HOT. WAIT UNTIL COOLED DOWN BEFORE REMOVING THE OVEN.**



## COMPATIBILITY OF FUEL OIL BLENDS BY SPOT TESTS

### Reference Spot



No. 1



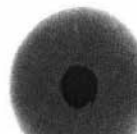
No. 2



No. 3



No. 4



No. 5

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## DESCRIPTION

Amongst the most important parameters with respect to onboard testing are the water content and the total base number in lube and fuel oils. The **MARICHEM COMBINED TEST KIT** enables marine engineers to test water in oil content for engine oils, gear oils, hydraulic oils, etc, whilst also checking on water leakages, lube oil separation and operational contamination in a quick and thorough way.

At the same time engineers on board can very easily test for T.B.N. value (alkalinity) of engine oils.

Water in oil test conforms the reproducibility limits of ISO 3733/ASTM D 95.

TBN test conforms the reproducibility limits of ASTM D2896.

Both test methods are simple and accurate and they can provide quick and valuable test results.

## TEST KIT CONTENTS

The **MARICHEM COMBINED TEST KIT** consists of the following parts:

### A. Accessories

- ◆ Sturdy case.
- ◆ Reaction vessel.
- ◆ Manometer and injection valve for the Reaction vessel.
- ◆ 1ml, 5ml and 10ml graduated plastic syringes.
- ◆ Magnetic stirrer and magnet. (optional)

### B. Reagents

- ◆ 1 pc Water In Oil test solution (50ml)  
Order Number: 720112
- ◆ 1 pc Water-free diluent (1000ml)  
Order Number: 720111
- ◆ 1 pc T.B.N. test solution (500ml)  
Order Number: 720211.

## PACKAGING

Order Number : 720100  
Container : Sturdy Case

## MARICHEM COMBINED TEST KIT™



## TESTING PROCEDURE

### A. WATER IN OIL TEST

1. Shake the sample to be tested thoroughly in order to obtain a homogeneous mixture. Immediately add 5ml of the oil sample into the reaction vessel using a clean 5ml syringe.
2. Add 5ml of the water-free diluent using a clean 5ml syringe. Also add the magnet if a magnetic stirrer is to be used.
3. Close the reaction vessel, swirl carefully and open the injection valve by turning the base ring counter-clockwise to position "O".
4. Shake the water test reagent bottle thoroughly until a homogeneous mixture is obtained. Take 0.75ml of the water test reagent using an 1ml clean syringe and inject into the test vessel.
5. Close the valve by turning the base ring clockwise to position "S" before removing the syringe.
6. Shake the test vessel in regular intervals and read off the value on the manometer after 10–12 minutes time.
7. In case a magnetic stirrer and a magnet are used, place the reaction vessel on the magnetic stirrer and switch the stirrer on. Let it stir for approximately 10–12 minutes and record the manometer reading.



### TEST RESULTS EVALUATION

After the manometer value, from steps 6 and/or 7, is recorded, calculate the water content as follows:

$$\text{Water \% Vol.} = \frac{[\text{Meter Reading (\% Vol)} \times 5]}{\text{Sample Volume Taken (ml)}}$$

► **NOTE:** If the water content of the sample is above 1.24% volume, open the cover, reduce the sample and repeat the test with a smaller amount of oil.

### B. T.B.N. (TOTAL BASE NUMBER) TEST

1. Open the reaction vessel and add 5ml water-free diluent using a clean 5ml syringe.
2. Add 10ml of the oil sample into the reaction vessel using a clean 10ml syringe. Add the magnet and close the reaction vessel. Open the valve by turning the base ring counterclockwise to position "O".
3. Fill a clean 10ml syringe with 10ml of the T.B.N. test solution. Insert the syringe into the valve and inject the contents into the reaction vessel.
4. Remove the syringe and wait for 10–15 seconds before closing the valve. Then close the valve by turning the base ring clockwise to position "S" before removing the syringe.
5. In case a magnetic stirrer and a magnet are used place the reaction vessel on the magnetic stirrer and switch the stirrer on. Otherwise, shake by hand. After 15 minutes read off the manometer pressure value and record it. This is the TBN value that must be recorded.

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## MARICHEM T.B.N. TEST KIT™

### DESCRIPTION

**MARICHEM T.B.N. TEST KIT** is specifically developed for the determination of T.B.N.–value (alkalinity) of engine oils. It is an exceptional tool for an engineer onboard when it is necessary to check for additive degradation, additive depletion and oil grade.

MARICHEM T.B.N. test conforms the reproducibility limits of ASTM D2896.

The simplicity and accuracy of the tests provide quick and valuable results.

### TEST KIT CONTENTS

The **MARICHEM T.B.N. TEST KIT** consists of the following parts:

#### A. Accessories

- ◆ Sturdy case.
- ◆ Reaction vessel.
- ◆ Manometer and injection valve for the Reaction vessel.
- ◆ 1ml, 5ml & 10ml graduated plastic syringes with a tip.
- ◆ Magnetic stirrer and magnet. (optional)

#### B. Reagents

- ◆ 1 pc T.B.N. test solution (500ml)  
Order Number: 720211
- ◆ 1 pc Water–free diluent (1000ml)  
Order Number: 720111

### PACKAGING

Order Number : 720201

Container : Sturdy Case



### TESTING PROCEDURE

1. Open the reaction vessel and add 5ml water free diluent using a clean 5ml syringe.
2. Add 10ml of the oil sample into the reaction vessel using a clean 10ml syringe. Add the magnet and close the reaction vessel. Open the valve by turning the base ring counterclockwise to position "O".
3. Fill a clean 10ml syringe with 10ml of the T.B.N. test solution. Insert the syringe into the valve and inject the contents into the reaction vessel.
4. Remove the syringe and wait for 10–15 seconds before closing the valve. Then close the valve by turning the base ring clockwise to position "S" before removing the syringe.
5. In case a magnetic stirrer and a magnet are used place the reaction vessel on the magnetic stirrer and switch the stirrer on. Otherwise, shake by hand. After 15 minutes read off the manometer pressure value and record it. This is the TBN value that must be recorded.



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## MARICHEM W.I.O. TEST KIT™

### DESCRIPTION

One of the most important items with respect to onboard testing is the water content in lube and fuel oils. The **MARICHEM W.I.O. TEST KIT** enables marine engineers to test engine oils, gear oils, hydraulic oils, etc, whilst also checking on water leakages, lube oil separation and operational contamination in a quick and thorough way.

MARICHEM Water In Oil test conforms the reproducibility limits of ISO 3733/ASTM D 95

The test method is simple and gives accurate results, based on the reaction of water with certain reagents, which finally determine the quantity of water in oil.

### TEST KIT CONTENTS

The **MARICHEM W.I.O. TEST KIT** consists of the following parts:

#### A. Accessories

- ◆ Sturdy case.
- ◆ Reaction vessel.
- ◆ Manometer and injection valve for the Reaction vessel.
- ◆ 1ml, 5ml & 10ml graduated plastic syringes with a tip.
- ◆ Magnetic stirrer and magnet (optional).

#### B. Reagents

- ◆ Water In Oil test solution (50ml)  
Order Number: 720112
- ◆ Water-free diluent (1000ml)  
Order Number: 720111

### PACKAGING

Order Number : 720101

Container : Sturdy Case

### TESTING PROCEDURE

1. Shake the sample to be tested thoroughly in order to obtain a homogeneous mixture. Immediately add 5ml of the oil sample into the reaction vessel using a clean 5ml syringe.
2. Add 5ml of the water-free diluent using a clean 5ml syringe. Also add the magnet if a magnetic stirrer is to be used.



3. Close the reaction vessel, swirl carefully and open the injection valve by turning the base ring counter-clockwise to position "O".
4. Shake the water in oil test solution bottle thoroughly until a homogeneous mixture is obtained. Take 0.75ml of the water in oil test solution using an 1ml clean syringe and inject into the test vessel.
5. Close the valve by turning the base ring clockwise to position "S" before removing the syringe.
6. Shake the test vessel in regular intervals and read off the value on the manometer after 10–12 minutes time.
7. In case a magnetic stirrer and a magnet are used, place the reaction vessel on the magnetic stirrer and switch the stirrer on. Let it stir for approximately 10–12 minutes and record the manometer reading.

### TEST RESULTS EVALUATION

After the manometer value, from steps 6 and/or 7, is recorded, calculate the water content as follows:

$$\text{Water \% Vol.} = \frac{[\text{Meter Reading (\% Vol)} \times 5]}{\text{Sample Volume Taken (ml)}}$$

- **NOTE:** If the water content of the sample is above 1.24% volume, open the cover, reduce the sample and repeat the test with a smaller amount of oil.



 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## MARICHEM PORT A LAB TEST KIT™

### DESCRIPTION

**MARICHEM PORT A LAB TEST KIT** is an on board test kit intended to swiftly and accurately measure fuel and lube oil properties. It is designed for precise measurement of various critical parameters and comes complete in a robust portable case containing all necessary equipment and consumables.

Based on laboratory standard test methods precise results can be obtained in just a fragment of the time needed to ship & test a sample ashore. These results are essential for effective fuel and lube oil management on board.

The tests that can be performed when using **MARICHEM PORT A LAB KIT** are the following:

1. **Water In Oil Test** - conforms the reproducibility limits of ISO 3733/ASTM D 95.
2. **TBN (Total Base Number) Test** - conforms the reproducibility limits of ASTM D2896.
3. **Salt (Seawater) Determination Test.**
4. **Insolubles Test** - according to the modified ASTM D893B method.
5. **Viscosity Test.**

### ADVANTAGES & CHARACTERISTICS

- ◆ Available in small and compact sturdy case.
- ◆ A wide variety of tests for fuel oil and lube oil can be performed.
- ◆ The tests method used are based on laboratory standard test methods.
- ◆ Quick and reliable determination.
- ◆ Designed specifically for on-board use.
- ◆ Corrective action can be taken during bunkering, if fuel oil found to be out of specification
- ◆ Cost effective, easy to apply and use.



MARICHEM PORT A LAB TEST KIT consists of the following parts

Test	Product Code	Description	Number of pieces/sets
Water in Oil Test	720113	Water In Oil manometer with pressure vessel	1
	720111	Water In Oil/TBN Test Diluent - 1000 ml	1
	720112	Water In Oil Test Solution - 50 ml	1
TBN (Alkalinity) Test	720114	TBN manometer with pressure vessel	1
	720211	TBN Test Solution 500 ml	1
Salt (Seawater) Determination Test	720124	Quantab Strips - 40 pcs per set	1
	720125	Separation funnel	1
	222501-1	Distilled water 50 ml	1
	720121	Reagent DG - 10 ml	1
	720126	Glass vial	2
Insolubles Test	720127	Filter paper A4 - set of 20 pcs	20
	720128	Perforated template	1
Viscosity Test	348596	Viscosity Tool	1
Items for various tests	720115	Magnetic Stirrer (optional)	1
	452222	Magnet (optional)	2
	201002	Safety Spectacle Goggles - Clear	1
	720117	Syringe - 1 ml	4
	720118	Syringe - 5 ml	3
	720119	Syringe - 10 ml	3

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## CAT FINES CHECK TEST KIT™

### DESCRIPTION

The abrasive action of catalyst fines can significantly reduce the quality of bunker fuel oil and cause very rapid wear on ship engines.

The new test device **CAT FINES CHECK TEST KIT** is specifically designed by **MARICHEM MARIGASES®** to detect the presence of these hard abrasive particles in HFO in a simple and quick test procedure.

The test method is based on the analysis of two samples of heavy fuel oil, i. e. before and after a separator. This allows to assess the general quality of bunker fuel delivered on board and quality of the clarified HFO in a separator.

The contents of the test kit are suitable for performing 48 tests.



### ADVANTAGES & CHARACTERISTICS

- ◆ Measuring range: go / no go
- ◆ Measuring time: about 20 min.
- ◆ Easy and quick test method
- ◆ Applicable for all types of heavy fuel oil
- ◆ Demonstrative test results
- ◆ Easy to use even for untrained personnel

### PACKAGING

Order Number : 720132

Container : Sturdy Case

### TESTING PROCEDURE

The test procedure requires two different reagents to prepare the HFO samples for analysis. The prepared samples are placed in the centrifuge in a parallel position for the fixed time. After that the samples are taken out and ready to be compared. The degree of cat fines before and after a separator is directly estimable.





 **Read the Material Safety Data Sheet before using this product.**

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## DESCRIPTION

Increased iron concentration in cylinder drain oil with regard to two-stroke marine diesel engines represents currently a big challenge for ship operators. Latest changes in operation of such vessels (slow-steaming practices with a partial load) as well as modified design of two-stroke engines (longer piston strokes) for optimization of fuel oil expenses often result in lower operating temperatures and in effect the phenomenon of "cold corrosion". The amount of iron present in cylinder drain oil provides direct indication of wear rate of cylinder components. Regular verification of iron concentration gives valuable information about the condition of engine parts, i.e. helps to determine the level of wear caused either by mechanical abrasion (iron particles) or acid corrosion (iron salts) at an early stage.

For effective management of cylinder lubricant, Marichem Marigases is distributing a new digital test called **COLD CORROSION TEST KIT** which enables easy on-board trend monitoring of the degree of iron concentration. Optimized semi-automatic test procedures with automatic electronic analysis of cylinder drain oil samples and direct digital display of iron amount provide engineers and users with quick and precise test results.

Through a combination of Iron test and BN measurements with Marichem Marigases **TBN TEST KIT** or **COMBINED TEST KIT** allows monitoring proper lubrication of cylinder components and therefore optimal engine performance can be ensured.

## ADVANTAGES & CHARACTERISTICS

- ◆ Precise automatic measurement of iron content
- ◆ Easy-to-read, digital display of test results
- ◆ No need to use color reference chart
- ◆ Early warning of corrosion problems
- ◆ Efficient adjustment of lubrication of cross-head engines

## COLD CORROSION TEST KIT™



## FEATURES

**Measuring range:** 15/20 - 1100 mg/kg

**Measuring temperature:** 70 °C

**Measuring time:** about 15min. for two cylinder drain oil samples

**Measurement method:** chroma meter with LED transmitted light source

**Accuracy:** +/- 20mg/kg (confirmed repeatability of test results)

## PACKAGING

Order Number : 720108

Container : Sturdy Case

## TESTING PROCEDURE

The measurement of iron content in cylinder drain oil is based on the chemical reaction of iron present in cylinder lubricant in corrosive or abrasive state and special indicator solution. The color of liquids obtained through the chemical reaction will vary from light blue to dark blue directly depending on the iron concentration in cylinder drain oil samples (the so-called "Prussian blue reaction"). The darker the hue of the liquid, the higher level of iron concentration the cylinder lubricant contains.

Once the **COLD CORROSION TEST KIT** is turned on, it is necessary to simply follow the instructions appearing on the digital display of the test device. In the first step,



two chambers A and B are automatically heated to the preset temperature. During the heating process cylinder drain oil samples can be prepared. After quick manual preparation and as soon as the heating process is completed, the glass vials filled with the mixture of reagent, indicator solution and the cylinder drain oil sample are placed into the corresponding chambers.

No further action is required: heating and evaluation of the cylinder lubricants will be automatically processed. While the chemical reaction occurs, the derived color of the liquids will be automatically assessed by means of the built-in chroma meter with LED transmitted light source. The degree of iron concentration ranging up to 1100 mg/kg will be shown on the display. The measured values will be then automatically saved on the internal memory chip.



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**Division**  
MARINE CHEMICALS & EQUIPMENT

**Section E**  
CHEMICAL EQUIPMENT

**Part 1**  
BOILER WATER TREATMENT TEST KITS

**Part 2**  
DIESEL COOLING WATER TREATMENT TEST KITS

**Part 3**  
OIL TEST KITS & SAMPLING EQUIPMENT

**Part 4**  
DOSING SYSTEMS

**Part 5**  
ANTI-POLLUTION KITS & EQUIPMENT

**Part 6**  
CLEANING SYSTEMS







## DESCRIPTION

Water systems on board all vessels are subject to scaling corrosion and fouling by marine organisms and bacteria. On their own, any of the above, can cause problems, but when they are combined, the problems are magnified; this can cause severe system damage, resulting in operational failure and high repair/maintenance costs.

The Marichem Marigases **DOSING SYSTEM** has been engineered to feed treatment chemicals by gravity through a flow meter. It has been carefully developed to ensure a constant, controlled flow rate and a long feeding time.

The **DOSING SYSTEM** is designed for use with the following Marichem Marigases products:

**EVAPORATOR TREATMENT (673005)** used for scale control in the fresh water evaporator. **OXYCONTROL (673008)** used for corrosion prevention within the boiler. **MARICHEM C.C.I. (673006)** for condensate corrosion inhibitors needed in the boiler. **CLOG-CONTROL (673014)** - anti fouling of the water cooling system.

## COMPONENTS

- ◆ One, 100 litre, high-density polyethylene cylindrical tank, specified to be used only for chemical products.
- ◆ One, high quality, long life adjustable flow meter.
- ◆ Suitable number of valves, connectors and fittings.
- ◆ Appropriate length of high standard polypropylene or reinforced nylon tubing, suitable for use with chemical products.

## PACKAGING

Order Number : 710301

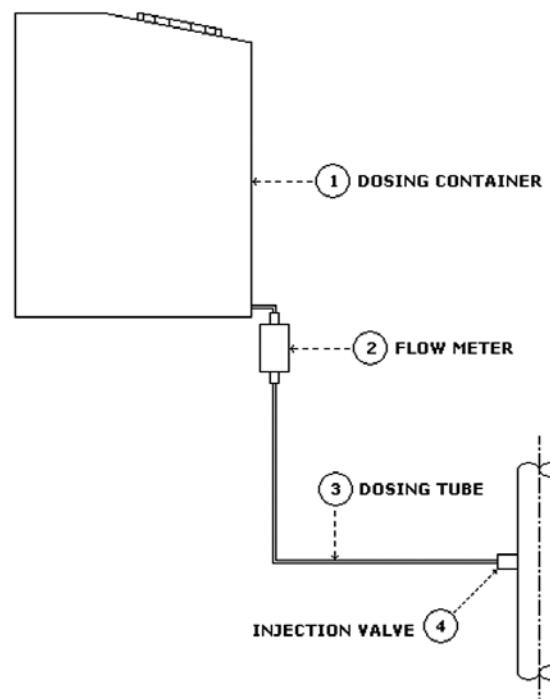
Container : Plastic Tank

## DOSING SYSTEM MANUAL™



Flow meter for Dosing system

Order No: 710302



## DOSING PROCEDURE

**Product: EVAPORATOR TREATMENT (673005)**

**Dosage:** Initial dosage should be 15–35ml/ton of distilled water per day. If scale is present the dosage should be increased to 30–70ml/ton of distilled water per day.

**Dosing unit location:** The dosing unit should be placed near to evaporator and dosed to the evaporator inlet or the salt water feed line.

**Product: OXYCONTROL (673008)**

**Dosage:** Initially the dosing must be regulated to supply the system at a rate of 1.2lt/ton of the boiler water. After 48 hours, the flow must be regulated to 0.3lt/ton of the boiler's water capacity on a daily basis. Thereafter, the flow is regulated according to the test results obtained from using the **WT SULFI TEST KIT**.

**Dosing unit location:** The dosing, must be done by introducing the **DOSING SYSTEMS** tubing into the boiler's feed pump suction line or into the hot well, which is below the water level and close to the feed pump suction unit.

**Product: MARICHEM C.C.I (673006)**

**Dosage:** 70 ml - 80 ml of **MARICHEM CCI** per 1 ton of boiler water should be dosed on a daily basis.

**Dosing unit location:** The location of the **DOSING SYSTEM** is chosen to enable the dosing tube to be introduced at one of the following points:

- Condensation pump discharge.
- Deaerator storage tank.
- Hot well tank.
- Condensation return tank.

Discharge of the solution must then be initiated by regulating the systems flow meter to the above prescribed rate.

**Product: CLOG-CONTROL (673014)**

**Dosage:** The recommended dosage for a sea water cooling system is 0.4 litres of **CLOG-CONTROL** per 100 tons of seawater flow for a period of one hour. This procedure must be repeated every 48 hours. However, the dosage should be adjusted proportionally to the rate of the seawater flow. The proposed dosage should deactivate the marine bio-film and completely remove the marine biological growth.

**Dosing unit location:** The dosage must be applied in a cross flow between the seawater suction pump and the system heat exchange.

For detailed information on safety and health, please refer to Product Label.

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## DESCRIPTION

**MARICHEM ELECTRONIC DOSING SYSTEM** is a complete –easy to use– advanced solution for boiler water treatment, sea water treatment and fuel oil treatment products. The system's dosing tank is equipped with a pump that is fully adjustable, allowing the user to feed automatically the desired product to the injection point – see the relevant diagram/picture at the bottom of this page.

The flow of the treatment can be adjusted in 2 modes ensuring highly accurate dosing. Flow rate is determined by the stroke length and by the stroke frequency. On the front panel, the led shows the activity status of the pump.

In case the level of the chemical is running low, the liquid level switch will stop the pump and the alarm indicator led will warn the user accordingly.

## PACKAGING

Order Number : 710310 (110-240V / 50-60Hz)

Container : Plastic Tank

## TECHNICAL CHARACTERISTICS

**MARICHEM ELECTRONIC DOSING SYSTEM** comes complete, with the electronic pump mounted on the top of the tank. The suction hose with the foot valve and the level switch is pre-installed, together with 10mtr delivery tube.

The pump fully complies with the **EUROPEAN regulations** EN 60335-1:1995, EN 55014, EN 50081-1/2, EN 50082-1/2, EN 6055-2, EN 60555-3, directive CEE 73/23 c 93/68 (DBT) and directive 89/336/CEE (EMC Electromagnetic Compatibility).

## COMPONENTS

- ◆ One 100 litres, high density polyethylene cylindrical tank, specified to use for chemical products.
- ◆ Electronic pump 4/10, with Level Alarm
- ◆ Foot Valve with Filter
- ◆ Float Switch
- ◆ Injection Valve with adaptors ¼" and ½"
- ◆ 10m PE tube ¼"

## DOSING SYSTEM ELECTRONIC™

### RECOMMENDED MARICHEM MARIGASES DOSING APPLICATIONS

#### 1. BOILER WATER TREATMENT

The dosing system's injection valve must be installed into the boiler water feedline after the circulation line.

#### 2. SEA WATER TREATMENT

The dosing system's injection valve must be installed into a convenient place in the circulation system.

#### 3. FUEL OIL TREATMENT

**F.O.T. / F.O.T. NEW GENERATION** and **F.O.T. 10 / F.O.T. 10 NEW GENERATION** can be dosed either before or after the transfer pump, or before or after the L.P. Fuel pump.

**F.O.T. C-100 / F.O.T. C-100 NEW GENERATION** should be dosed after the separators.

Diagram 1 shows the recommended injection points for **MARICHEM fuel oil treatment** products in a characteristic main engine fuel arrangement.

► **IMPORTANT NOTICE:** Always refer to the "Operating Instructions Manual" for this dosing system before installing it.

► **ATTENTION:** Keep the system away from high temperature & protect the pump from contact with water.

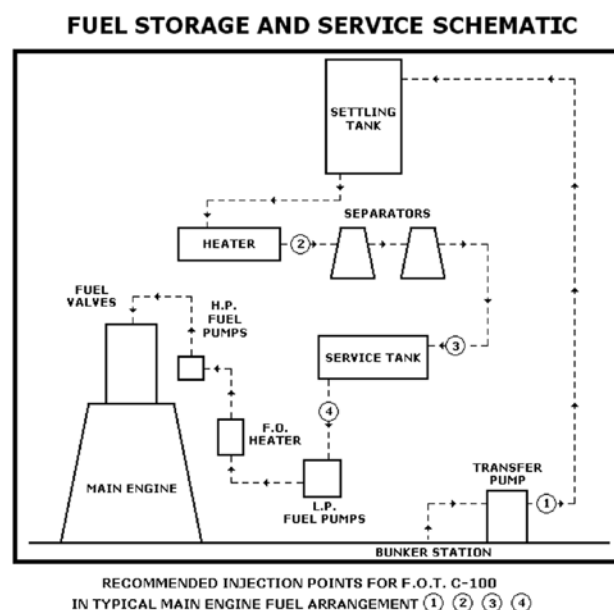


DIAGRAM 1



For detailed information on safety and health, please refer to Operating Instruction Manual and to Product Label.

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**OIL CLEAN KIT™****DESCRIPTION**

**MARICHEM OIL CLEAN KIT** is a complete unit of mixed equipment, specifically made to use on board merchant vessels in conjunction with **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** for cleaning up spills at sea, on board and/or at shore by the crew.

**MARICHEM OIL CLEAN KIT** is engineered, designed and manufactured under high quality standards in order to fulfill **IMO (International Maritime Organisation)** and **OPA 90 (Oil Pollution Act of 1990)** regulations.

**SPECIFICATIONS**

According to **OPA 90 U.S. Coast Guard regulations, paragraph 155205**, tanker vessels which are 400ft or greater in length, must provide oil spill cleaning equipment on board equivalent to handle 12 barrels of oil spill. Tanker vessels smaller than 400ft in length and all dry cargo must provide oil spill cleaning equipment on board equivalent to handle 7 barrels of oil spill.



## OIL CLEAN KIT CONTENTS

**12 Barrel Oil Clean Kit** Product number: 711201**A. Sorbents**

Part #	Quantity	Product	Dimensions	Absorbing Capacity (lt)
712001	1 BALE	Oil Sorbent Pads – 200/Bale	3/16”T x 17”W x 9”L	207
711001	2 BALE	Oil Sorbent Pads – 100/Bale	3/8”T x 17”W x 19”L	414
710401	1 BALE	Oil Sorbent Pillow – 10 Pillows/Bale	8”D x 18”L	209
710402	2 BALE	Oil Sorbent Boom 510 – 4 Booms/Bale	5”D x 10”L	972
710403	2 BALE	Oil Sorbent Roll 30 – 1 Roll/Bale	30”W x 150”L	880
<b>Total</b>				<b>2,682</b>

**B. Instruments**

- ◆ One spraying unit.
- ◆ One 5 gallon **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** container.
- ◆ Six sets of protection suits and boots.
- ◆ One non–sparking shovel.
- ◆ One non–sparking rake.
- ◆ Mops.
- ◆ One heavy duty wringer.
- ◆ Four units of non–sparking scoops.
- ◆ One non–sparking hand scraper.
- ◆ One heavy duty squeegee 24” wide by 5ft handle rod.
- ◆ 50 heavy duty disposal plastic bags/Bale.
- ◆ Two High Density Polyethylene storage equipment boxes, 1.70 x 1.07 x 0.74 m.

**7 Barrel Oil Clean Kit** Product number: 710701**A. Sorbents**

Part #	Quantity	Product	Dimensions	Absorbing Capacity (lt)
712001	1 BALE	Oil Sorbent Pads – 200/Bale	3/16”T x 17”W x 19”L	207
711001	1 BALE	Oil Sorbent Pads – 100/Bale	3/8”T x 17”W x 19”L	207
710401	1 BALE	Oil Sorbent Pillow 10 Pillows/Bale	8”D x 18”L	209
710402	1 BALE	Oil Sorbent Boom 510 – 4 Booms/Bale	5”D x 10”L	486
710403	1 BALE	Oil Sorbent Roll 30 – 1 Roll/Bale	30”W x 150”L	440
<b>Total</b>				<b>1,549</b>

**B. Instruments**

- ◆ One spraying unit.
- ◆ One 5 gallon **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** container.
- ◆ Six sets of protection suits and boots.
- ◆ One non–sparking shovel.
- ◆ One non–sparking rake.
- ◆ Mops.
- ◆ One heavy duty wringer.
- ◆ Four units of non–sparking scoops.
- ◆ One non–sparking hand scraper.
- ◆ One heavy duty squeegee 24” wide by 5ft handle rod.
- ◆ 50 heavy duty disposal plastic bags/Bale.
- ◆ One High Density Polyethylene storage equipment box, 1.70 x 1.07 x 0.74 m.

## APPLICATION AND USE

In the event of an accidental Oil Spill, immediate action is required in order to avoid unnecessary spreading of the spill to the surrounding areas. Therefore, a swift response to treat the problem is of vital importance, this will depend on the reaction time of the assigned crew team for such a situation. The cases in which an oil spill must be cleaned are at sea, on board and/or at shore.

### A. At Sea

1. Approach the contaminated area having available the boom, the pillows, the pads, the plastic disposal bags, the spraying equipment and the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT**.
2. Contain the spill by connecting the boom parts and throw in the water to surround the spill.
3. Throw oil spill pads over the spill (If the spill is small, use the pillow sorbents).
4. Slowly pull the boom containing the spill close to the hull of the vessel.
5. Lay the pads over the spill so that they cover all the contaminated area and leave it to absorb as much oil as possible.
6. Draw and dispose of used oil pads in the plastic disposal bags, if necessary, repeat procedure with more pads.
7. Clean the left over oil contaminants on the seawater surface by spraying a sufficient quantity of the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT**, enough, so as to cover the contaminated area.
8. Leave to act for a few minutes and mix by applying plenty of water using a high-pressure water source (i.e. water hose).
9. Leave the seawater surface to settle.
10. Repeat the application of the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** if necessary.

### B. On Board

1. Wear the protection suit.
2. Approach the contaminated area having available the shovel, the rake, the mops, the wringer, the scoops, the scraper, the squeegee, the plastic disposal bags, some absorbent pads, the absorbent roll (if the spill is big) and the spraying unit along with the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT**.
3. Consider the size of the spill and lay over it enough pads or a few meters of the roll to cover the contaminated area.



4. Collect the used oil pads and/or roll and dispose in the plastic disposal bags.
5. Scrap the left over oil waste using the tools mentioned above and properly dispose of in the plastic disposal bags.
6. Clean the oil contaminated surface by applying the spray unit with the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** and leave it to act for a few minutes.
7. Wash with plenty of water using a high-pressure water source.
8. Repeat the application of the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** if necessary.

### C. At Shore

1. Wear the protection suit.
2. Approach the contaminated area having available absorbent pads and roll, the cleaning equipment and the **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** spraying unit and solution.
3. Follow steps 3–8 of the cleaning procedure as described at the **On-board** process found above.

## NOTES

- ◆ Wherever the use of **OIL SPILL EMULSIFIER** or **MARICHEM OIL SPILL DISPERSANT** cannot be avoided, try to use in a controlled matter.
- ◆ It is suggested, if possible, to fight oil spills by means of absorbents only. Other conventional ways are strongly prohibited.



For detailed information on safety and health, please refer to Product Label.

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## MARICHEM MARIGASES OIL BOOMS™

### DESCRIPTION

MARICHEM MARIGASES OIL BOOM 1 & OIL BOOM 2 are made from heavy duty vinyl polyester that is resistant to heavy sea conditions, abrasion, harsh weather, marine life growth and chemical dispersant products.

### ADVANTAGES AND CHARACTERISTICS

Design ingenuity, product quality and customer satisfaction are built into every single boom. We are proud and stand behind every one of our products, as they have all the safety certificates and approvals required by the Marine Industry, plus, they are always available for immediate shipment worldwide; these factors have helped make them unique in the international market.

MARICHEM MARIGASES OIL BOOM 1 & 2 are all fully equipped with anchor points, handles, galvanized ballast chains and custom logos. The main advantages of our booms, amongst others, are the following:

- ◆ Continuous bottom tension and draft for best performance.
- ◆ Flexibility and lightweight.
- ◆ Strength and reliability.
- ◆ Constant freeboard regardless of wind and swells.
- ◆ Adapts to wave surface motion.
- ◆ Designed for constant freeboard and high buoyancy.

► MARICHEM MARIGASES OIL BOOM 1 & 2 are approved for use from the **Greek Ministry of Merchantile Marine** according to EU regulations.



## TECHNICAL SPECIFICATIONS

**MARICHEM MARIGASES OIL BOOM 1****for calm sea**

Product No: 686868

**Typical length of one part**

50m

**Total height of the boom**

900mm

**Freeboard height**

200mm

**Draught height**

700mm

**Material the boom is made of:**

Waterproof wax cloth from polyester.

**Colour of the wax cloth**

Orange

**Components of the boom**

Anchors, buoys, nautical keys, ropes, belts, fibreglass rods, chains, handgrips.

**Type of connection**

Marine shackles.

**"Walls" upright backing**

With fibreglass rods of 900mm height.

**"Walls" horizontal backing**

With two belts, one on the top part of the boom and one on the middle with a 12mm chain at the bottom part of the boom.

**Handgrips (on the top part of the boom)**

One handgrip per meter of the boom.

**MARICHEM MARIGASES OIL BOOM 2****for open sea**

Product No: 686869

**Typical length of one part**

50m

**Total height of the boom**

1,200mm

**Freeboard height**

300mm

**Draught height**

900mm

**Material the boom is made of**

Waterproof wax cloth from polyester.

**Colour of the wax cloth**

Orange

**Components of the boom**

Anchors, buoys, nautical keys, ropes, belts, fibreglass rods, chains, handgrips.

**Type of connection**

Nautical keys.

**"Walls" upright backing**

With fibreglass rods of 1,200mm height.

**"Walls" horizontal backing**

With two belts, one on the top part of the boom and one on the middle with a 12mm chain at the bottom part of the boom.

**Handgrips (on the top part of the boom)**

One handgrip per meter of the boom.

For detailed information on safety and health, please refer to Product Label.

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## OIL SPILL ABSORBENTS™

### DESCRIPTION

**MARICHEM OIL SPILL ABSORBENTS** are the best choice you may make when you require optimum cleanup or the most effectual oil removal from land or water. They are the best solution for two reasons: (1) they are convenient and lightweight in their handling and (2) they are also very cost-effective. Moreover, they can absorb up to 25 times their own weight in petroleum products.

### ADVANTAGES AND CHARACTERISTICS

- ◆ They are effective in absorbing petroleum based solvents and paints, vegetable oils and other non-water soluble chemicals.
- ◆ **MARICHEM OIL SPILL ABSORBENTS** are easy to deploy, this can save time and money.
- ◆ They do not absorb water, float continuously (not immersible), are wringable, dustless, unaffected by temperature, flame resistant and impervious to both rot and mildew.
- ◆ The non-toxic environmental-friendly material Polypropylene, is the main ingredient in **MARICHEM OIL SPILL ABSORBENTS**.
- ◆ They are approved for use according to the latest EU regulations.

The available range of **MARICHEM OIL SPILL ABSORBENTS** is as follows:

#### 1. Pads 100/Pads 200

These pads are designed to absorb solvent based products, but not water, they float on water and are used for absorbing petroleum-based fluids. Furthermore, they can be used on land or water and they are recommended for use on oil spills. These oil absorbents are always easy to place and retrieve. Our pads come in the following types:

##### Pads 100 (100 pieces of pads together)

Product No.	: 711001
Dimensions	: 16"W x 19"L
Packaging	: 100 pads/bale
Bale Weight	: 8.6 kgr/bale

##### Pads 200 (200 pieces of pads together)

Product No.	: 712001
Dimensions	: 16"W x 19"L
Packaging	: 200 pads/bale
Bale Weight	: 8.6 kgr/bale

#### 2. Boom 510

Boom 510 absorbents are plastic net tubes filled with sorbent material. The boom is flexible, thus it can be adapted to fit in waste water or holding ponds. Connectors at each end allow the linking together of several booms so as to provide a continuous chain of protection, allowing containment and absorption of the spill. This oil absorbent boom may be left deployed almost indefinitely.

It is the ideal product for emergency spills on water. It absorbs petroleum-based fluids. Our boom comes in the following size:

##### Boom 510 (5 inch diameter)

Product No.	: 710402
Dimensions	: 5"D x 10'L
Packaging	: 4 booms/bale
Bale Weight	: 9.6 kgr/bale



**3. Roll 30**

It is a sorbent material that can be used for the laying over and covering of the area contaminated by oil. Also, it has been constructed with flexible planning, so it is ready to be cut into any desirable configuration or to be transformed into any eligible size, for use around industrial equipment to protect floors from oil or chemical leakage. Furthermore, this specific product is suitable for over sprays next to leaky equipment.

<b>Product No.</b>	: 710403
<b>Dimensions</b>	: 30"W x 150"L
<b>Packaging</b>	: 1 roll/bale
<b>Bale Weight</b>	: 6.8 kgr/bale

**4. Pillow 10P**

They are sorbent materials packed into open weave poly-mesh bags that allow passage of oil for more complete saturation. Pillow 10P is ideal for use in bilge areas of ships and also for absorbing oil spills in seawaters. Thanks to the attached clips at the Pillows sides, each one may be joined with many others; this makes their use and removal uncomplicated.

<b>Product No.</b>	: 710401
<b>Dimensions</b>	: 8"D x 18"L
<b>Packaging</b>	: 10 pillows/bale
<b>Bale Weight</b>	: 8 kgr/bale

**5. Pom Pom**

Pom Poms were developed for the recovery (absorbance) of crude oil. They can operate even in sub-freezing conditions and will recover between 20 and 60 times their own weight, the amount recovered depends on the viscosity of the oil. Pom Poms are the best solution in order to absorb heavy oil spilled on the water and shorelines. Furthermore, they constitute an excellent oil adsorbent solution for recovery of viscous oils on piers, bulkheads, marsh and rocky shoreline environments. Amongst their other numerous advantages, it is worth mentioning that Pom Poms are especially designed for viscous oil clean up and are non-toxic, non-scattering, wringable, inert and they are applicable in both small and large oil spills.

<b>Product No.</b>	: 710404
<b>Dimensions</b>	: 16"D x 4"L
<b>Packaging</b>	: 200 pom poms/bale
<b>Bale Weight</b>	: 2.6 kgr/bale

For detailed information on safety and health, please refer to Product Label.

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**Division**  
MARINE CHEMICALS & EQUIPMENT

**Section E**  
CHEMICAL EQUIPMENT

**Part 1**  
BOILER WATER TREATMENT TEST KITS

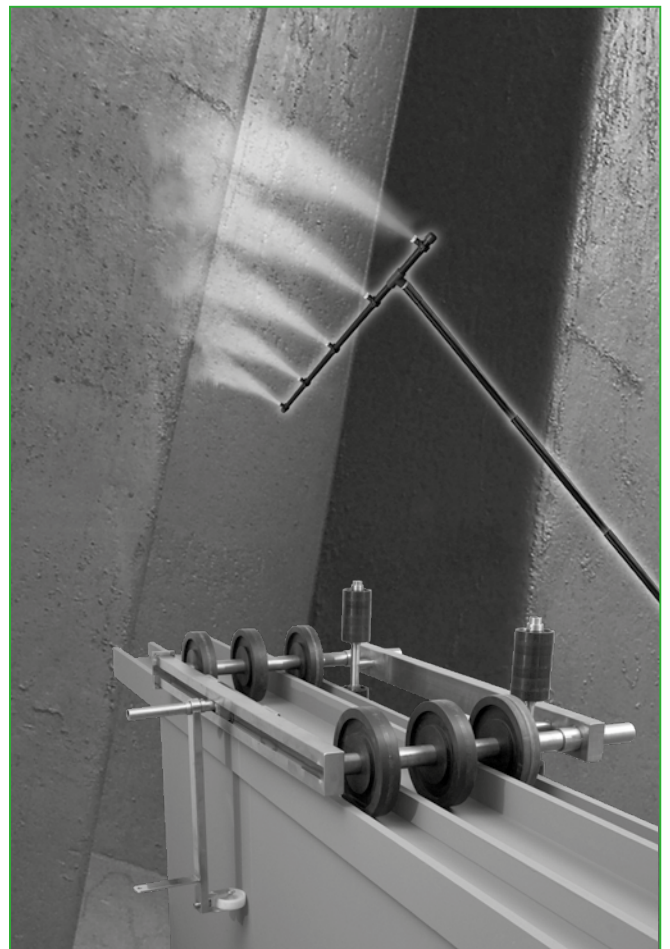
**Part 2**  
DIESEL COOLING WATER TREATMENT TEST KITS

**Part 3**  
OIL TEST KITS & SAMPLING EQUIPMENT

**Part 4**  
DOSING SYSTEMS

**Part 5**  
ANTI-POLLUTION KITS & EQUIPMENT

**Part 6**  
CLEANING SYSTEMS







### MARICHEM HOLD CLEANING SYSTEM 200

MARICHEM MARIGASES Worldwide Services, your global partner for successful shipping introduces the **MARICHEM Hold Cleaning System 200** (the improved version), a special innovation for most types of cargo holds. This unique device is used in combination with chemical products. **MHCS 200** is the one & only device that utilizes the actual construction of most types of hatch coamings, in order to offer optimum results for an easy, effective and quick cargo hold chemical cleaning. **MHCS 200 has the Patent Number 1005912 of O.B.I.**

#### FEATURES & BENEFITS

- ◆ Light in weight
- ◆ Quick & Simple
- ◆ Easy to carry
- ◆ Easy to install
- ◆ Simple in operation
- ◆ Adjusted (by the user) to each type of hatch coaming
- ◆ Cost effective
- ◆ Minimizing the chemical consumption
- ◆ Environmentally friendly device

#### The M.H.C.S. 200 consists of:

- ◆ Rolling carrier
- ◆ Hanging device
- ◆ Adjustable chemical piping
- ◆ Chemical pump

#### ROLLING CARRIER

A stainless and acid proof unit designed to move manually on self adjusted wheels across the channels of hatch coamings. Safety side wheels secure a safe operation of the rolling carrier throughout the hold cleaning operation (photos 1, 2,3).

#### HANGING DEVICE

A wire system enabling the chemical spraying pipe to be kept by the user at the desired angle. The HANGING DEVICE can handle a spraying pipe of adjustable length, up to maximum 20m (as per scheme on next page).

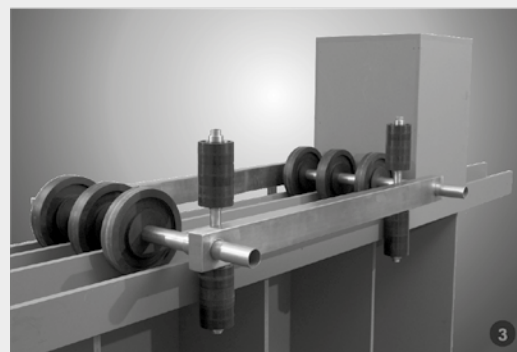
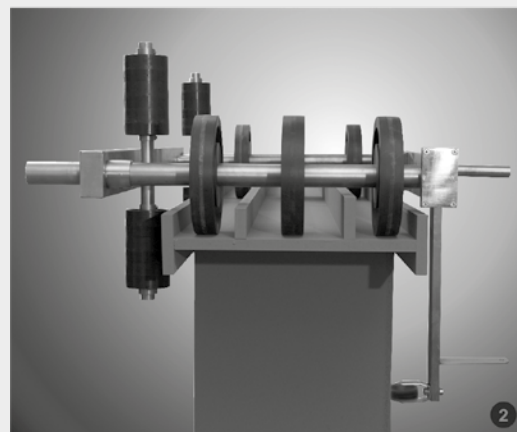
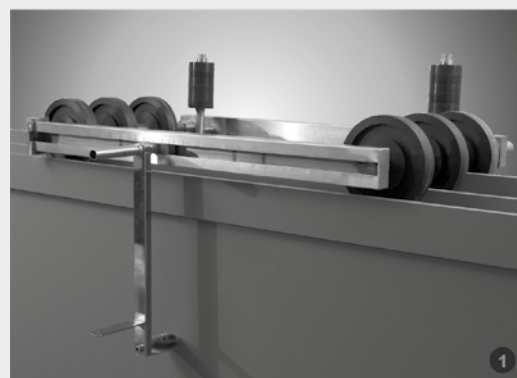
#### ADJUSTABLE CHEMICAL PIPING

A piping system consisting of an acid proof pipe guiding the chemical spraying hose to the proper location in the cargo hold. Depending on the size of cargo holds, the length of the CHEMICAL PIPING can be adjusted between 2 to 20m.

## CARGO HOLD CLEANING SYSTEMS

#### CHEMICAL PUMP UNIT

Contains an air operated – acid proof diaphragm pump installed on a stainless steel basis with connections to air & chemical supply on the front panel (photo 4) enabling the chemical to be sprayed on steel surfaces at any height in cargo holds.



## INSTRUCTIONS FOR USE

### 1. Installing the ROLLING CARRIER

- Secure the Hatch Cover of the Cargo Hold at the OPEN position.
- Ensure that the channels of hatch coaming are thoroughly cleaned from any substances which could obstruct the undisrupted movement of the ROLLING CARRIER.
- Place the ROLLING CARRIER in the channel on either starboard, port, fore or aft side of the hatch coaming with self adjustable wheels freely moving within the channels / bars of the hatch coaming and fix the adjusting bolts securely (photo 1). Secure the hanging arm (cargo hold side) to succeed a continuous contact of the horizontal wheel with the inner side of hatch coaming (photo 2). Adjust the side of the ROLLING CARRIER to succeed a continuous contact of the side wheels on the side bar of the hatch coaming (photo 3).

### 2. Installing the HANGING DEVICE

- Calculate the maximum height that needs to be reached in cargo hold and choose equivalent lengths of guide pipe line and spraying hose. Lower the above items down the cargo hold.
- Cover the full length of spraying hose with the 2m parts of guide pipe line and connect them to each other.
- Lower the HANGING DEVICE by slacking the wire block manually down the cargo hold.
- Connect the edges of the HANGING DEVICE with the guide pipe line at the indicated colored connections (red to red, yellow to yellow, blue to blue, green to green). Connect the spray nozzles pipe at the upper end of the spraying hose.
- Check all connections are safely secured.

### 3. Formatting the CHEMICAL PUMP

Using a high pressure hose at a desired length, fix the one end to the supply connection of the CHEMICAL PUMP and the other to the gun handle at the lower end of chemical pipe. The pump's suction should be connected to a polypropylene hose with the other end of the hose in the drum with chemical.

### 4. M.H.C.S. 200 is now ready to operate

Using manually the hoisting block and the ROLLING CARRIER, any position in the cargo hold is accessible to be sprayed with cleaning chemical.

### 5. "Turn over motion"

In case permanent constructions on hatch coamings obstruct the free movement of the MHCS 200, the ROLLING CARRIER can pass over them with a patented "turn over motion" up to 60cm high (photos 5, 6, 7, 8).

### 6. Rinsing off with high pressure

Disconnect the spray nozzles pipe and connect the high pressure nozzle. Disconnect the hose from the chemical pump and connect it to a water high pressure machine. Rinsing off procedure is succeeded by means of using the gun handle.

- Maximizing the effectiveness of chemical
- Eliminating the quantities of chemicals to the minimum possible
- Spraying simply and quickly
- Smooth operation through a patented Rolling Carrier



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**MARICHEM MCM 200****complete with hoses & connectors**

MCM 200 is an ideal applicator for spraying chemical to the cargo holds. A solid construction in stainless steel frame, easy to handle, well protected, and equipped with quick coupling connectors. It can also be used independently for any fluid transfer. Its construction materials are suitable for use with acids, solvents, flammables, cleaning fluids etc. Additional accessories (hoses, telescopic pole etc) are available upon request.

MCM 200 COMPLETE  
w/hoses and connectors  
Order No: 801010



Inlet / Outlet 1/2"	(12.7mm)
Maximum Flow Rate	15 gpm (57 lpm)
Maximum Discharge Pressure	7.0 bar (100 psi)
Weight	19 kgs
Suction Hose w/quick coupling	1/2", 10 mtr length-braided
Discharge Hose w/ quick coupling	1/2", 50mtr length
Air Hose w/quick coupling	5/16", 25 mtr

**WATER JET GUN**

The WATER JET GUN uses water from the vessel's fire lines together with compressed air. The use of water together with compressed air generates a compressed jet of water reaching up-to 35-40 meters. Used for rinsing cargo residues from holds of all sizes of tankers and bulk carriers. Manufactured from Aluminum, making it easy to use, easy to transport, maintenance free.

WATER JET GUN  
Tripod mounted  
Order Number: 801131



InAir Supply	Max. 7 kg/cm <sup>2</sup> (100 psi)
Water Pressure	Max. 6 kg/cm <sup>2</sup> (84 psi)
Range (at above pressures)	35-40 mtrs
Air Consumption (approx.)	1.6m <sup>3</sup> /min
Water Hose size	2"
Air Hose	3/4"
Water Hose Coupling Shank	2" Storz type 'C' x 2" Hose
Air hose Coupling	Universal - claw type
Weight	25 kgs
Dimension (packed)	145 x 60 x 20 cm



### MARICHEM TELESCOPIC POLE 8mtr

#### w/3nozzles pack

MARICHEM'S TELESCOPIC POLE 8mtr can be used at both low pressure and high pressure applications.

It is easy to handle, light weighted (just about 6.5kgs) extendable from 2.7mtr up-to 8mtr, with heavy duty/high pressure hose and trigger.

It can be connected to any low pressure chemical applicator for reaching at high areas. It can also be connected to any high pressure cleaning machine with maximum pressure of 280 bar/30lpm.

The TELESCOPIC POLE is manufactured from highest quality fibreglass and comes equipped with 3 quick connect nozzles (0, 15, 45 degrees).

#### QUICK NOZZLE, 3 PACK SET (SPARE)

Order No: 801123

Spare parts and any accessories needed for connecting to an existing applicator or HPC machine are available upon request.

#### BACK BELT FOR TELESCOPIC POLE

BACK BELT is an optional accessory for the TELESCOPIC POLE.

It is made of durable nylon and it helps support the telescopic pole, taking stress off the arms and body. The belt easily clips on and off and it fits any size (adjustable).

The TELESCOPIC POLE is compatible for use with:

- ◆ MCM-200 complete w/hoses & connectors
- ◆ Any Marichem high pressure cleaning machine (subject to adjust the outlet hp at max. 280bar).

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Order No: 801116



Order No: 801119

**MARICHEM TELESCOPIC POLE 16mtr****w/3nozzles pack**

**MARICHEM TELESCOPIC POLE 16mtr** can be used at both low pressure and high pressure applications.

It is easy to handle, light weighted, extendable from 2.7mtr up-to 16mtr, with heavy duty/high pressure hose and trigger.

It can be connected to any low pressure chemical applicator for reaching at high areas. It can also be connected to any high pressure cleaning machine with maximum pressure of 280 bar/30lpm.

The **TELESCOPIC POLE** is manufactured from highest quality fiber material and comes equipped with 3 quick connect nozzles.



Order No: 801116/16

(Tripod support is an optional accessory)

**QUICK NOZZLE, 3 PACK SET (SPARE)**

Order No: 801123

Spare parts and any accessories needed for connecting to an existing applicator or HPC machine are available upon request.



The **TELESCOPIC POLE** is compatible for use with:

- ◆ **MCM-200** complete w/hoses & connectors
- ◆ Any Marichem high pressure cleaning machine (subject to adjust the outlet hp at max. 280bar).

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## OPTIONAL ACCESSORIES

### TRIPOD SUPPORT FOR TELESCOPIC POLE

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Order No: 801116-1

**TRIPOD SUPPORT** is an optional accessory for the **TELESCOPIC POLE**. Practical in its design, easy to use, provides stability and precision in chemical application while taking stress off the arms and body.

It is manufactured from highest quality, durable aluminum alloy.

The **TRIPOD SUPPORT** the ideal accessory for heavy duty chemical application with telescopic pole.



### ROLLING SPRAYER FOR TELESCOPIC POLE

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Order No: 801116-2

**ROLLING SPRAYER** is a high pressure manifold with 4 flat spray nozzles that provides an even and wide spray application.

The adjusted wheels allow this accessory to guide itself through every angle of the cargo hold walls providing perfect coverage with minimum chemical loss.



Spare parts and any accessories needed for connecting to an existing applicator or HPC machine are available upon request.

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## HIGH PRESSURE CLEANING MACHINES

### DESCRIPTION

**MARICHEM HIGH PRESSURE CLEANING MACHINES (HPCM)** are revolutionary, multi-purpose and low cost machinery distinct for high quality, optimal performance and dual operation of water and water-sand blasting.

These machines are designed exclusively to pressurize the water supply in order to wash objects or surfaces eligible to be treated by the mechanical action of pressurized water jet and by the possible chemical action of liquid detergent additives. The liquid detergent additives must be chosen in accordance with the chemical compatibility of the surface to be washed.

Moreover, high pressure machines are capable to use water and sand blends for the treatment of rust deposits on metal surfaces, which require water-sand blasting.

**MARICHEM HPCM** are simple with easy operation and handling, also equipped with ceramic heads to allow the use of fresh water and seawater.

Note that, before shutdown, after the use with seawater, the jet system should be rinsed through with fresh water, in order to avoid scale clogging and corrosion.

**MARICHEM HPCM are extremely effective and long lasting, designed with major priority upon safety.**

They include a built-in adjustable by-pass valve, assisting to variable regulation of water volume.

### APPLICATIONS

- ◆ Cleaning of the air cooler in the main engine.
- ◆ Cleaning of the bilges in the engine room.
- ◆ Cleaning of the boilers after chemical treatment.
- ◆ Cleaning of the ballast, wing and cargo tanks from mud, rust and other dirt.
- ◆ Rust removal from metal surfaces with high pressure.
- ◆ All-purpose use requiring high-pressure applications offering the option to switch from hydro sand blasting and vice versa.
- ◆ Ability for high pressure cleaning with water and chemical product mixtures.



### ADVANTAGES AND CHARACTERISTICS

#### Construction and standard equipment

- ◆ 10m high pressure hose.
- ◆ 10m electric cable.
- ◆ Spray gun, single or double lance with adjustable handle and spray nozzles.
- ◆ Built-in adjustable by-pass for continuous variable regulation of water volume.
- ◆ Operating temperature: up-to max 60°C.
- ◆ Quick release coupling system that allows easy connection and fast swapping of different spraying equipment (flat fan nozzle, rotary nozzle, sand blasting equipment).
- ◆ Built-in automatic start-stop device for prevention of continuous operation.
- ◆ Built-in protection against dry run with adjustable operating pressure valve.

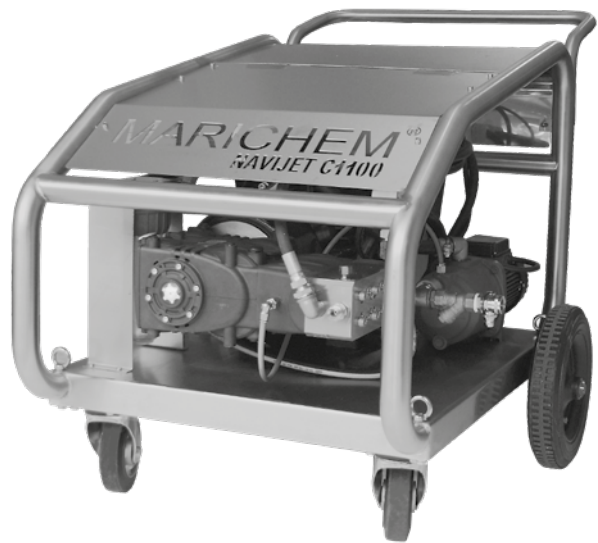


## NAVIJET C1100E

NAVIJET C1100E is an electric driven high pressure cleaning machine, operating with cold water (feed water temperature up-to max. 60 °C). This heavy duty HPC machine is ideal for paint and rust removal, as well as for any cleaning task on board. NAVIJET C1100E is constructed of stainless steel frame, with Sst cover, 2 solid & 2 rotating wheels for easy handling. The pump is driven by low RPM motor for long time - life.

### Features

- ◆ Stainless steel 304 chassis
- ◆ Stainless steel top cover 304
- ◆ Power: 30kW • Class F insulation
- ◆ S1 duty (continuous run)
- ◆ Overheat protection
- ◆ 3 ceramic piston plunger pump
- ◆ Stainless steel head
- ◆ Working pressure: 1100 bar
- ◆ Water Flow: 15.0ltr/min
- ◆ Maximum water feed temperature: 60 °C
- ◆ Non-Stop water cooling method
- ◆ IP 65 enclosure - ABB components
- ◆ Electrical Switchboard Complete 30kW
- ◆ Circuit breaker at main circuit
- ◆ Dry running protection
- ◆ Emergency STOP button
- ◆ Manual operation button of Booster Pump (on/off)
- ◆ Adjustable overpressure release valve (1100 bar)
- ◆ Dry Running Protection • Water inlet filter • Operating hours counter



TECHNICAL SPECIFICATION	NAVIJET C1100E	Order Number 731001
Voltage / frequency	V/Hz	400/50 or 440/60
Working pressure	Bar	1100
Water Flow	lpm/gpm	15.6
Motor power rating	kW/HP	30
Water inlet temp. (max.)	°C	60
Dimensions	mm	L1100 x W950 x H920
Weight	kg	320

### STANDARD ACCESSORIES

10mtr hp-heavy duty hose & 10mtr electric cable • Dump gun • Lance 1000mm c/w nozzle • Wheel brake • Pressure gauge • Hour counter • Water filter • Dry Running Protection • Motor starter in enclosure IP65

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**NAVIJET C500E-III**

NAVIJET C500E-III is an electric driven high pressure cleaning machine, operating with cold water (feed water temperature up-to max. 60 °C). This heavy duty HPC machine is ideal for paint and rust removal, as well as for any cleaning task on board. NAVIJET C500E-III is constructed of stainless steel frame, with Sst cover, 4 solid wheels for easy handling and wheel brake. The pump is driven by low RPM motor for long time - life.

**Features**

- ◆ Stainless steel 304 chassis, with wheel brake
- ◆ Stainless steel top cover 304
- ◆ Power: 18kW
- ◆ Class F insulation & S1 duty (continuous run)
- ◆ Overheat protection
- ◆ IP 65 enclosure with High quality components
- ◆ Electrical Switchboard Complete 18kW
- ◆ Circuit breaker at main & auxiliary circuit
- ◆ Thermal overload relay protection
- ◆ 24V auxiliary circuit (autotransformer)
- ◆ Emergency STOP button
- ◆ Safety release overpressure valve



- ◆ Built-in manual override system of DRP & Automatic start-stop operation
- ◆ Adjustable unloader valve (50-500 bar)
- ◆ Auto start-stop, Dry Running Protection
- ◆ Operating hours counter
- ◆ Quick release nozzles attachments
- ◆ Time relay (auto start-stop)

TECHNICAL SPECIFICATION	NAVIJET C500E-III Order Number 735001	
Voltage / frequency	V/Hz	400/50 or 440/60
Working pressure	Bar/Mpa	500 / 50
Water Flow	lpm/gpm	18
Motor power rating	kW	18
Water inlet temp. (max.)	°C	60
Dimensions	mm	L970 x W680 x H750
Weight	kg	170

**STANTARD ACCESSORIES**

10mtr hp-heavy duty hose & 10mtr electric cable • Dry shut spray gun • Lance 1000mm c/w nozzle • Wheel brake • Pressure gauge • Hour counter • Water filter • Dry Running Protection • Motor starter in enclosure IP65 • Quick release coupling for spraying equipment

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## NAVIJET C300E-II

NAVIJET C300E-II is a general purpose electric high pressure cleaning machine, operating with cold water (feed water temperature up-to max. 60 °C). The machine is built in Stainless steel frame, with stainless steel cover and 4 wheels for easy handling. The pump is driven by low RPM motor for long time-life.

### Features

- ◆ Sturdy and compact design
- ◆ 3 ceramic piston plunger pump
- ◆ 9 kW motor, IP 55, class F, S1 duty
- ◆ Unloader valve with by-pass protection
- ◆ Motor starter with overload relay protection
- ◆ Auto start-stop device (delayed auto-stop)
- ◆ Water inlet filter
- ◆ Quick couplings at inlet
- ◆ Easy to maintain and repair



TECHNICAL SPECIFICATION	NAVIJET C300E-II Order Number 733001	
Voltage / frequency	V/Hz	380/50 or 440/60
Working pressure	Bar/Mpa	280 / 28
Water Flow	lpm/gpm	16
Motor power rating	kW/HP	9
Water inlet temp. (max.)	°C	60
Dimensions	mm	L760 x W550 x H600
Weight	kg	70

### STANDARD ACCESSORIES

10mtr hp hose with couplings • 10mtr electric cable, oil resistant • Spray gun with safety latch • Double lance complete with nozzles • Auto start-stop device • 3 phase motor starter c/w thermal overload relay

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## NAVIJET C350E-A

NAVIJET C350E-A is an electric driven high pressure cleaning machine, operating with cold water (feed water temperature up-to max. 60 °C). This heavy duty HPC machine is ideal for paint and rust removal, as well as for any cleaning task on board. NAVIJET C350E-A is constructed of stainless steel frame, with Sst cover, 4 solid wheels for easy handling and wheel brake. The pump is driven by low RPM motor for long time - life.

### Features

- ◆ Stainless steel 304 chassis, with wheel brake
- ◆ Stainless steel top cover 304 • Power: 13kW
- ◆ Class F insulation
- ◆ S1 duty (continuous run)
- ◆ Overheat protection
- ◆ 3 ceramic piston plunger pump
- ◆ Working pressure: 350 bar
- ◆ Water Flow: 18.0ltr/min
- ◆ Maximum water feed temperature: 60 °C
- ◆ IP 65 enclosure
- ◆ Electrical Motor Starter Complete 13kW
- ◆ Circuit breaker at main & auxiliary circuit
- ◆ Thermal overload relay protection
- ◆ 24V auxiliary circuit (autotransformer)
- ◆ Time relay (auto stop)
- ◆ Safety Release Valve
- ◆ Dry running protection •Emergency STOP button
- ◆ Adjustable unloader valve
- ◆ Auto start-stop, Dry Running Protection
- ◆ Water inlet filter



TECHNICAL SPECIFICATION	NAVIJET C350E-A Order Number 733502	
Voltage / frequency	V/Hz	400/50 or 440/60
Working pressure	Bar/Mpa	350 / 35
Water Flow	lpm/gpm	18
Motor power rating	kW/HP	13.2
Water inlet temp. (max.)	°C	60
Dimensions	mm	L970 x W680 x H750
Weight	kg	125

### STANDARD ACCESSORIES

10mtr hp hose with couplings • 10mtr electric cable • Dry shut spray gun, 1000mm • Wheel brake • Pressure gauge • Water inlet filter • Auto start-stop system (delayed) • Dry Running Protection • Motor starter in enclosure IP65

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### NAVIJET C200A-II

NAVIJET C200A-II is a general purpose electric high pressure cleaning machine, operating with cold water (feed water temperature up-to max. 60 °C). The machine is built in Stainless steel frame, with stainless steel cover and 4 wheels for easy handling. The pump is driven by low RPM motor for long time-life.

#### Features:

- ◆ Sturdy and compact design
- ◆ 3 ceramic piston plunger pump
- ◆ 5 kW motor
- ◆ IP 55, class F, S1 duty
- ◆ Unloader valve with by-pass protection
- ◆ Motor starter with overload relay protection
- ◆ Auto start-stop device (delayed auto-stop)
- ◆ Water inlet filter
- ◆ Quick couplings at inlet and outlet
- ◆ Easy to maintain and repair
- ◆ European product/manufacture



TECHNICAL SPECIFICATION	NAVIJET C200A-II Order Number 732002	
Voltage / frequency	V/Hz	380/50 or 440/60
Working pressure	Bar/Mpa	200 / 20
Water Flow	lpm/gpm	13.5
Motor power rating	kW/HP	5
Water inlet temp. (max.)	°C	60
Dimensions	mm	L760 x W550 x H600
Weight	kg	54

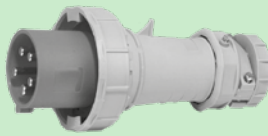
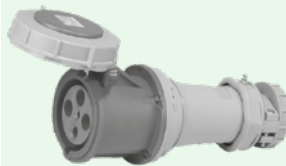
#### STANDARD ACCESSORIES

10mtr hp hose • 10mtr electric cable • Spray gun • Double lance c/w nozzles • Auto start-stop device • 3 phase motor starter c/w thermal overload relay • Water inlet filter

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## ACCESSORIES FOR HIGH PRESSURE CLEANERS

A wide range of optional accessories are available for expanding and improving the performance and usage of Marichem high pressure cleaners.




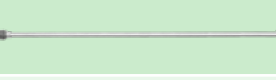





ORDER NO	DESCRIPTION	SUITABLE FOR USE WITH	ACCESSORIES
730331	El. Extens. Cable 16A (3P+E) w/connectors IP67-50mtr	NAVIJET 200/300	
730179	El. Extens. Cable 32A (3P+E) w/connectors IP67 -50mtr	NAVIJET 200/300/350	
730166	El. Extens. Cable 63A (3P+E) w/connectors IP67-50mtr	NAVIJET 500	
731166	El. Extens. Cable 4x16/63A (3P+E) w/con. IP67-50mtr	NAVIJET 1100	
730331-1	Plug male, 3poles + E, 16A IP67	NAVIJET 200/300	
730179-1	Plug male, 3poles + E, 32A IP67	NAVIJET 200/300/350	
730166-1	Plug male, 3poles + E, 63A IP67	NAVIJET 500/1100	
730331-2	Socket female, 3poles + E, 16A IP67	NAVIJET 200/300	
730179-2	Socket female, 3poles + E, 32A IP67	NAVIJET 200/300/350	
730166-2	Socket female, 3poles+ E, 63A IP67	NAVIJET 500/1100	
730201	HP Hose 5/16", 10mtr, 300 bar, c/w connecting adaptor	NAVIJET 200/300	
730202	HP Hose 5/16", 15mtr, 300 bar, c/w connecting adaptor		
730203	HP Hose 5/16", 20mtr, 300 bar, c/w connecting adaptor		
730221	HP Hose 3/8", 10mtr, 500 bar, c/w connecting nipple	NAVIJET 500/350	
730222	HP Hose 3/8", 15mtr, 500 bar, c/w connecting nipple		
730223	HP Hose 3/8", 20mtr, 500 bar, c/w connecting nipple		
731223	HP Hose 1/2", 20mtr, 1250 bar, c/w connect	NAVIJET 1100	
730141	Turbonozzle Package N200	NAVIJET 200	
730116/40-2	Turbonozzle Package N300	NAVIJET 300	
730157	Turbonozzle N500/35	NAVIJET 500	
730142	Turbonozzle QR attachment 500/35	NAVIJET 500	
731157	Turbonozzle 1100 bar 9/16" LH	NAVIJET 1100	



ORDER NO	DESCRIPTION	SUITABLE FOR USE WITH	ACCESSORIES
730190-2	Repair Kit for Turbonozzle N200, 250/45	NAVIJET 200	
730189/40-2	Repair Kit for Turbonozzle N300, 350/40	NAVIJET 300	
730158	Repair Kit for Turbonozzle N500/35	NAVIJET 500	
730165	Repair Kit for Turbonozzle N500/30	NAVIJET 500	
731158	Repair Kit for Turbonozzle 1100 bar 9/16"	NAVIJET 1100	
730164	HP S.S. Flat Fan Nozzle N500 1534	NAVIJET 300/500	
730359	Flat Fan Nozzle 15045	NAVIJET 300/500	
730217	Nozzle L.P. for HPC Machine	NAVIJET 200/300	
730286-2	Sandblasting complete package N300, 280/40	NAVIJET 200/300/350	
730143-2	Sandblasting QR Equipment 500/35	NAVIJET 500	
731143	Sandblasting package 1100 bar	NAVIJET 1100	
730287	Chemical Adjustable Injector N200/N300. quick connect	NAVIJET 200/300	
730196	Rotating Brush Package, complete	TELESCOPIC POLE	
730196-1	Rotating Brush /w Lance 1000mm	NAVIJET 200/300	
730197	Sewer/Drain Cleaning Pack 20mtr c/w nozzle	NAVIJET 200/300	

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ORDER NO	DESCRIPTION	SUITABLE FOR USE WITH	ACCESSORIES
801116	Telescopic Pole 8mtr. w/3 nozzles set	NAVIJET 200/300	
801119	Back Belt for Telescopic Pole	NAVIJET 200/300	
730191-0	Spray Gun RL84 w/o couplings	NAVIJET 500	
730340	Spray Gun N300SG	NAVIJET 200/300	
730341	Double Lance 1000mm, w/valve aside	NAVIJET 200/300	
730249/QR	Long Lance 2mtr N500, w/QR coupling	NAVIJET 500	
730162	Shoulder Rest for Spray Gun N500	NAVIJET 500	
750316	Air/Water Hose 3/4", 50mtr coil	NAVIJET ALL	
730575	Lance 1000mm, 500 bar w/grip	NAVIJET 500	
730191-C	Spraying System N500 - Complete Package	NAVIJET 500	
731191	Dump Gun complete w/lance & shoulder rest	NAVIJET 1100	
778080	Personal Protective equipment. Set for high pressure applications	NAVIJET ALL	

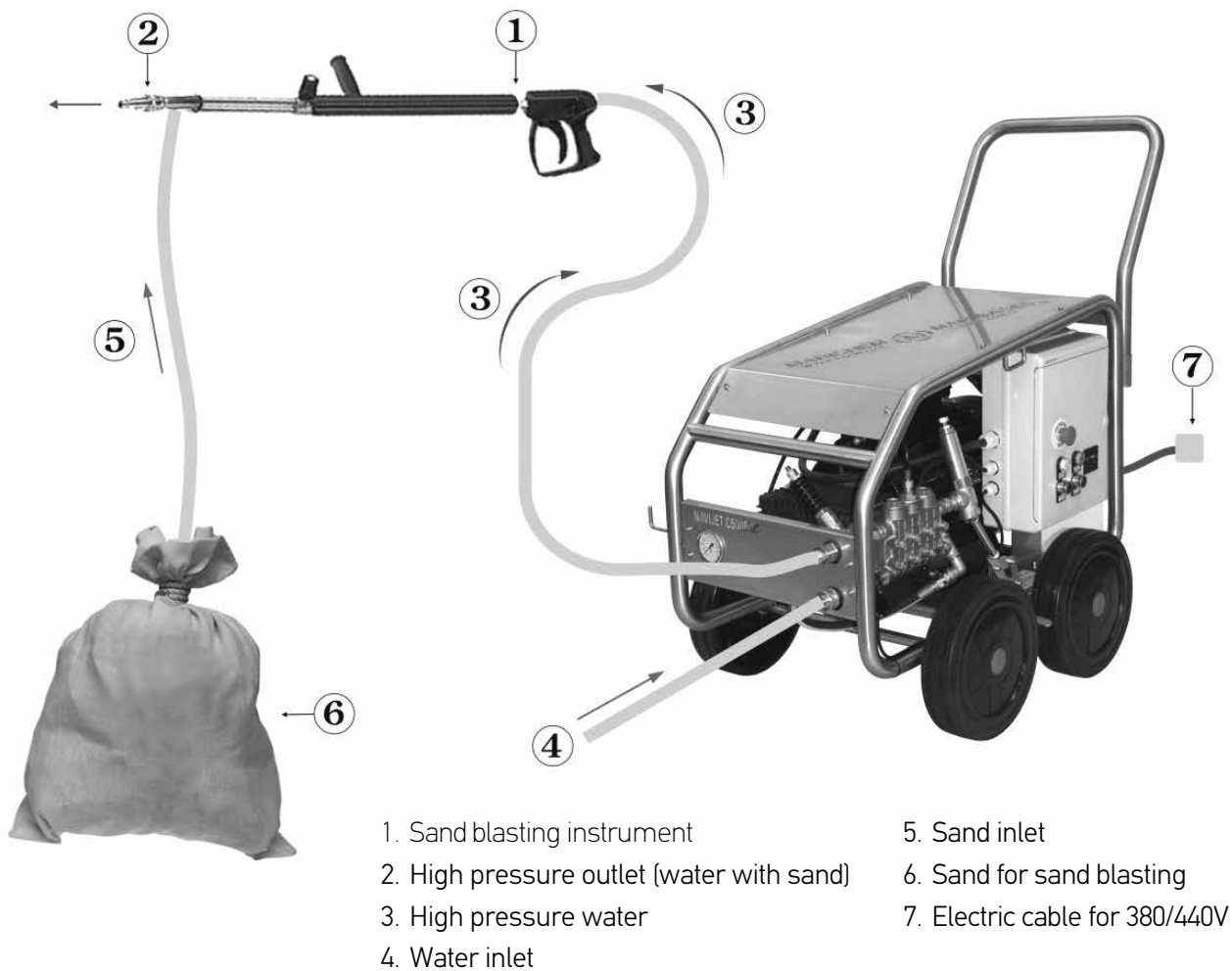
► **Remark:** Conditionally, some of the accessories can be used with other than the hpc machines specified above. As this is subject to technical specifications, please contact us for further advice.

**SPARE PARTS** Marichem keep stocks readily available for all its high pressure cleaning machines. Consult the user's and technical manuals of your machine for the spare part required and contact your sales representative for any query you may have.

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## PRESENTATION OF WATER-SAND BLASTING



## PRECAUTIONS

- ◆ It is recommended to shut down the unit when not in use. This way, machine life is elongated and safety conditions are ensured.
- ◆ Biodegradable detergents with pH value between 7 and 12 should preferably be used.
- ◆ The maximum water inlet temperature, must not exceed 60°C (140°F).
- ◆ The water supply should be connected to the inlet port by means of a reinforced hose (min. 15 bar/200 psi) with internal diameter of no less than 13mm (1/2").
- ◆ Always check water supply before use. Running the machine without water will cause serious damage to the jet system. The machine can be fed with either fresh or sea water.
- ◆ When sea water is used, always rinse the system with fresh water for approximately 4-5 minutes, to assure sea water residues are expelled from the jet system.
- ◆ High-pressure water jet pipes or guns must not be directed against humans and/or sensitive equipment.
- ◆ This machine is built in compliance with the requirements of the current safety regulations. Whatever is the use of any electrical appliance, the user must follow some basic rules:
  1. To avoid touching electrical parts or components.
  2. Qualified personnel only must conduct all operations of inspection, maintenance and/or repair.



## AIRLESS PAINT SPRAYER SERIES

### DESCRIPTION

#### Marichem AIRLESS PAINT SPRAYER SERIES

A lightweight professional airless paint sprayer with fluid pressure ratio range from 30:1 to 60:1, reaching a maximum of 360 bar. Due to its high flow capacity airless paint sprayer can operate with 2 spray guns at the same time. All models of Airless Paint Sprayer Series come with 15mtr high pressure hose, complete with spray gun and nozzle. The machines are equipped with durable displacement pump.

### FEATURES

- ◆ Reduced maintenance requirements. Teflon made v-packing ensures long life.
- ◆ High capacity of paint discharge (maximum 13.5 lpm), able to support 2 spraying guns, operating simultaneously
- ◆ Large manifold filter ensures nice finishing without pressure fluctuation
- ◆ Easy to install, use and move around
- ◆ Equipped with Air filter regulator and lubricator for easy control of the air line, extending machine's lifetime and performance



### ACCESSORIES AND SPARE PARTS

Various accessories such as extension poles (different lengths), different sizes of spraying nozzles as well as all parts for all sprayer models are available.

TECHNICAL DATA		M301	M451	M601
Fluid pressure ratio		30:1	45:1	60:1
Maximum operating	bar	210	270	360
Maximum flow capacity	lpm	8.4	13.5	11
Free load capacity	lpm	20.8	33	22
Inlet air pressure range	bar	3 - 6	3 - 6	3 - 6
Air consumption (at 6 bar)	lpm	~450	~800	~800
Air inlet size (*)	inches	1/4	1/4	1/4
Fluid outlet size	inches	1/4	1/4	1/4
Noise level	db	75	75	75
Weight	Kg	55	99	96
Order Number		801600	801645	801660

(\*) Hose of 1/4" with outer diameter of 16mm to be used





## SAND BLASTING SET



SAND BLASTING SET Order Number: 801700

### DESCRIPTION

**MARICHEM SAND BLASTING SET** is a complete package for abrasive effect application. It allows the user to remove rust and scale from metallic surfaces, rough edges, dirt, paint and tempering color. It can also be used for roughening metallic surfaces before applying coatings and paint. It works with all sand types, providing excellent results. The complete package consists of the sand blasting unit and the air compressor unit.

#### TECHNICAL SPECIFICATION

Container Size Diameter	mm	380
Container Size Length	mm	762
Container Capacity	Ltr	75
Machine Size	mm	920x780x380
Sand Blasting Hose Length	Mtr	2.5

#### AIR COMPRESSOR REQUIREMENTS

Pressure	0.8 Mpa / 8 Bar
Exhaust Volume	0.6 m <sup>3</sup> / Min

#### Sand Blasting Unit

Order No 801703

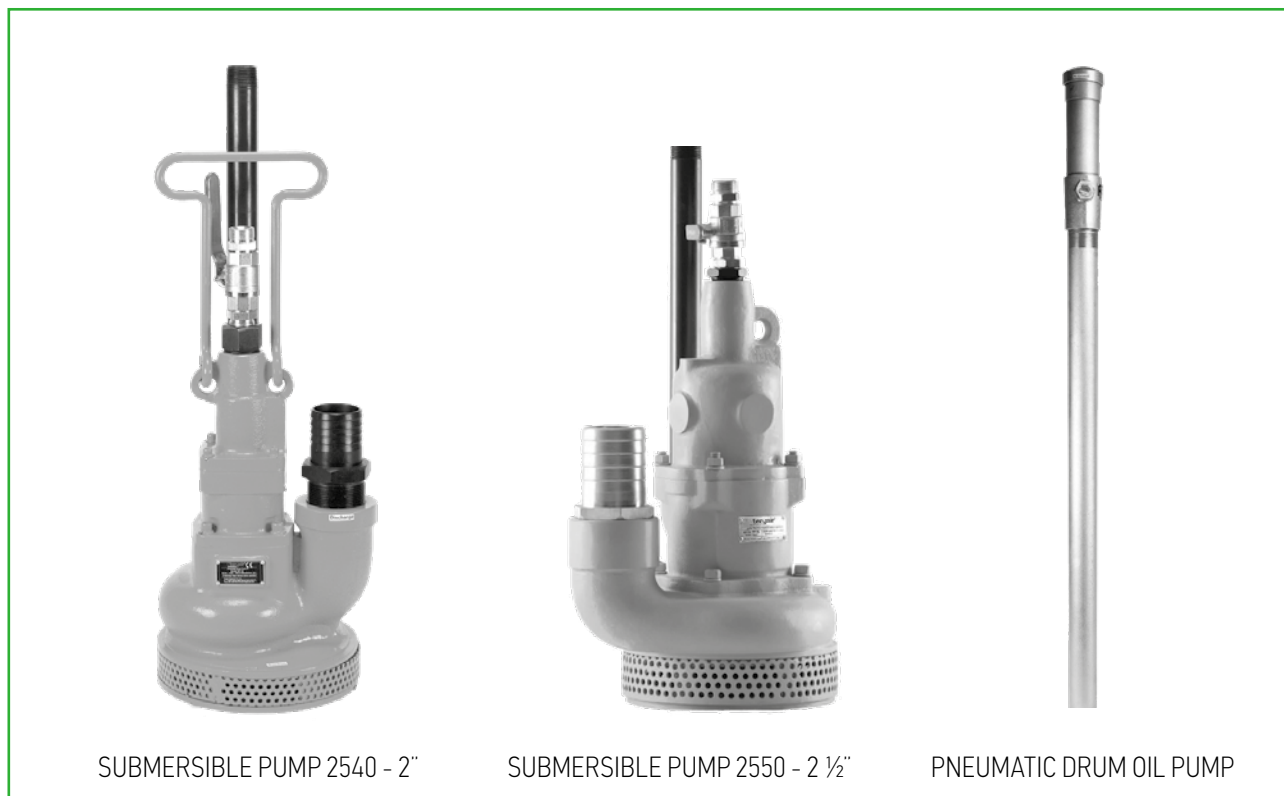
#### Additional Personal Protective Equipment Set

Order No 801702

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## SUBMERSIBLE PUMPS / DRUM OIL PUMP



SUBMERSIBLE PUMP 2540 - 2"

SUBMERSIBLE PUMP 2550 - 2 1/2"

PNEUMATIC DRUM OIL PUMP

### SUBMERSIBLE PUMPS - AIR OPERATED



Marichem PNEUMATIC SUBMERSIBLE PUMPS are ideal for draining cargo holds after cleaning and washing procedures. They can also be used at any other areas for pumping of sea water, such as ballast tanks, bilges or at areas where electric spark may risk ignition or explosion. Marichem has 2 types of pneumatic pumps available, one at 2 inch and another one at 2½ inch discharge sizes. With their compact design, enabling use in restricted areas.

### Features

- ◆ Sturdy and compact design
- ◆ Small cross section, can be lowered to small access hatches
- ◆ Screen fluid inlet
- ◆ Handling of up to 3mm solids
- ◆ Head capacity >25 meter
- ◆ Pump down to 22mm
- ◆ Governor controlled motor
- ◆ Easy to maintain and repair

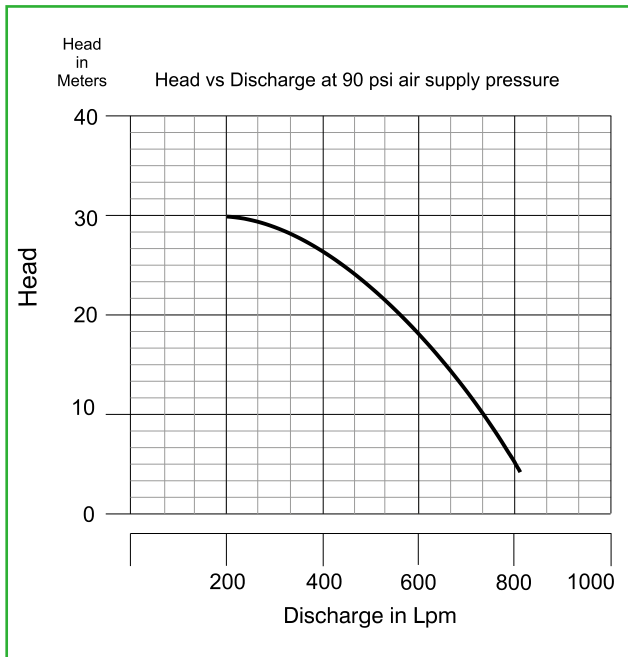
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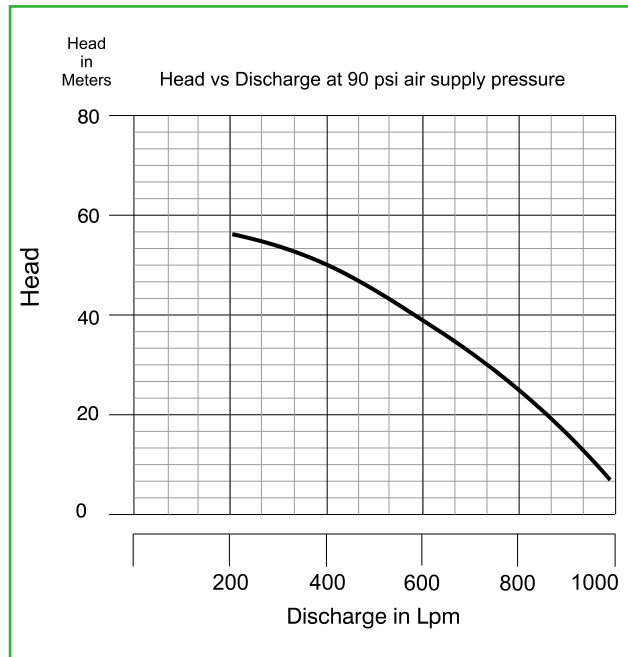
PRODUCT	SUBMERSIBLE PUMP 2540 - 2"	SUBMERSIBLE PUMP 2550 - 2 1/2"
		
Order No	750301	750302
Discharge capacity at 25mtr head	40m <sup>3</sup> /hour (at 90psi/6.2 bar air pressure)	50m <sup>3</sup> /hour (at 90psi/6.2 bar air pressure)
Air inlet	3/4" Hose Tail	3/4" Hose Tail
Air outlet	1" BSPP	1 1/2" BSPP
Air consumption	2.7 m <sup>3</sup> /min	3.8 m <sup>3</sup> /min
Air Hose diameter	3/4" Hose Tail	3/4" Hose Tail
Fluid inlet	Screen	Screen
Fluid outlet	2" Hose Tail	2 1/2" Hose Tail
Dimensions	204mm x 340mm	210mm x 430mm
Weight	20 kgs	30 kgs

HEAD vs DISCHARGE AT 90 PSI AIR SUPPLY PRESSURE

SUBMERSIBLE PUMP 2540 - 2"



SUBMERSIBLE PUMP 2550 - 2 1/2"

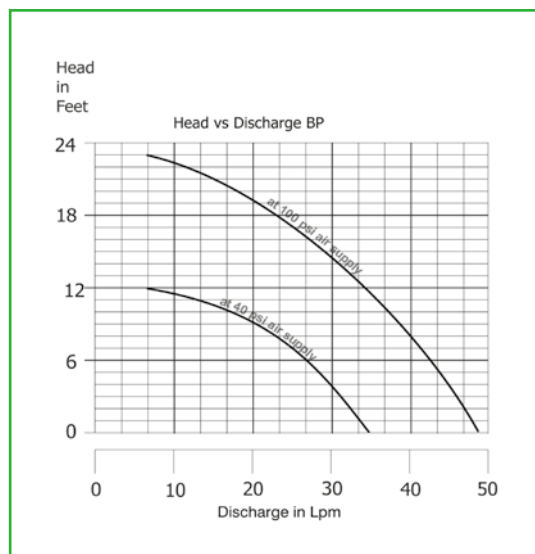


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**DRUM OIL PUMP - AIR OPERATED**

Marichem PNEUMATIC DRUM OIL PUMP is designed to pump light viscous oil, like engine oil, and other non aggressive fluids. It can be inserted into most drums and will operate over a range of air inlet pressures. It can be directly inserted into a drum and screwed onto the bung using the provided adaptor.

Product	Drum oil pump, air operated
Order No	750303
Air inlet	5/16" Hose Tail
Air consumption	4-8 cfm
Fluid outlet	3/4" Hose Tail
Weight	5.3 kgs



**ACCESSORIES FOR AIR PUMPS**

AIR HOSES, SLOPS DISCHARGE HOSES and OIL HOSES in suitable sizes for connecting to the pneumatic hoses are available throughout Marichem's network.

SLOPS HOSE 2", REINFORCED 50 MTR COIL

Order No. 750311

SLOPS HOSE 2-1/2", REINFORCED 50 MTR COIL

Order No. 750312

AIR HOSE 3/4", 50 MTR COIL

Order No. 750316

AIR HOSE 5/16", 50 MTR COIL

Order No. 750317



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### SUBMERSIBLE PUMPS - ELECTRIC OPERATED

Marichem ELECTRIC SUBMERSIBLE PUMPS E2521 and E2521/3P are ideal for draining cargo holds after cleaning and washing procedures.

The pumps can also be used at any other areas for pumping of water dilutions, such as ballast tanks, bilges etc.

E2521 is a single phase 230V/60Hz, powerful and high-head pump of 2 inches discharge size. With its compact design, E2521 enable use in restricted areas.

E2521/3P has the same specifications with E2521, but operates with 3 phase voltage, 440V/60Hz.



### Features

- ◆ Sturdy and compact design
- ◆ Small cross section, can be lowered to small access hatches
- ◆ Screen fluid inlet
- ◆ Handling of up to 3mm solids
- ◆ Maximum Head capacity 30 meter
- ◆ Maximum flow 21 m<sup>3</sup>/hr
- ◆ 2 HP, 2 poles motor design
- ◆ Motor casing made of Stainless steel 304
- ◆ Stainless steel 304 strainer
- ◆ Closed bronze impeller
- ◆ 10mtr electric cable

### TECHNICAL SPECIFICATION

Product	Electric Submersible pump E2521, 2"	Electric Submersible pump E2521/3P, 2"
Order No	750304	750305
Max Head	30 mtr	
Max Flow	350 lpm (21 cm <sup>3</sup> /hr)	
Supply Voltage	230V/60Hz	3x440V/60Hz
Outlet	2"	
Weight	30 kgs	26 kgs

### ACCESSORIES FOR ELECTRIC PUMPS

SLOPS DISCHARGE HOSES and ELECTRIC CABLE EXTENSIONS in suitable sizes for connecting the pumps are available throughout Marichem's network.

SLOPS HOSE 2", REINFORCED 50 mtr COIL Order No. 750311

SLOPS HOSE 2-1/2", REINFORCED 50 mtr COIL Order No. 750312

ELECTRIC EXTENSION CABLE 2P+E, 16A w/CONNECTORS IP67-50 mtr Order No. 750325

ELECTRIC EXTENSION CABLE 3P+E, 16A w/CONNECTORS IP67-50 mtr Order No. 730331



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## PORTABLE ULTRASONIC CLEANER UNIT

Suitable for machine parts or components, tools, metals parts

**ULTRASONIC cleaning technology** has been proven to be the most efficient method of removing contaminants, such as grease, oil, wax, fluxes, fingerprints, oxides and other deposits from visible and invisible surfaces, holes and cracks.

- ◆ Utilization of international state-of-the-art IC, micro-processor circuit, protective circuit and digital display.
- ◆ Adopt full-bridge LGBT using high-power integrated power control module that can resist above 80°C and high pressure.
- ◆ Utilization of earthing terminal is better for protection of the machine.
- ◆ Novel structure, high reliability, high efficiency, and low noise.
- ◆ Adoption of international state-of-the-art technology incorporating with unique bonding technology.
- ◆ Ensuring ultrasonic power, powerful output, never dropping vibrator.
- ◆ Additional functions such as digital heating, thermostat, and timing etc.
- ◆ The size of ultrasonic cleaner is customized according to actual tank body.
- ◆ Unique design of saw-teeth water overflowing to ensure proper level and that the dirt can timely be escaped.
- ◆ Multi ultrasonic directions ensure completely and thoroughly cleaning for the parts.
- ◆ Adopting excellent transducer to ensure above 98% output of ultrasonic power.
- ◆ Stronger universality, higher cleanliness and easy operation.
- ◆ Design of overflow device, lid, basket, etc.
- ◆ Design of wheel for the tank to ensure flexible movement.

### PRINCIPLE

Ultrasonic cleaning uses high frequency sound waves (usually from 20–400KHZ) to agitate in an aqueous or organic compound.

Cavitation bubbles induced by the agitation act on contaminants adhering to substrates like metals, plastics, glass, rubber, and ceramics. This action also penetrates blind holes, cracks, and recesses. The intention is to thoroughly remove tightly adhering or embedded particles from solid surfaces. Water or other solvents



can be used, depending on the type of contamination and the workpiece.

Contaminants can include dust, dirt, oil, pigments, grease, polishing compounds, flux agents, fingerprints, soot wax and mold release agents, biological soil like blood, and so on.

Ultrasonic cleaning can be used for a wide range of workpiece shapes, sizes and materials, and may not require the part to be disassembled prior to cleaning.

### SAFETY PRECAUTIONS FOR PERSONNEL OPERATE-USE-TEST ULTRASONIC CLEANERS

1. Do not start ultrasonic when tank is empty or low water level.
2. Do not start heating if water level is below heating element.
3. Do not add solution to the tank if temperature differs 40°C or more.
4. Do not use acid or highly alkaline solutions.
5. Objects must not come in direct contact with the tank.
6. Aggressive liquids should be used in combination with beakers.
7. Do not use flammable solutions, fire and/or explosion may occur.
8. Read instructions Manual carefully before Install and operating this machine.
9. Personnel that uses the Ultrasonic Machine must be trained and familiar with the Operation of Ultrasonic cleaner.
10. Always when Operate - Use the Ultrasonic Machine the personnel must follow up the Instructions Manual Procedures - Safe Working Practices Guidelines - Health and Safety Precautions to be taken and subject ISM Requirements to be follow up.



MARICHEM MARIGASES offers a wide range of ultrasonic cleaners, meeting the needs of even the most demanding users

MODEL	MUC-20	MUC-30	MUC-60	MUC-100
Order No	710321	710321/30	710315	710316
Capacity (Lt)	20	30	60	100
Tank Dimens. (mm)	498x298x200	500x300x200	500x400x330	700x400x350
Outline Dimens. (mm)	530x398x388	535x400x400	700x600x700	1000x750x700
Ultrasonic Power (kW)	0.5	0.5	0.6	1.8
Heating Power (kW)	1.5	1.8	2	4
Voltage (V)	220-240	220-240	110/220	3x440
Ultrasonic Direction	1 side	1 side	1 side	3 sides
Dregs Tank	YES	YES	YES	YES
Overflow Device	YES	YES	YES	YES
Thermostat (°C)	0-100	0-100	0-100	0-100
Timer (min)	YES	YES	YES	YES

MODEL	MUC-120	MUC-160	MUC-200	MUC-300
Order No	710317	710318	710319	710322
Capacity (Lt)	120	160	200	300
Tank Dimens. (mm)	600x480x450	700x500x700	750x550x480	1000x700x750
Outline Dimens. (mm)	760x770x680	1000x850x700	910x850x770	1530x1080x1385
Ultrasonic Power (kW)	1.8	1.8	2.8	3.6
Heating Power (kW)	4	4	6	12
Voltage (V)	3x440	3x440	3x440	3x440
Ultrasonic Direction	3 sides	3 sides	3 sides	3 sides
Dregs Tank	YES	YES	YES	YES
Overflow Device	YES	YES	YES	YES
Thermostat (°C)	0-100	0-100	0-100	0-100
Timer (min)	YES	YES	YES	YES



# Ultrasonic Cleaners

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# Gases

TO SERVE AND TO MAINTAIN



**MARIGASES®**



# MARIGASES

**Division**  
**GASES**

**Section A**  
**GASES AND CYLINDERS**

**Part 1**  
**GASES & REFRIGERANTS**

**Part 2**  
**GAS DISTRIBUTION SYSTEMS**



## INSTRUCTIONS FOR USE AND STORAGE OF CYLINDERS

1. Never cause cylinders to bump to each other.
2. Never drop a gas cylinder, either full or empty.
3. Never lift or pull gas cylinders by the valve cup or valve top.
4. Always ensure that the cylinders are stored in an upright position, safely lashed or fastened, in order to prevent their fall.
5. Never strike and/or expose a cylinder to high temperature, Ox/Ac flame from a torch or any other source.
6. Cylinders must be stored and used at temperatures lower than 45°C (113°F).
7. During storage, Oxygen cylinders must always be separated from acetylene cylinders by a distance of minimum six (6) meters, unless a fire proof barrier is erected. Provide adequate ventilation at all times.
8. Avoid denting, cutting or other action which might damage the cylinder's body or the top valve. Furthermore, ensure that the cylinders are stored in safe distance from any objects likely to cause dents, cuts or other damages.
9. Never use any tools to force open a cylinder's top valve. If the valve cannot be opened by hand put the cylinder aside and notify **MARIGASES**.
10. Never attempt to fill cylinders or transfer gas from one cylinder to another. This may cause serious accidents.
11. Never attempt to repair or modify any cylinder parts. Do not change or obliterate initials or stamps engraved or cast on the cylinder body. For safety reasons, cylinder maintenance should only be carried out by authorized **MARIGASES** personnel. Any defected cylinders must be tagged and put aside unused and returned to **MARIGASES** at the earliest opportunity.
12. Always make sure that the threads on the regulator or outlet union to be connected correspond to the threads of the top valve. Forcing the connections may damage the top valve threads and cause leakage.
13. Always return cylinders with some positive gas pressure. Be sure that the valves are closed after use to avoid contamination.
14. Never use gas cylinders as rollers or other mechanical purposes /actions except for its designated use.
15. Always report faults and irregularities upon return of the cylinders to **MARIGASES**.



## ACETYLENE

**ACETYLENE** (C<sub>2</sub>H<sub>2</sub>) is a slightly lighter than air, flammable, colorless gas, with a distinct garlic-like odor. When mixed with Oxygen, it gives flame temperatures up to 3,100°C (5,612°F). It is spontaneously combustible in air, at pressures above 2 BAR (30psi).

- ▶ Boiling point: -83.8°C (-118.8°F)
- ▶ Trade name: Acetylene

### Precautions

- ▶ Although it is non-toxic, acetylene is anesthetic if inhaled. Acetylene concentrations higher than 20% can cause unconsciousness, so areas of storage and use should always be well ventilated.
- ▶ Acetylene is explosive when mixed with air, however large or small the quantity. Explosive reactions may occur on ignition. It reacts explosively with halogens and halogenated compounds and will form an explosive compound with copper; therefore, equipment containing more than 65% copper should not be used. Acetylene is also not compatible with mercury or silver.
- ▶ Storage temperature should be kept under 54°C (130°F).
- ▶ For cutting and welding, safety goggles or glasses must always be used.



## OXYGEN

**OXYGEN** (O<sub>2</sub>) is a gas heavier than air, colorless, odorless and taste free. Although it is a non-flammable natural born gas Oxygen, can still enforce combustion.

- ▶ Boiling point: -182.97°C (-297.35°F)
- ▶ Trade name: Oxygen

### Precautions

- ▶ Grease, oil or other flammable materials, may react violently on contact with Oxygen under pressure. Therefore, they must never mix with any welding or cutting equipment. Moreover, Oxygen must never be used as a substitute for compressed air in pneumatic equipment, since this type of equipment contains flammable lubricants.
- ▶ Storage temperature should be kept under 54°C (130°F). Moreover, areas of storage should be dry and well ventilated.
- ▶ Breathing high concentrations of O<sub>2</sub>, causes symptoms of hyperoxia, which in some cases may be fatal.
- ▶ For cutting and welding, safety goggles or glasses must be used.



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## ARGON

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**ARGON** (Ar) is a slightly heavier than air, colorless and odor free gas. It is an inert gas, commonly used as a shielding gas for the Tungsten Inert Gas (TIG) welding, primarily to clean the molten pool. It is non-toxic and non-combustible.

- Trade name: Argon

### Precautions

- As with all inert gases, argon displaces Oxygen in non ventilated areas, this can cause asphyxiation and death. Therefore, areas of storage and use should always be well ventilated and have the possibility for a fast evacuation. In addition, precautions should be taken in order to avoid any leakage.
- Store temperature should be kept under 45°C (113°F).
- For welding, safety goggles or glasses should be used.



## ARGON - CO<sub>2</sub> MIXTURES

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**ARGON - CO<sub>2</sub>** mixtures are very useful in MIG/MAG welding as shielding gases. MARIGASES 80–20 mixture (80% Argon and 20% CO<sub>2</sub>) is ideal for welding the unalloyed and low-alloyed carbon steels. It protects the molten pool against contaminants in the atmosphere.

### Precautions

- Store temperature should be kept under 45°C (113°F).
- For welding, safety goggles or glasses should be used.

## NITROGEN

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**NITROGEN** (N<sub>2</sub>) is a colorless, tasteless, and an odorless inert gas, slightly lighter than air; it is used for purging tanks and pipelines and for the removal of moisture from refrigeration systems. It does not react with any substance or gas and is non toxic. Nitrogen is also non combustible and does not burn nor does it affect the respiratory system. It is slightly soluble in water and most other liquids and is a poor conductor of heat and electricity. It can also be used for providing a safe blanket for cargo, preventing reactions with Oxygen.

- Trade name: Nitrogen

### Precautions

- As with Argon, Nitrogen displaces Oxygen in non ventilated areas, this can cause asphyxiation and in prolonged cases, even death. Therefore, areas of storage should always be well ventilated and have the possibility for a fast evacuation for your staff.
- Extra precautions should be taken to avoid the possibility of leakages.
- Storage temperature should be kept under 45°C (113°F).

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## Technical Data

CYLINDER TYPE		AC-40	OX-40	Ar-50	Ar/CO <sub>2</sub> -50 80-20%	N <sub>2</sub> -50 99.9%	N <sub>2</sub> -50 99.999%
Cylinder Capacity	ltr	40	40	50	50	50	50
Gross Weight	kg	71.4	60	99.3	98.4	92.7	92.7
Nominal Tare	kg	65.2	52.2	81.2	81.2	81.2	81.2
Nominal outside diameter	mm	229	230	231.5	231.5	231.5	231.5
Overall length	mm	1357	1337	1664	1664	1664	1664
Color		Maroon	Blue	Grey	Grey/Yellow	Green	Green
Valve Type		Forged brass	Forged brass with nickel bursting disc	Forged brass with nickel bursting disc	Forged brass with nickel bursting disc	Forged brass with nickel bursting disc	Forged brass with nickel bursting disc
Valve Outlet Connection		W26.4 x 1/14RH int.	W21.8 x 1/14RH ext.	W24.32 x 1/14RH ext.	W24.32 x 1/14RH ext.	W24.32 x 1/14RH ext.	W24.32 x 1/14RH ext.
<b>PRODUCT CONTENT AT 15° C, 1 ATU</b>							
Volume	m <sup>3</sup>	5.6	6.4	11	11	10.2	10.2
Weight	kg	6.2	7.8	18.1	17.2	11.5	11.5
Nominal filling pressure	bar	15	147	200	200	200	200
Cylinder test pressure	bar	60	250	300	300	300	300
Gas refill Order Number		330201	330202	330211	330212	330231	330232
Cylinder Order Number		324001	324002	325011	325012	325031	325031

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## CALIBRATION GASES

MARIGASES offers a great variety, all purpose **Calibration Gases**. They are efficiently used for calibration of gas detection systems. **MARIGASES** guarantees the mixture components for all its **Calibration Gases** available:

CALIBRATION GAS	CYLINDER CAPACITY	Order No
Ammonia (NH <sub>3</sub> 5.25% VOL.) in Air 35% LEL	10 Ltr.	330241
Butane (C <sub>4</sub> H <sub>10</sub> 0.63% VOL.) in Air 35% LEL	10 Ltr.	330243
Ethylene (C <sub>2</sub> H <sub>4</sub> 0.95% VOL.) in Air 35% LEL	10 Ltr.	330244
Methane (CH <sub>4</sub> 2.5% VOL.) in Air 50% LEL	10 Ltr.	330245
Propane (C <sub>3</sub> H <sub>8</sub> 0.74% VOL.) in Air 35% LEL	10 Ltr.	330246
Propylene (C <sub>3</sub> H <sub>6</sub> 0.70% VOL.) in Air 35% LEL	10 Ltr.	330247
Vinylchloride (C <sub>2</sub> H <sub>3</sub> Cl 1.33% VOL) in Air 35% LEL	10 Ltr.	330248
Butane (C <sub>4</sub> H <sub>10</sub> 0.57% VOL.) in Air 30% LEL	10 Ltr.	330249



CYLINDER TYPE	CG-10
Cylinder Capacity (water) Ltr.	10
Application	Calibration
Gross weight – Kg (Lbs)	20 (44) [depends on gas mixture]
Nominal Tare Weight – Kg (Lbs)	18 (39.68)
Nominal Outside Diameter – mm	140
Overall length – mm	1,000
Color	Black/Orange
Valve Type	Forged Brass with bursting disc, inlet filter and positive pressure cartridge
Valve outlet Connection	W 24.32 mm x 1/14"
Gas capacity (Kg)	2.0 [depends on gas mixture]
Gas capacity (M <sup>3</sup> )	1.5
Nominal Filling Pressure (Bar)	150
Order number	330141

 **Read the Material Safety Data Sheet before using this product.**

For detailed information on safety and health, please refer to Material Safety Data Sheet and/or Product Label.

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## REFRIGERANTS

**MARIGASES** supplies a wide range of refrigerants worldwide. HCFCs and HFCs ozone friendly refrigerants are available in most of the ports, for short notice supplies.

**R-404A:** R-404A is intended as replacement for R-502 in medium and low-temperature refrigeration systems (ET-45/+8°C). It is a mixture based on all-HFC refrigerants, which results in no ozone depletion factor.

**R-407C** (Replaces R-22): A long-term HFC replacement for HCFC-22 in positive displacement equipment. R407C offers similar performance to R-22 and can be used to retrofit existing R-22 air-conditioning equipment (similar to R-22 in capacity and energy efficiency). It is suitable for low, medium and high temperature applications (ET-25/+13°C).

**R-134a:** R-134a is an environmentally friendly refrigerant introduced as a replacement for CFCs (R-12). It has an ozone depletion potential (ODP) of zero. It is suitable for medium and high-temperature applications (ET-20/+25°C).

**R-417A** (Replaces R-22): A blend of R-125, R-134a and R-600 (butane), intended for retrofitting R-22 air conditioning and refrigeration systems. Runs slightly lower suction pressure and lower discharge pressure than R-22. There will also be a drop in discharge temperature compared to R-22. Lower pressures can affect valve operation or selection of orifice tube. The blend will produce lower capacity than R-22, especially at lower suction temperatures. Addition of hydrocarbon to the blend improves oil return with mineral oil and alkylbenzene oil, however the lubricant may still separate from the refrigerant. In some applications polyolester (POE) lubricants may be needed.

**R-422D** (Replaces R-22): A low and medium temperature retrofit blend replacement for R-22 refrigeration and air-conditioning systems. It is suitable for low and medium temperature applications.

**R-22:** R-22 is used in all types of shipboard refrigeration. It is available for low, medium and high temperatures applications (ET-40/+16°C). In line with international agreements on the management of ozone depleting chemicals, use of R-22 is progressively



phased out across the world. Regulated by the Montreal Protocol, 1987.

Reclaimed R-22 is available upon request in main European stock points.

**R-410A** (Replaces R-22): A long-term HFC replacement for R-22 in positive displacement of air-conditioning equipment. It is suitable for low, medium and high temperature applications (ET-45/+8°C) but as a higher-pressure refrigerant than R-22 and should be used only in equipment specifically designed for R-410A. R-410A offers improved performance over R-22.

**R-507** (Replaces R-502): A long-term HFC replacement for R-502 in refrigeration equipment. It is available for low and medium temperature applications (ET-45/+8°C). It can be used in new and existing R-502 equipment. However, retrofit costs will be higher due to the required conversion to Polyol Ester (POE) lubricant hence, mostly used in new systems.

**R-407F:** A zeotropic refrigerant blend of R-125, R-32 and R-134a. R-407F is a blend of HFC refrigerants designed to replace R-22, R-404A and R-507 in low and medium temperature refrigeration applications. R-407F has very similar properties to R-404A. It is non flammable, compatible with Polyol Ester (POE) lubricants and safe to use.

**Other Refrigerants are available upon request.**

**All the above refrigerants are also available upon request in small refillable cylinders of 12.3ltr or disposable cylinders where permissible.**

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Technical Data	R-22	R-134a	R-404a	R-417a	R-407c	R-410a	R-507	R-422D	R-407F
Cylinder Water Capacity	56.0 lt	56.0 lt	56.0 lt	56.0 lt	56.0 lt	56.0 lt	56.0 lt	56.0 lt	56.0 lt
Tare weight (typical)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)	23.8 kg (52.4 lbs)
Gross weight	80.8 kg	80.8 kg	68.8 kg	74.8 kg	75.8 kg	68.8 kg	68.8 kg	78.8 kg	75.8 kg
Net weight	57.0 kg	57.0 kg	45.0 kg	51.0 kg	52.0 kg	45.0 kg	5.0 kg	55.0 kg	52.0 kg
Nominal Outside diameter	256 mm	256 mm	256 mm	256 mm	256 mm	256 mm	256 mm	256 mm	256 mm
Overall length	1,370 mm	1,370 mm	1,370 mm	1,370 mm	1,370 mm	1,370 mm	1,370 mm	1,370 mm	1,370 mm
Valve type	Liquid / Vapor								
Valve outlet connection	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO	CGA 660 1.030" x 14 NGO
Cylinder's Color	Green	Blue	Orange	Green	Orange Brown	Rose	Teal	Green	Green
Order Number	330222	330223	330225	330236	330226	330227	330254	330265	330292



#### REFRIGERANT TOP VALVE

ORDER NUMBER: 332463

For various accessories on refrigerants charging applications, see [REFRIGERATION PRODUCTS](#) section.

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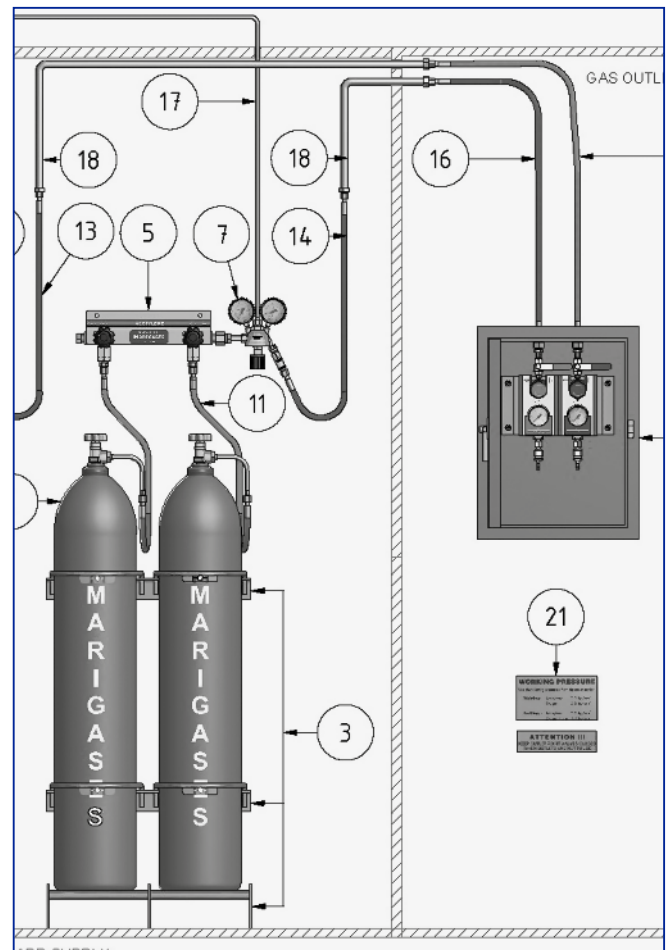
# MARIGASES

Division  
GASES

Section A  
GASES AND CYLINDERS

Part 1  
GASES & REFRIGERANTS

Part 2  
GAS DISTRIBUTION SYSTEMS







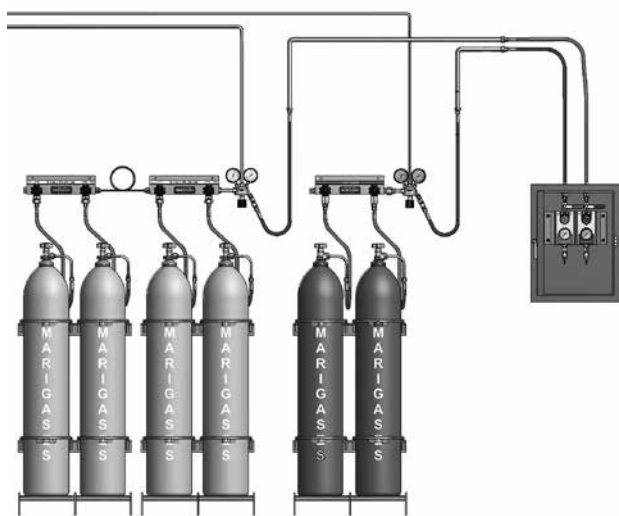
**MARIGASES CENTRAL GAS SUPPLY SYSTEM** consists of the cylinders, the cylinder batteries with the connecting hoses, the cylinder holders, the gas outlet stations and the pipeline network.

A central gas supply system offers several major advantages:

- With cylinder batteries having two header pipes, there is no work interruption at cylinder exchange.
- Important gas reserve and better utilization of cylinder content.
- Higher stability of working pressure than with a single cylinder.
- Safety in the work area by elimination of high-pressure fittings.
- Better survey of gas consumption and gas reserve.
- Reduced costs with accelerated cylinder rotation.
- Central surveillance of gas reserve.

The cylinder batteries include:

- Header pipe (color sprayed) with stop valves.
- Header pipe support (zinc plated).
- Master manifold valve.
- Wall bracket.



## CENTRAL GAS SUPPLY SYSTEM

**MARIGASES CENTRAL GAS SUPPLY SYSTEM** components are manufactured in Europe and they are in accordance with the latest European regulations. They are manufactured under the highest quality standards and they are available at all major ports.

**MARIGASES GAS OUTLET STATION** is designed to ensure maximum safety and high grade efficiency. It includes a high quality twin valve unit and two flashback arrestors (one for Oxygen and one for acetylene) complete with nuts and fittings. The gas outlet station is recommended to be protected in a cabinet.

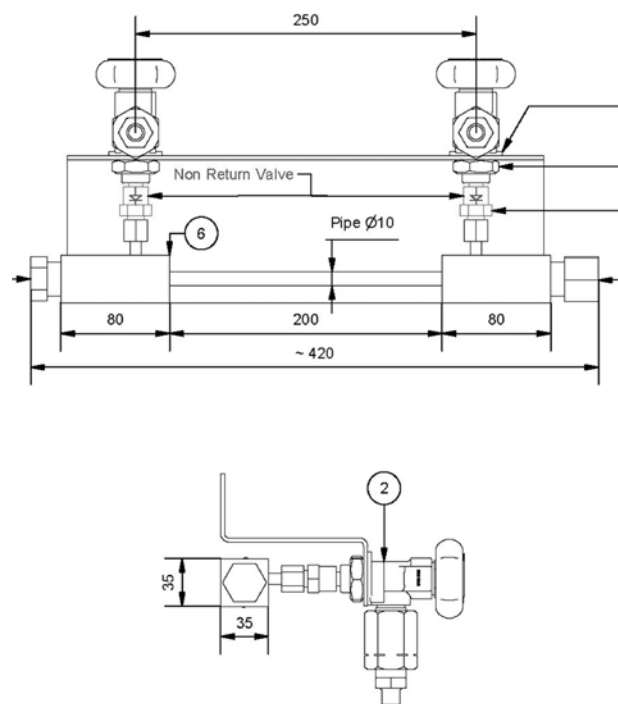
**MARIGASES** offers a steel safety cabinet (color sprayed), which completely encloses the gas outlet equipment.

### SYSTEM CONFIGURATION

Any kind of configuration is possible with the new **MARIGASES CYLINDER BATTERIES** system.

For each cylinder there is a separate shut-off valve, so that it can be easily cut off from the system and be removed for replacing it.

All the shut-off valves are equipped with Non-Return Valve at their inlet, for increased safety.



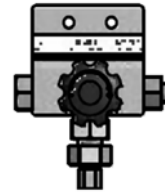
## MARIGASES CYLINDER BATTERIES SYSTEM

### SINGLE AC VALVE w/BRACKET & NON RETURN VALVE

ORDER NUMBER: 333161

### SINGLE OX VALVE w/BRACKET & NON RETURN VALVE

ORDER NUMBER: 333162



### 2 AC CYLINDERS BATTERY, COMPLETE

ORDER NUMBER: 332610/A



### 2 OX CYLINDERS BATTERY, COMPLETE

ORDER NUMBER: 332610



### 3 AC CYLINDERS BATTERY, COMPLETE

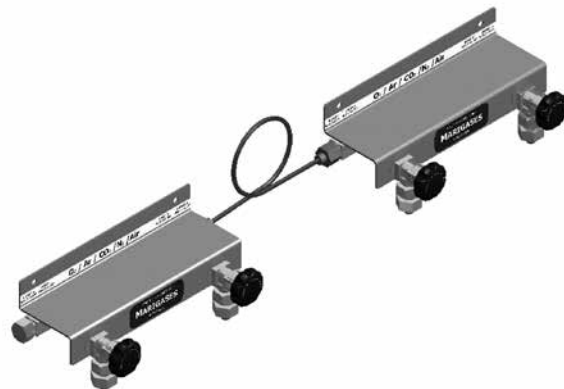
ORDER NUMBER: 332611A

### 3 OX CYLINDERS BATTERY, COMPLETE

ORDER NUMBER: 332611

### 4 OX CYLINDERS BATTERY, COMPLETE

ORDER NUMBER: 332612

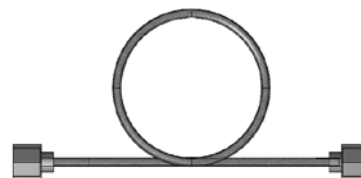


### OX BATTERIES CONNECTING PIPE

ORDER NUMBER: 332658

### AC BATTERIES CONNECTING PIPE

ORDER NUMBER: 332657



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## HIGH & LOW PRESSURE HOSES

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### AC HIGH PRESSURE FLEXIBLE HOSE

ORDER NUMBER: 332721

### OX HIGH PRESSURE FLEXIBLE HOSE

ORDER NUMBER: 332722

### AC LOW PRES. EXPANSION FLEXIBLE HOSE (CYL. BATTERY SIDE)

ORDER NUMBER: 332724

### OX LOW PRES. EXPANSION FLEXIBLE HOSE (CYL. BATTERY SIDE)

ORDER NUMBER: 332723

### AC LOW PRES. FLEXIBLE HOSE (GAS OUTLET STATION SIDE)

ORDER NUMBER: 332725

### OX LOW PRES. FLEXIBLE HOSE (GAS OUTLET STATION SIDE)

ORDER NUMBER: 332726



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## CYLINDER HOLDERS

### 1 CYLINDER HOLDER HD COMPLETE W/CLAMPS

ORDER NUMBER: 332672

### 2 CYLINDERS HOLDER HD COMPLETE W/CLAMPS

ORDER NUMBER: 332673

### CYLINDERS' CLAMP

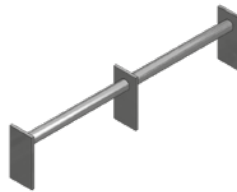
ORDER NUMBER: 332674



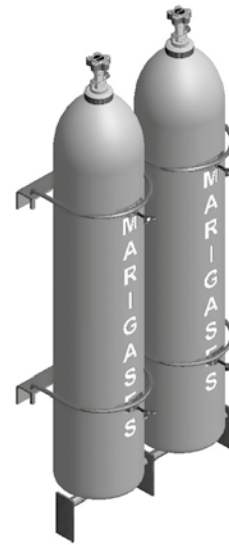
Cylinder Clamp



Wall Bracket



Foot Support



- **REMARK:** Marigases CYLINDER HOLDERS are made of galvanized steel cylinder holders, and consist of foot support, wall bracket and cylinder clamp especially designed to avoid damaging the cylinder.

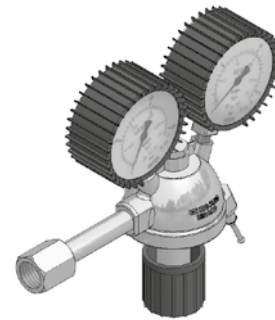
## CENTRAL REGULATORS & FLASHBACK ARRESTORS

### REGULATOR OXYGEN FOR CGSS

ORDER NUMBER: 332302

### REGULATOR ACETYLENE FOR CGSS

ORDER NUMBER: 332301



- **REMARK:** Marigases regulators for CGSS are equipped with safety release valve, for connecting ventilation pipes which release gas to open deck area

### FLASHBACK ARRESTOR FOR AC CYLINDER

ORDER NUMBER: 332489

### FLASHBACK ARRESTOR FOR OX CYLINDER

ORDER NUMBER: 332488



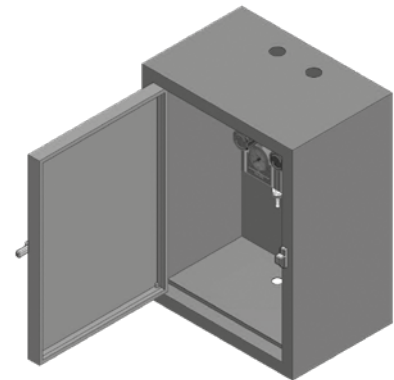
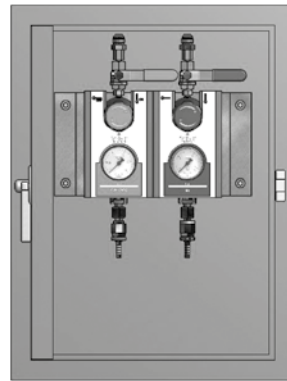
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**GAS OUTLET STATION**

**GAS OUTLET STATION – COMPLETE**

ORDER NUMBER: 332605

► **External Dimensions**  
(HxWxD) mm: 600x450x300



**WORKSTATION OXYGEN W/O BRACKET**

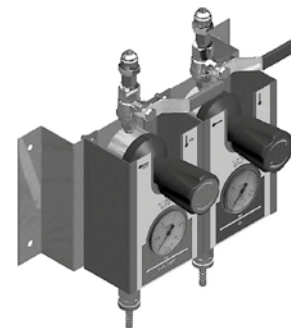
ORDER NUMBER: 332661

**WORKSTATION ACETYLENE W/O BRACKET**

ORDER NUMBER: 332662

**BRACKET FOR WORKSTATIONS OF OX/AC**

ORDER NUMBER: 332663



**SIGNS**

Adhesive Signs for all locations where the CGSS components are placed.

**SIGNS FOR ENTRANCE DOORS (5 pcs)**

ORDER NUMBER: 333171

**SIGNS FOR GAS CENTRAL CABINET (2 pcs)**

ORDER NUMBER: 333172

**SIGNS FOR GAS OUTLET STATION (2 PCS)**

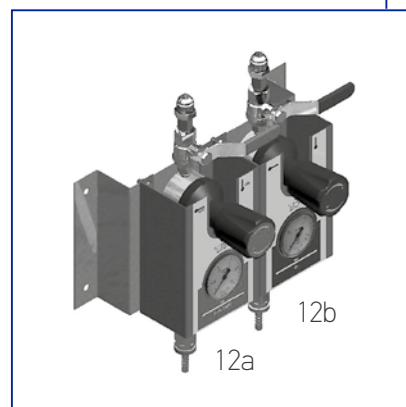
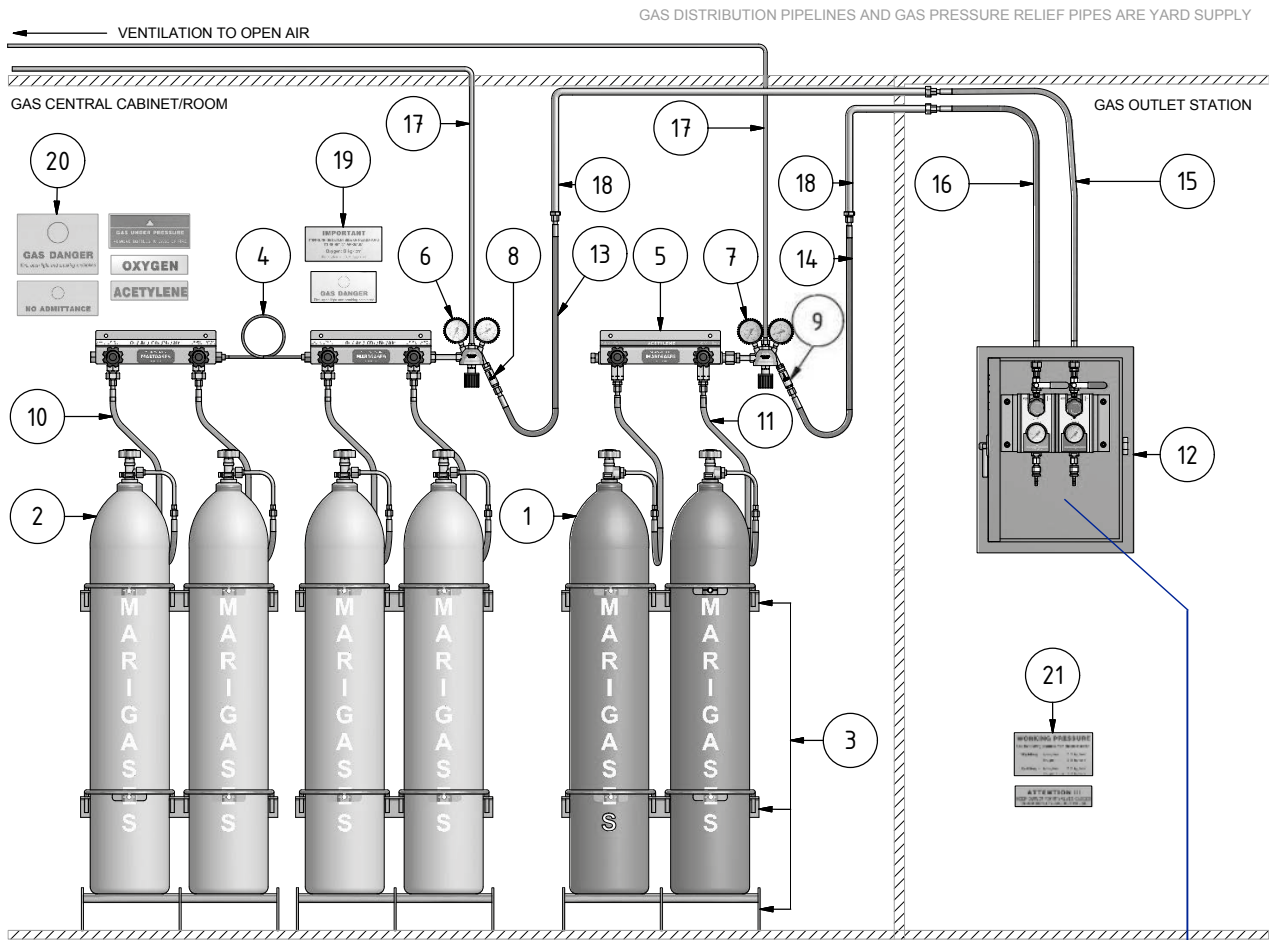
ORDER NUMBER: 333173



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A CENTRAL GAS DISTRIBUTION SYSTEM consisting of 4 Oxygen & 2 Acetylene cylinders



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## CENTRAL GAS DISTRIBUTION SYSTEM PARTS LIST

ITEM	PRODUCT NUMBER	DESCRIPTION	DATA SHEET NO	QUANTITY
01	324001	AC-40 Cylinder Empty	MAR - 003 - 000	2
02	324002	OX-40 Cylinder Empty	MAR - 001 - 000	4
03	332673	2 Cylinder Holder HD Complete W/Clamps	MAR - 002 - 000	3
04	332612	4 Oxygen Cylinder Battery Complete with T-Valves	MAR - 008 - 000	1
05	332610/A	2 Acetylene Cylinder Battery Complete with T-Valves	MAR - 006 - 000	1
06	332302	Regulator Oxygen for CGSS	MAR - 004 - 000	1
07	332301	Regulator Acetylene for CGSS	MAR - 005 - 000	1
08	332488	Flashback Arrestor for Oxygen Cylinder	MAR - 000 - 011	1
09	332489	Flashback Arrestor for Acetylene Cylinder	MAR - 000 - 012	1
10	332722	OX High Pressure Flexible Hose	MAR - 000 - 013	4
11	332721	AC High Pressure Flexible Hose	MAR - 000 - 014	2
12	332605	Gas Outlet Station - Complete	MAR - 010 - 000	1
12a	332661	Workstation Oxygen w/o Bracket		
12b	332662	Workstation Acetylene w/o Bracket		
13	332723	OX Low Pressure Expansion Flexible Hose (Cylinder Battery Side)	MAR - 000 - 018	1
14	332724	AC Low Pressure Expansion Flexible Hose (Cylinder Battery Side)	MAR - 000 - 019	1
15	332726	OX Low Pressure Flexible Hose (Gas Outlet Station Side)	MAR - 000 - 020	1
16	332725	AC Low Pressure Flexible Hose (Gas Outlet Station Side)	MAR - 000 - 021	1
17	-	Gas Pressure Relief Pipes	SHIPYARD SUPPLY	1
18	-	Gas Distribution Pipelines	SHIPYARD SUPPLY	1
19	333172	Signs - Set For Gas Central	MAR - 000 - 015	1
20	333171	Signs - Set For Entrance Door	MAR - 000 - 016	1
21	333173	Signs - Set For Gas Outlet Station	MAR - 000 - 017	1

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## NITROGEN HIGH PRESSURE SUPPLY SYSTEM

The **MARIGASES NITROGEN HIGH PRESSURE SUPPLY SYSTEM** is used to compensate the loss of Nitrogen during the voyage and to ensure a safe position pressure of at least 0.07 bar in the cargo tanks (padding operation).

It is also used to provide the Nitrogen needed for the purging operation, when required.

Nitrogen is a colorless, odor and flavor free, non-toxic and almost totally inert gas.

Nitrogen padding is used to exclude Oxygen from the cargo tanks to prevent dangerous situations and maintain the quality of the cargo.

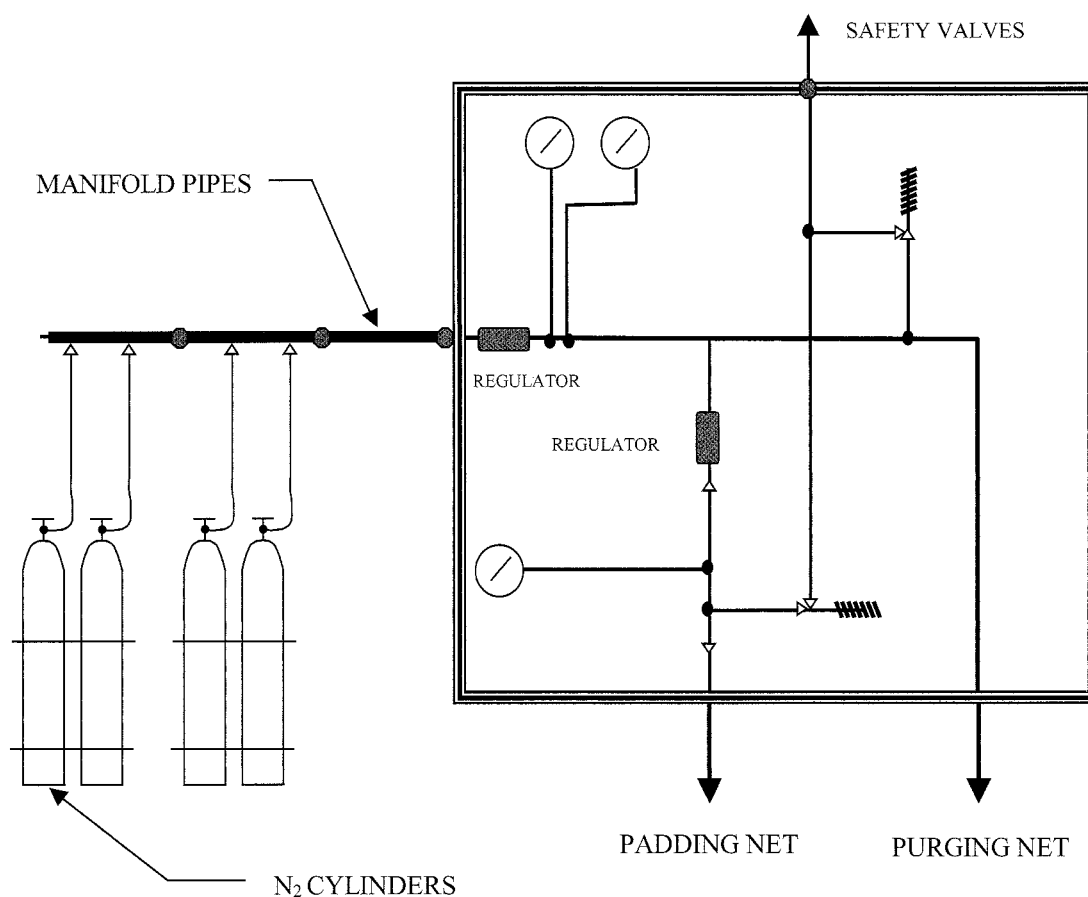
Another use of Nitrogen, is purging and draining pumps, cargo pipes and valves, air cooling systems etc.

The **MARIGASES NITROGEN HIGH PRESSURE SUPPLY SYSTEM** consists of manifold pipes, cylinder holders, cylinder hoses and a reducer cabinet.

The reducer cabinet is used for reducing the cylinder pressure to 5–10 bar, appropriate for distribution. It includes regulators with built in safety relief valves, inlet/outlet closing valves and two outlets, one for purging and one for padding.

Manifold pipes can be connected together in order to form a connector pipe.

Cylinders are connected to manifold pipes via non-return valves.



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**Division**  
**GASES**

**Section B**  
**GAS WELDING EQUIPMENT & ACCESSORIES**

**Part 1**  
**GAS WELDING & CUTTING EQUIPMENT**

**Part 2**  
**GAS WELDING & BRAZING CONSUMABLES**









## WELDING & CUTTING MAIN EQUIPMENT

### GAS WELDING & CUTTING KIT

The MARIGASES GAS WELDING AND CUTTING KIT is a high quality set containing all the tools and components required for gas welding, cutting and brazing on board. All components are designed with safety in mind. They guarantee top performance and reliability, under the toughest working conditions. Our heavy-duty torch provides maximum resistance against flashbacks and offers flexibility, as it can be used both for brazing and welding plates.

The MARIGASES GAS WELDING AND CUTTING KIT includes a cutting roller guide and a circular bar with center tap, for special cuts. It covers a welding range up to 30mm and a cutting range up to 100mm. The equipment is available as a complete set or as individual parts with additional available special accessories, covering practically all forms of welding, cutting, soldering and heating.

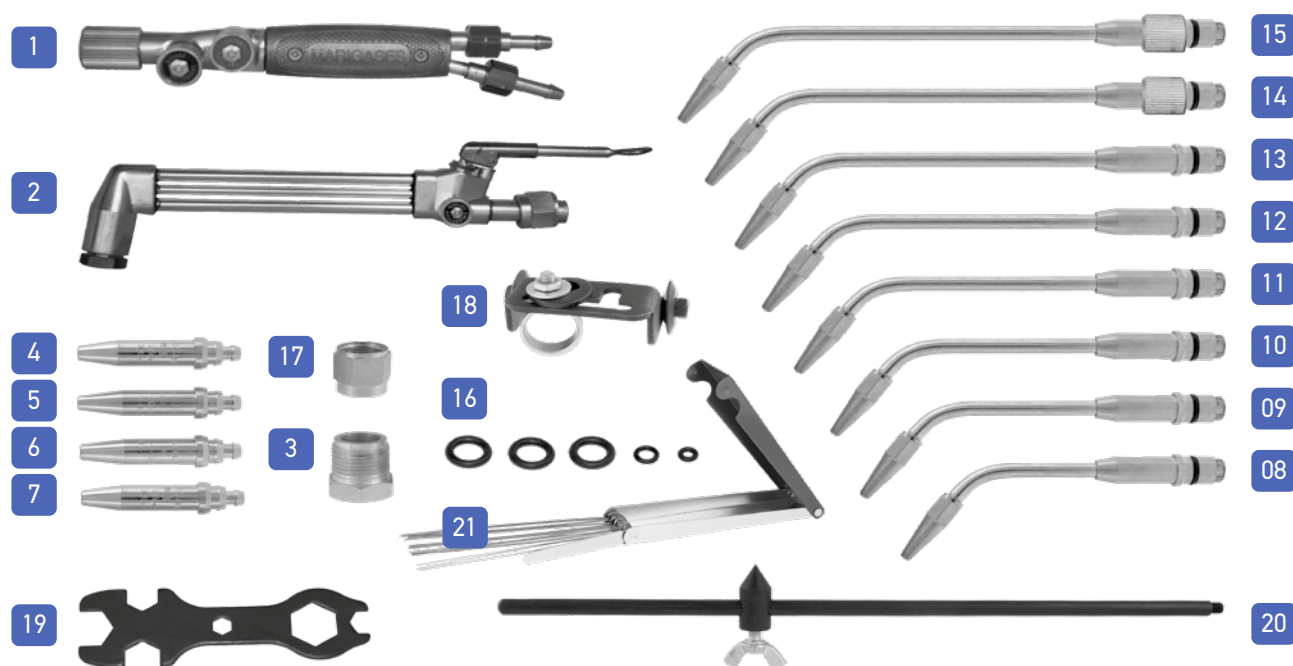
Dim. (mm): 470W x 21L x 9H

Weight (Kgs): 7.10



Order number: 332468





GAS WELDING & CUTTING KIT COMPONENTS		Order number
01	Welding Torch handle (complete with sockets & nuts 3/8")	332469
02	3 Tubes cutting attachment 90°C	332470
03	Nozzle retainer nut	332650
04	Cutting nozzle 3 – 10 mm	332479
05	Cutting nozzle 10 – 25 mm	332480
06	Cutting nozzle 25 – 50 mm	332481
07	Cutting nozzle 50 – 100 mm	332482
08	Welding attachment 0.5 – 1 mm (No 1)	332471
09	Welding attachment 1 – 2 mm (No 2)	332472
10	Welding attachment 2 – 4 mm (No 3)	332473
11	Welding attachment 4 – 6 mm (No 4)	332474
12	Welding attachment 6 – 9 mm (No 5)	332475
13	Welding attachment 9 – 14 mm (No 6)	332476
14	Welding attachment 14 – 20 mm (No 7)	332477
15	Welding attachment 20 – 30 mm (No 8)	332478
16	Spare O-ring set	332502
17	Welding attachment nut	332651
18	Cutting roller guide	332484
19	Spanner	332499
20	Cutting circular bar and centre	332483
21	Cleaning needles	332485
22	Protective metal case	

### WELDING TORCH HANDLE

Order number: 332469

Standard handle in forged brass, with aluminum grip. It guarantees high durability, solid construction and easy handling. This handle accommodates all welding, cutting and heating attachments, supplied by MARIGASES.

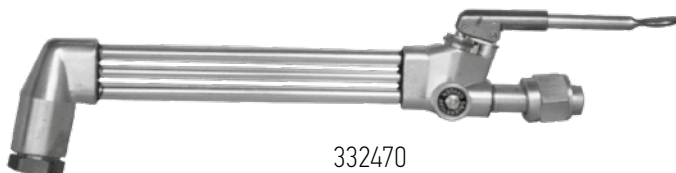


332469

### 3 TUBES CUTTING ATTACHMENT 90°

Order number: 332470

It includes lockable Oxygen lever and covers a cutting range up to 200mm.



332470

### NOZZLE RETAINER NUT

Order number: 332650

Spare nut for the 3 Tubes Cutting Attachment 90°



332650

### WELDING ATTACHMENT NUT

Order number: 332651

Spare nut for the Welding Torch Handle.



332651

### CUTTING NOZZLES

MARIGASES high performance cutting, mix type nozzles, for high cutting speed.

#### CUTTING NOZZLE 3–10mm

Order number: 332479

#### CUTTING NOZZLE 10–25mm

Order number: 332480

#### CUTTING NOZZLE 25–50mm

Order number: 332481

#### CUTTING NOZZLE 50–100mm

Order number: 332482



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## WELDING ATTACHMENTS

MARIGASES offers a wide range of 8 high quality welding attachments:

### WELDING ATTACHMENT 0.5 – 1mm

Order number: 332471

### WELDING ATTACHMENT 1 – 2mm

Order number: 332472

### WELDING ATTACHMENT 2 – 4mm

Order number: 332473

### WELDING ATTACHMENT 4 – 6mm

Order number: 332474

### WELDING ATTACHMENT 6 – 9mm

Order number: 332475

### WELDING ATTACHMENT 9 – 14mm

Order number: 332476

### WELDING ATTACHMENT 14 – 20mm

Order number: 332477

### WELDING ATTACHMENT 20 – 30mm

Order number: 332478

## SPARE O – RING SET

Order number: 332502

## CUTTING ROLLER GUIDE

Order number: 332484

A roller guide for accurate cutting lines.

## CUTTING CIRCULAR BAR AND CENTER

Order number: 332483

Circle cutting attachment with adjustable point for circle cuts from 80 up to 800mm diameter.

## SPANNER

Order number: 332499

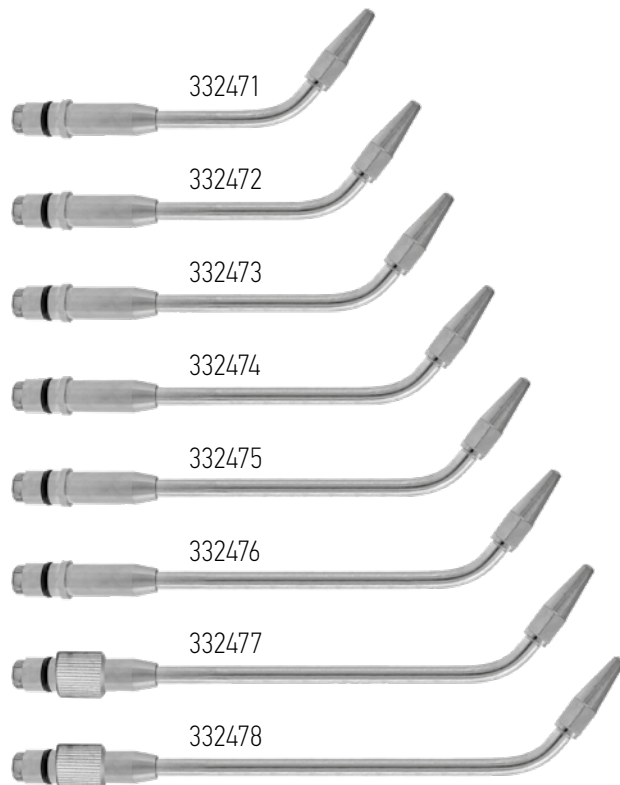
A useful tool for multi – purpose use.

## CLEANING NEEDLES

Order number: 332485

A practical set of nozzle cleaners for the welding and cutting kit, which cover a wide range of cutting nozzles and welding attachments.

A set of 5 spare O-rings for the gas welding and cutting kit.



## GAS WELDING & CUTTING PROCESS

Oxyacetylene welding (gas welding), is a process which relies on combustion of Oxygen and acetylene. The flame produced when mixed at correct proportion is of a temperature of about 3,200°C.

The chemical action of the oxyacetylene flame can be adjusted by changing the ratio of the volume of Oxygen to acetylene.

Three distinct flame settings are used, neutral (pic.1), oxidising (pic.2) and carburising (pic.3).

Welding is generally carried out using the neutral flame setting which has equal quantities of Oxygen and acetylene. The oxidising flame is obtained by increasing just the Oxygen flow rate while the carburising flame is achieved by increasing acetylene flow in relation to Oxygen flow.

Because steel melts at a temperature above 1,500°C, the mixture of Oxygen and acetylene is used as it is the only gas combination with enough heat to weld steel. However, other gases such as propane, hydrogen and coal gas can be used for joining lower melting point non-ferrous metals, and for brazing and silver soldering.

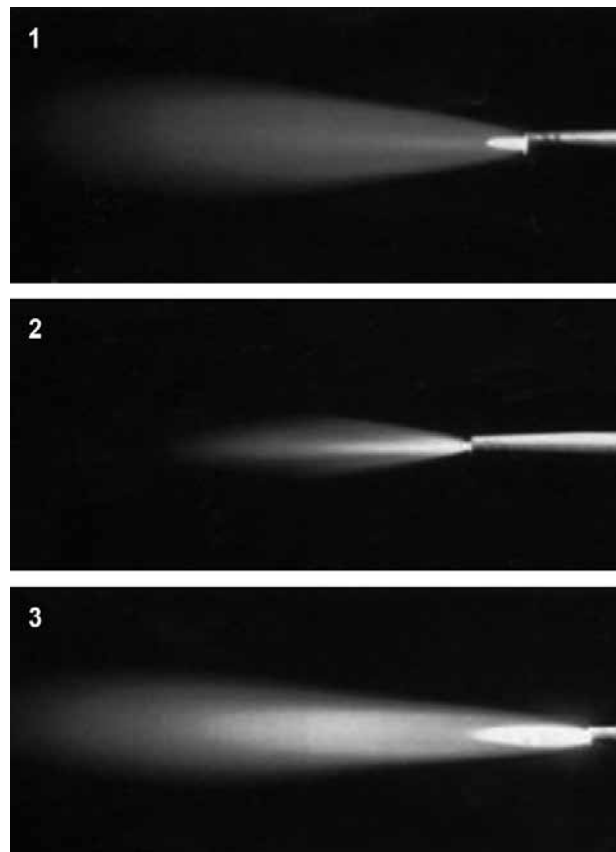
## EQUIPMENT

**Marigases Welding Torch Handle and 3 Tubes Cutting Attachment** is portable and easy to use. It comprises Oxygen and acetylene gases stored under pressure in gas cylinders. The cylinders are fitted with regulators and flexible hoses which lead to the Welding Torch Handle. Specially designed flashback arrestors are fitted between the hoses and the cylinder regulators. The flashback arrestor prevents flames generated by a 'flashback' from reaching the cylinders; principal causes of flashbacks are the failure to purge the hoses and overheating of the blowpipe nozzle.

**When welding, the operator must wear protective clothing and tinted coloured goggles. As the flame is less intense than an arc and very little UV is emitted, general purpose tinted goggles provide sufficient protection.**

## OPERATING CHARACTERISTICS

The action of the oxyacetylene flame on the surface of the material to be welded can be adjusted to produce a soft, harsh or violent reaction by varying the gas flows. There are of course practical limits as to the type of flame which can be used for welding. A harsh forceful flame will cause the molten weld pool to be blown



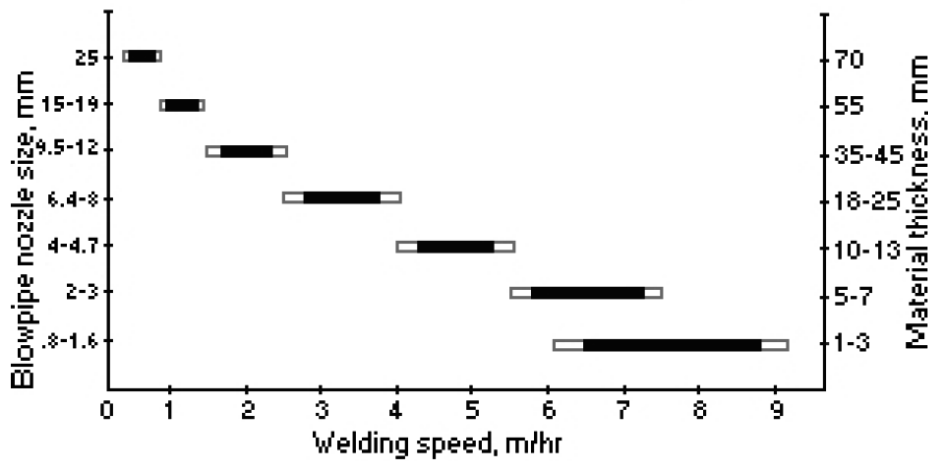
away, while too soft a flame will not be stable near the point of application. The blowpipe is therefore designed to accommodate different sizes of 'swan neck copper nozzle which allows the correct intensity of flame to be used. The relationship between material thickness, blowpipe nozzle size and welding speed, is shown in the chart.

When carrying out fusion welding the addition of filler metal in the form of a rod can be made when required.

The principal techniques employed in oxyacetylene welding are leftward, rightward and all-positional rightward. The former is used almost exclusively and is ideally suited for welding butt, fillet and lap joints in sheet thicknesses up to approximately 5mm. The rightward technique finds application on plate thicknesses above 5mm for welding in the flat and horizontal-vertical position.

The all-positional rightward method is a modification of the rightward technique and is ideally suited for welding steel plate and in particular pipework where positional welding, (vertical and overhead) has to be carried out.





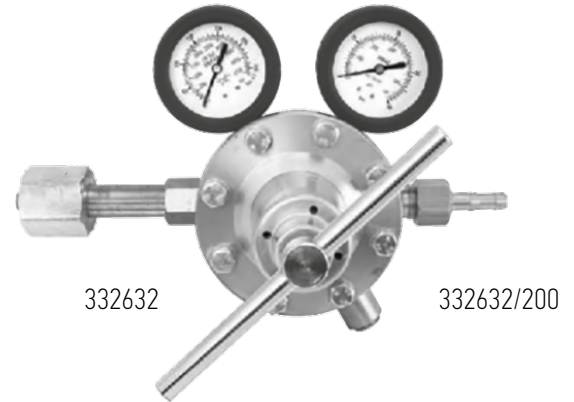
The rightward and all - positional rightward techniques enable the welder to obtain a uniform penetration bead with added control over the molten weldpool and weld metal. Moreover, the welder has a clear view of the weldpool and can work in complete freedom of movement.

These techniques are very highly skilled and are less frequently used than the conventional leftward technique.

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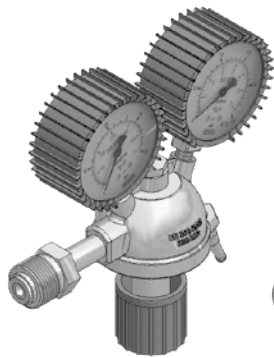
**REGULATORS FOR GAS CYLINDERS**

**MARIGASES PRESSURE REGULATORS** include pressure and contents gauges and/or flowmeters, integrated safety valve and shut-off valve. They are made of forged brass and are of a very solid construction. They ensure stable working pressure without any follow up adjustment. They are easy to use, with large, comfortable adjustment knobs and are suitable for all compressed gases and gas mixtures. **MARIGASES CYLINDER REGULATORS** are designed for maximum reliability and safety of use.

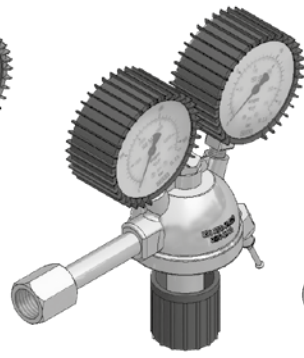


332632

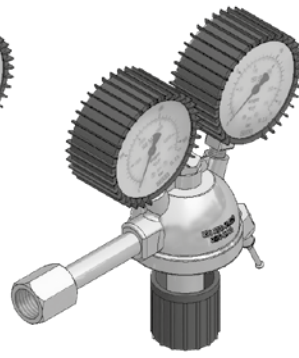
332632/200



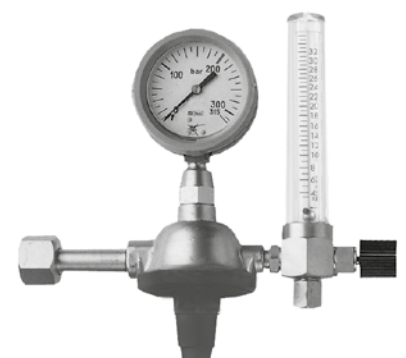
332486



332487



332640



332645

332646

PRODUCT	PRESSURE/FLOW ADJUSTMENT RANGES		Order number
	WORKING	CONTENT	
Regulator for acetylene cylinder	0–2.5 bar	0–40 bar	332486
Regulator for Oxygen cylinder	0–16 bar	0–315 bar	332487
Regulator for Argon / Nitrogen cylinder	0–16 bar	0–315 bar	332640
Regulator for Argon / Nitrogen cylinder with flowmeter 16	0–16 L/min	0–315 bar	332645
Regulator for Argon/ Nitrogen cylinder with flowmeter 32	0–32 L/min	0–315 bar	332646
Regulator HD for Nitrogen 0-40 bar	0-40 bar	0-315 bar	332632
Regulator HD for Nitrogen 0 -200 bar	0-200 bar	0-315 bar	332632/200

**Precautions**

Fat, oil or grease should not be used on Oxygen regulators (see also precautions for Oxygen).



**WASHER FOR ACETYLENE REGULATOR – SET OF 10PCS**

Order number: 332751

**WASHER FOR OXYGEN REGULATOR – SET OF 10PCS**

Order number: 332752

**CONTENT AND WORKING GAUGES**

MARIGASES offers a wide range of spare content and working gauges for Acetylene and Oxygen regulators:

**CONTENT GAUGE FOR ACETYLENE  
(0–40 bar)**

Order number: 332490

**WORKING GAUGE FOR ACETYLENE  
(0–2.5 bar)**

Order number: 332491

**CONTENT GAUGE FOR OXYGEN  
(0–315 bar)**

Order number: 332492

**WORKING GAUGE FOR OXYGEN  
(0–16 bar)**

Order number: 332493



332490



332491



332492



332493

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### FLASHBACK ARRESTORS

FLASHBACK ARRESTORS are safety, flame arresting devices, used to protect both line regulators of central gas supply systems and pressure regulators of single cylinders. Normally, flames resulting from flashback will stop in the torch. However, in case of wrong manipulation, incorrect maintenance or use of gas welding equipment, the gas flames may pass back through the hoses and even reach the cylinder. **MARIGASES FLASHBACK ARRESTORS** ensure maximum safety as they are manufactured in conformity with EN 730, AS 4603, along with certifications from BAM, DVGW. **MARIGASES FLASHBACK ARRESTORS** incorporate several safety functions:

- ▶ Gas non-return valve, to prevent reverse flow of gases.
- ▶ Flame arrester, to quench the flame of a flashback.
- ▶ Temperature sensitive cut-off valve, to prevent further gas supply in case of fire.



#### FLASHBACK ARRESTOR FOR OXYGEN CYLINDER

Order number: 332488



#### FLASHBACK ARRESTOR FOR ACETYLENE CYLINDER

Order number: 332489

GAS TYPE	PRESSURE P max. bar	FLOW RATE V max. m <sup>3</sup> /h	CONNECTOR	
			INLET (FEMALE)	OUTLET (MALE)
Oxygen	15	140	3/8"	3/8"
Nitrogen				
Argon				
Acetylene	1.5	16	3/8" L	3/8" L

#### MARIGASES FLASHBACK ARRESTORS offer maximum safety:

##### 1. Security against the reverse flow of gas

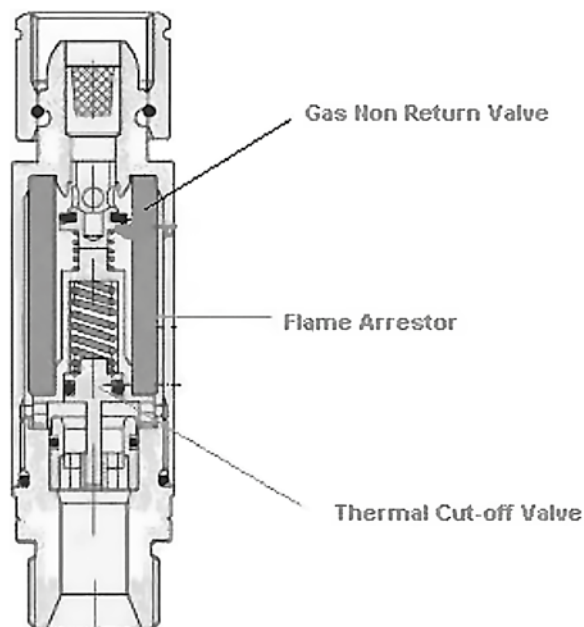
The gas non-return valve prevents leakage or the sudden return of air or Oxygen in the distribution line or single cylinders.

##### 2. Stops Flashbacks

A sintered stainless steel flame arrester prevents flashback from the gas outlet side and cools the flame down to below the ignition temperature, so that the gas cannot re-ignite on the inlet side.

##### 3. Prevent Burn-backs

The temperature regulated thermal cut-off valve is held in the open position by a soldered element. In the case of excessive temperatures in the safety device due to flashbacks or burn-backs, the valve closes automatically and cuts off the gas flow and stops burn-back.



There are also available the following flashback arrestors:

**FLASHBACK ARRESTOR for OXYGEN HOSE**

Order number: 332568

**FLASHBACK ARRESTOR for ACETYLENE HOSE**

Order number: 332569

**FLASHBACK ARRESTOR ON HANDLE 3/8" L**

Order number: 332588

**FLASHBACK ARRESTOR ON HANDLE 1/4" R**

Order number: 332589



**CYLINDER TOP VALVES**

All type of spare top valves for the cylinders are available with MARIGASES:

**TOP VALVE for ACETYLENE**

Order number: 332465

**TOP VALVE for OXYGEN**

Order number: 332466

**TOP VALVE for NITROGEN, ARGON**

Order number: 332464

**TOP VALVE for REFRIGERANTS**

Order number: 332463



**VALVE PROTECTION CAP**

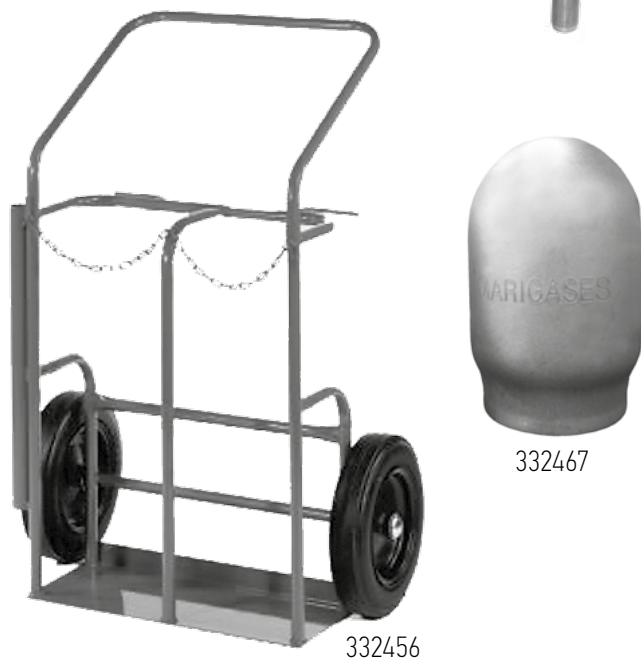
Order number: 332467

Fits all MARIGASES cylinders.

**CYLINDER TROLLEY FOR OX/AC**

Order number: 332456

Light weight trolley for easy on board carriage of 2x40ltr cylinders (OX/AC).



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## MARIGASES HOSES AND FITTINGS

### HOSES

**MARIGASES HOSES** are designed for maximum safety and durability. They are manufactured in conformity with EN 559 standards. Smooth cover hoses, which are highly resistant to kinks and abrasion. Excellent to use with all gases and gas mixtures. Twin hoses correspond to a red hose for acetylene and a blue one for Oxygen flow. These two hoses are bonded together.

#### OXYGEN HOSE 1/4" (6.30mm) BLUE

Order number: 332495

#### ACETYLENE HOSE 1/4" (6.30mm) RED

Order number: 332496

#### OXYGEN HOSE 5/16" (7.90mm) BLUE

Order number: 332598

#### ACETYLENE HOSE 5/16" (7.90mm) RED

Order number: 332600

#### TWIN HOSE 1/4" (6.30mm) RED/BLUE

Order number: 332494

#### TWIN HOSE 5/16" (7.90mm) RED/BLUE

Order number: 332597

### JOINTS FOR GAS HOSES

Screw couplings are supplied in sets. Each set is complete with two hose sockets, nuts (for connection to gas regulator), torch and a connection stub. Nuts and stubs for acetylene are marked with a groove and their threads are left-handed in order to avoid incorrect use.

#### OXYGEN HOSE JOINT 1/4" (6.30mm) R

Order number: 332500

#### ACETYLENE HOSE JOINT 1/4" (6.30mm) L

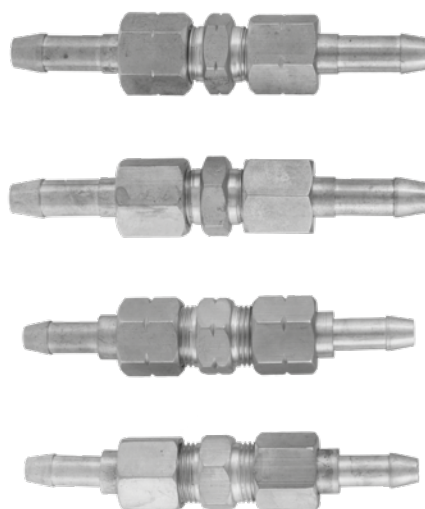
Order number: 332501

#### OXYGEN HOSE JOINT 3/8" (9.50mm) R

Order number: 332560

#### ACETYLENE HOSE JOINT 3/8" (9.50mm) L

Order number: 332561



**QUICK COUPLINGS**

MARIGASES QUICK COUPLINGS are designed for quick connection of the hoses with cylinder regulators and outlet stations.

They ensure maximum safety, without gas leakage and fit easily by using man-hand power only. There are different types of quick couplings for each gas

(Oxygen, Acetylene), so as to be impossible to use it with a wrong gas. Additional safety is provided, as quick couplings automatically shut-off gas flow, when the side towards the regulator is disconnected.

There are the following types of quick couplings:

**For connecting on the pressure regulator**

**QUICK COUPLING FOR OX REGULATOR**

Order number: 332585

**QUICK COUPLING FOR AC REGULATOR**

Order number: 332586



**For connecting hoses**

**QUICK COUPLING FOR OX HOSE**

Order number: 332581

**QUICK COUPLING FOR AC HOSE**

Order number: 332582



**For connection on the torch handle**

**QUICK COUPLING FOR OX TORCH**

Order number: 332583

**QUICK COUPLING FOR AC TORCH**

Order number: 332584



**EAR CLAMPS FOR 1/4" HOSE**

Order number: 332976

**EAR CLAMPS FOR 3/8" HOSE**

Order number: 332976-1

**PINCER TOOL (FOR EAR CLAMPS)**

Order number: 332977



332976 & 332976-1

332977

**CLIPS for WELDING HOSES 1/4"-3/8" (10pcs/set)**

Order number: 363895

**T-BOLT H.D CLAMPS FOR GAS WELDING HOSES 1/4"-3/8"**

Order number: 332973



363895



332973

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### WELDING GOGGLES 50mm FLIP FRONT

Order number: 332562

**MARIGASES** heavy-duty protective glasses with flip up frame. They are soft and comfortable, with ventilation slots to prevent glasses from fogging. These goggles are designed for full protection against sparks and spatter. Complete with two pairs of lenses, a plain and a colored one.



### WELDING GOGGLES 50mm SOFT FRAME

Order number: 332503

This is **MARIGASES** light version of welding goggles with one pair of lenses. They are available with plain or dark pair of glasses. Moreover, they are efficiently operational due to anti fog design.



### COVER LENS 50mm – DARK

Order number: 332504

Two spare colored lenses, that can be used with both welding goggles flip front and welding goggles soft frame.



### COVER LENS 50mm – CLEAR

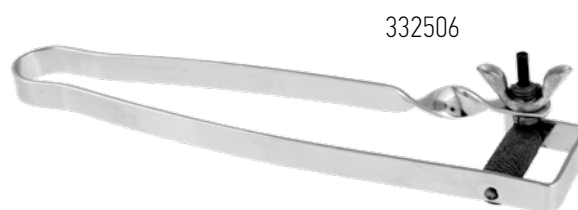
Order number: 332505

A plain, high visibility spare lens that can be used with both welding goggles flip front and welding goggles soft frame.

### GAS LIGHTER

Order number: 332506

**MARIGASES** lighter is easy to use, light, with large sparks that guarantee one touch ignition.



### SPARE FLINTS SET OF 10 pcs

Order number: 332507

A set of 10 spare high quality flints, to use with gas lighters.

### WELDER'S CHALK (144pcs/box)

Order number: 332621

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**GAS WELDING CABINET**

**GAS WELDING CABINET** is a complete store for all necessary **MARIGASES** rods, fluxes, equipment & accessories required for gas welding & cutting on board. Convenient design, easy to use, made of galvanized steel plates. It is suitable for new shipbuildings, but can be adapted into existing vessels as well. Additionally, **MARIGASES** offers specific enquiries or specialized design requirements. Consult our service engineers or sales representatives for details. Each Full Cabinet consists of the following:

**GAS WELDING CABINET**

Order Numbers: 333053 ( full ), 333054 ( empty )



Complete Gas Welding & Cutting Kit in metal case

- Torch handle (complete with sockets & nuts 3/8")
- 3 Tubes cutting attachment 90°
- Nozzle retainer nut
- Welding attachment nut
- Cutting nozzles – complete set: 3–10mm, 10–25mm 25–50mm & 50–100mm steel thickness
- Welding attachment No 1 / 0.5 – 1mm
- Welding attachment No 2 / 1 – 2mm
- Welding attachment No 3 / 2 – 4mm
- Welding attachment No 4 / 4 – 6mm
- Welding attachment No 5 / 6 – 9mm
- Welding attachment No 6 / 9 – 14mm
- Welding attachment No 7 / 14 – 20mm
- Welding attachment No 8 / 20 – 30mm
- Cutting roller guide
- Cutting circular bar & center
- Cleaning needles
- Spanner
- Spare O–ring set

GAS WELDING EQUIPMENT & ACCESSORIES INCLUDED IN THE CABINET	QUANT
Welding goggles 50mm flip – front	1 PC
Cover Lens 50mm – DARK	10 PC
Gas Lighter	1 PC
Spare Flints – set of 10 pcs	1 SET
Wire Brush	1 PC
Welding Gloves	1 PAIR
AC Quick Coupling for torch With automatic gas flow cut off	1 PC
OX Quick Coupling for torch With automatic gas flow cut off	1 PC
AC Quick Coupling for hose With automatic gas flow cut off	1 PC
OX Quick Coupling for hose With automatic gas flow cut off	1 PC
Hose Clamps	10 PC

WELDING RODS INCLUDED IN THE CABINET	QUANT
MS Rod 2.0 x 500mm	2 KG
MS Rod 3.0 x 500mm	2 KG
Bronze Alloy Rod 2.0 x 500mm	2 KG
Bronze Alloy Rod 2.0 x 500mm	2 KG
Bronze FC Rod 2.0 x 500mm	4 KG
Bronze FC Rod 3.0 x 500mm	3 KG
Wear–Bronze FC Rod 3.0 x 500mm	1 KG
Bronze Brazing Powder – 250gr	1 JAR
S45 Silver Alloy Rod 2.0 x 500mm	0.5 KG
S60 Silver Alloy Rod 2.0 x 500mm	0.5 KG
Silver Brazing Powder for S60 & S45 Rods – 250gr	1 JAR
Aluminum Brazing Rods 3.2 x 500mm	0.5 KG
Aluminum Powder – 250gr	1 JAR
Dimensions: 600 x 600 x 400 mm	

# MARIGASES

**Division**  
GASES

**Section B**  
GAS WELDING EQUIPMENT & ACCESSORIES

**Part 1**  
GAS WELDING & CUTTING EQUIPMENT

**Part 2**  
GAS WELDING & BRAZING CONSUMABLES









## RODS AND FLUXES

Each type of **MARIGASES RODS** is carefully selected for specific gas welding and brazing jobs. Our range covers all applications that may occur on board. **MARIGASES RODS** are packaged in practical sealed containers, which assure factory freshness. On each container there is a label with full details about the use and the product. Moreover, where appropriate flux

coated rods can be used in order to ensure best welding properties and performance. In addition, a range of fluxes is available, each one assigned to exactly match the characteristics of specific rods. For better results it is recommended to remove any residual flux after finishing work, as most fluxes are corrosive.

## MARIGASES RODS

METAL APPLICATION	ROD TYPE	DIAMETER x LENGTH (mm)	DESCRIPTION	ORDER NUMBER
MILD STEEL	MS ROD [MILD STEEL]	2.0 x 1000	Appropriate for unalloyed steels with carbon content less than 20%. Suitable for iron copper coated and TIG welding. No flux is required.	332524
		3.0 x 1000		332525
ALUMINUM	ALUMINUM [ALUMINUM SILICON]	3.2 x 500	MARIGASES A rod, is an aluminum silicon alloy designed for brazing cast aluminum and forging alloys. It should be used with MARIGASES Aluminum Brazing Powder.	332526
STEEL	BRONZE ALLOY	2.0 x 500	Appropriate for cast iron, steel, copper, brass, bronze and malleable castings. Moreover, it can be used for welding different metals and for overlaying surfaces etc. It should be used with MARIGASES Bronze Brazing Powder.	332591
		3.0 x 500		332571
COPPER ALLOYS	BRONZE FLUX COATED	2.0 x 500	High tensile strength flux-coated bronze rod for welding copper, brass, bronze, cast iron and steels. It is also appropriate for galvanized steel and can be used for overlaying surfaces. If additional flux is required, MARIGASES Bronze Brazing Powder should be used.	332529
IRON		3.0 x 500		332530
	WEARBRO FC ROD	3.0 x 500	MARIGASES WEARBRO is a fluxcoated bronze rod (blue-colored) with low bonding temperature and high tensile strength for joining and overlaying copper, brass, bronze, cast iron and steels. It should be used with MARIGASES Wearbro Brazing Powder	332759
COPPER ALLOYS	S 60 SILVER ALLOY	2.0 x 500	MARIGASES S 60 is a cadmium-free high silver alloy. It may be used for brazing copper and stainless steel even if the joint is in direct contact with drinking water, food products etc. It provides similar color with stainless steel, high corrosion resistance and tensile strength. It should be used with MARIGASES Silver Brazing Powder.	332527
STAINLES STEEL				
OTHER STEELS	S 45 SILVER ALLOY	2.0 x 500	MARIGASES S 45 is a cadmium-free medium silver alloy. It may be used for capillary brazing of all types of steel, copper and nickel alloys etc. It should be used with MARIGASES Silver Brazing Powder.	332528



## MARIGASES FLUXES

ROD APPLICATION	FLUX TYPE	WEIGHT (gr)	ORDER NUMBER
Aluminum	ALUMINUM BRAZING POWDER	250	332533
Bronze Alloy & Bronze Fluxcoated	BRONZE BRAZING POWDER	250	332532
S60 & S45 Silver Alloys	SILVER BRAZING POWDER	250	332531



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**Division**  
**GASES**

**Section C**

**ARC WELDING MACHINES, EQUIPMENT  
ACCESSORIES & CONSUMABLES**

**Part 1**

**ARC WELDING MACHINES**

**Part 2**

**ARC WELDING EQUIPMENT & ACCESSORIES**

**Part 3**

**ARC WELDING CONSUMABLES**





## MARIGASES 160

### DESCRIPTION

**MARIGASES 160** is the new Inverter Generator for light duty MMA welding, able to use basic electrodes up to 3.2mm.

Single phase, portable, in metal enclosure for increased protection, **MARIGASES 160** comes equipped with all necessary basic accessories:

- ▶ Electrode holder with 5mtr cable
- ▶ Ground clamp with 3mtr cable
- ▶ Protective Face shield
- ▶ Wire brush and chipping hammer

Its innovative technology and the special care in construction has allowed the weight and overall size to be reduced without affecting the reliability and performance that make this inverter generator being one of the top in its category.

### ADVANTAGES

The microprocessor of the machine automatically provides a hot start and an increase in the current at the time of short-circuiting between the electrode and the weld pool (arc force) makes the welding easier, smoother and of higher quality even with particularly difficult electrodes.

If the electrode continues to stick, the anti-sticking function will allow you to prevent damage to the electrode holder.



TECHNICAL DATA	Order number 332564/1
Main voltage	220-240V, 50-60Hz
Setting range	20-160 Amps
Maximum permissible current at	
60% duty cycle	160A
100% duty cycle	124A
Power factor at max. current	0.93
Open circuit voltage	62V
Dimensions (L x W x H)	410 x 160 x 150mm
Weight	8kgs
MARIGASES 160 conforms to standards EN60974-10: 2003, EN 55011: 2007, EN 61000-3-2: 2006, EN 61000-3-3: 1995+A1: 2001 + A2: 2005	

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## MARIGASES 180

### DESCRIPTION

**MARIGASES 180** is the new Inverter Generator for light duty MMA welding, able to use basic electrodes up to 3.2mm. Single phase, portable, in metal enclosure for increased protection, **MARIGASES 180** comes equipped with all necessary basic accessories:

- Electrode holder with 5mtr cable
- Ground clamp with 3mtr cable
- Protective Face shield
- Wire brush and chipping hammer

Its innovative technology and the special care in construction has allowed the weight and overall size to be reduced without affecting the reliability and performance that make this inverter generator being one of the top in its category.

### ADVANTAGES

The microprocessor of the machine automatically provides a hot start and an increase in the current at the time of short-circuiting between the electrode and the weld pool (arc force) makes the welding easier, smoother and of higher quality even with particularly difficult electrodes.

If the electrode continues to stick, the anti-sticking function will allow you to prevent damage to the electrode holder.



TECHNICAL DATA		Order number 332564/2	
Power voltage	V	AC110/220 ±15%	
Frequency	Hz	50/60	
Rated input current	A	37.4	38
No-load voltage	V	65	
Output current	A	30-100	30-180
Rated output voltage	V	24	27.7
Forge range	A	-	
Duty cycle	%	60	
No-load loss	W	40	
Efficiency	%	80	
Power factor		0.73	
Insulation grade		F	
Housing protection grade		IP21S	
Weight	kg	9	
Dimensions	mm	375x155x232	
MARIGASES 180 conforms to standards EN 61000-3-3: 1995 + A1: 2001 + A2: 2005			

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## MARIGASES MGI-32



### DESCRIPTION

**MARIGASES MGI-32** is a welding inverter, 3-phase 400-440V, 50-60Hz, highly suitable for MMA welding. It is easy to carry (9.0kg) and has a maximum output current of 320A. It has been built with hot start and anti-stick functions. This ensures easy strike and a controlled stable arc. Built for professional use, **MGI-32 welding inverter** is generator suited. All machine components are lacquered to protect them against environmental influences, such as dust and humidity. It comes with built-in features that help welding process like: hot-start and anti-sticking, making welding easier, smoother and of higher quality, even with particularly difficult electrodes, like cellulose ones in all positions. The system is equipped with powerful fans for continuous and sufficient cooling, thermal overload trips which operate if the internal temperature becomes too high and intergrated circuit breaker protection.

### APPLICATIONS

The processes and the areas that this welding machine can be used are listed in the table below:

Processes	Recommended areas of use
MMA	Shipbuilding, Machinery constructions

The recommended base metals are Structural steels, Cr-Ni steels and Duplex steels.

### ADVANTAGES

The welding current sources supply constant electrical current. They are built on **INVERTER** technology with high power and high reliability parts.

### SYSTEM DESCRIPTION

The main panel board consists of the current source board and the separate control logic board, both of which are individually replaceable. This system of configuration ensures a very high degree of reliability with simplified maintenance and customer service. The power electronics contains an **INVERTER** operating at a frequency higher than 50kHz with a very low resonance period.

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TECHNICAL DATA	Order number 333024
Main voltage	3x440V ±15%, 50-60Hz
Primary current	I <sub>max</sub> 18A at 440V 20A at 400V
Setting range	5A – 320A
Maximum permissible current at	
35% duty cycle	320A / 32.8V
60% duty cycle	280A / 30.4V
100% duty cycle	240A / 28V
Power factor at max. current	0.80
Efficiency at max. current	86%
Open circuit voltage	60-70V
Temperature range	-10 to +40 °C
Dimensions (L x W x H)	400 x 310 x 155 mm
Weight	9 kg



## MARIGASES ARC500i



### DESCRIPTION

MARIGASES ARC500i is a welding inverter, 3-phase 400-440V, 50-60Hz, highly suitable for MMA welding. Rotating wheels make it easy to carry and has a maximum output current of 500A. It has been built with hot start and anti-stick functions. This ensures easy strike and a controlled stable arc.

Built for professional use, ARC500i welding inverter is generator suited.

All machine components are lacquered to protect them against environmental conditions such as dust and humidity. It comes with built-in features that help welding process like: hot-start and anti-sticking, making welding easier, smoother and of higher quality, even with particularly difficult electrodes, like cellulose ones in all positions. The power source has thermal overload trips which operate if the internal temperature becomes too high.

### APPLICATIONS

Marigases ARC500i is a very durable and reliable inverter welding machine, that can be used for ship building and machinery constructions with amazing results.

### ADVANTAGES

The welding current sources supply constant electrical current. They are built on INVERTER technology with high power and high reliability parts and can be used for stick electrode.

### SYSTEM DESCRIPTION

The main panel board consists of the current source board and the separate control logic board, both of which are individually replaceable. This system of configuration ensures a very high degree of reliability with simplified maintenance and customer service. The power electronics contains an INVERTER operating at a frequency higher than 50kHz with a very low resonance period.



TECHNICAL DATA	Order number 333026
Power Voltage / Frequency	440V ± 15%, 50/60Hz
Rated Current Input (A)	38.4
No-Load voltage (V)	72
Output Current (A)	40-500
Rated Output voltage (V)	40
Force range (A)	0-100
Duty cycle (%)	100
No-Load loss (W)	150
Efficiency	85
Power factor	0.93
Insulation grade	F
Housing protection grade	IP21S
Weight (Kg)	40
Dimensions (mm)	760x313x437

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## MARIGASES MT-400



### DESCRIPTION

**MARIGASES MT-400** is a welding inverter, 3-phase 400-440V, 50-60Hz, highly suitable for MMA and TIG welding. It is easy to carry and has a maximum output current of 400A. It has been built with both adjustable hot start and arc force, as well as anti-stick functions. This ensures easy strike and a controlled stable arc. Built for professional use, **MT-400** welding inverter is generator suited. All machine components are lacquered to protect them against environmental influences, such as dust and humidity. It comes with built-in features that help welding process like: hot-start and anti-sticking, making welding easier, smoother and of higher quality, even with particularly difficult electrodes and dissimilar metals. The power source has thermal overload trips which operate if the internal temperature becomes too high.



### APPLICATIONS

The processes and the areas that this welding machine can be used are listed in the table below:

Processes	Recommended areas of use
MMA	Shipbuilding. Machinery constructions
TIG-(Lift arc)	Plant construction. Maintenance & repair. Rolling-stock construction

### ADVANTAGES

The welding current sources supply constant electrical current. They are built on INVERTER technology with high power and high reliability parts. It can be used for stick electrode as well as for TIG (LIFT-ARC) welding..

### SYSTEM DESCRIPTION

The main panel board consists of the current source board and the separate control logic board, both of which are individually replaceable. This system of configuration ensures a very high degree of reliability with simplified maintenance and customer service. The power electronics contains an INVERTER operating at a frequency higher than 50kHz with a very low resonance period.

### TECHNICAL DATA

Order number 333027

Main voltage	3 Phases 380/440V $\pm$ 15%, 50-60Hz
Rating Input Current	28A
Setting range	20 - 400A
Nominal Input Capacity	18.2KVA
Duty Cycle	
60% duty cycle	400A
100% duty cycle	310A
Power factor	0.93
Efficiency	85%
Open circuit voltage	65V
Temperature range	-10 to +40 °C
Arc Force Adjustment (A)	0-100A
Hot Start Adjustment (A)	0-200A
Insulation Class	F
Protection Class	IP21S-IP23
Weight	19 kg
Dimensions (L x W x H)	618x330x441 mm

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**Division**  
GASES

**Section C**  
ARC WELDING MACHINES, EQUIPMENT  
ACCESSORIES & CONSUMABLES

**Part 1**  
ARC WELDING MACHINES

**Part 2**  
ARC WELDING EQUIPMENT & ACCESSORIES

**Part 3**  
ARC WELDING CONSUMABLES







## WELDING CABLE

MARIGASES WELDING CABLE is black neoprene sheathed cable, with high flexibility and copper conductor. Highly resistant to oil, water, flame and abrasion. It is available in cross section areas 50 and 70mm<sup>2</sup>.

### WELDING CABLE 50mm<sup>2</sup> (400A)

Order number: 332566

### WELDING CABLE 70mm<sup>2</sup> (500A)

Order number: 332567

## ARC WELDING ACCESSORIES



## CABLE CONNECTORS

MARIGASES CABLE CONNECTORS ensure good electrical conductivity and are suitable for use with either copper or aluminium cable, providing a quick, water-tight fitting of cables on sight. Two methods of cable fixing are available, either by grub screws and copper ferrule or by a gland pressure nut retaining the cable against a machined cone.

### CABLE CONNECTOR MALE 35–50mm<sup>2</sup>

Order number: 332511

### CABLE CONNECTOR FEMALE 35–50mm<sup>2</sup>

Order number: 332512

### CABLE CONNECTOR MALE 50–70mm<sup>2</sup>

Order number: 332513

### CABLE CONNECTOR FEMALE 50–70mm<sup>2</sup>

Order number: 332514

Special safety connectors are also available. They are recommended for use under the toughest conditions.

Capacity: 500A

Cable size: up to 70mm<sup>2</sup>

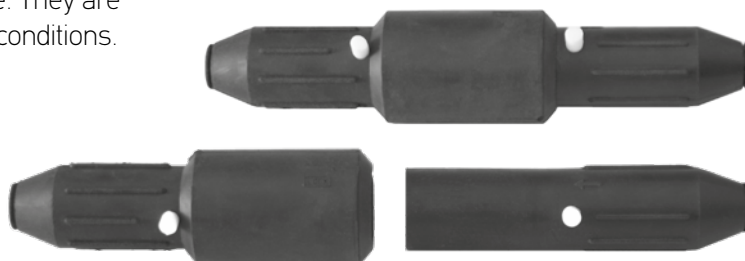
### SAFETY CABLE CONNECTORS MALE/FEMALE

Order number: 332630



332511

332512



332630

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## ELECTRODE HOLDERS & GROUND CLAMPS

**MARIGASES ELECTRODE HOLDERS** have a 'D' section, knurled handle providing a firm grip and good balance. Designed to withstand heat, with shielded spring to prevent damage from spatter and fixing by means of a bolt.

### ELECTRODE HOLDER 400A

Order number: 332515

### ELECTRODE HOLDER 600A

Order number: 332559

### ELECTRODE HOLDER – SAFETY TYPE

Order number: 332636

### GROUND CLAMP

Order number: 332648



332515  
332559



332636



332648

## FACE SHIELDS

**MARIGASES** offers two types of **FACE SHIELDS**, for full protection of the welder. Both of them are made of a light, quality resistant plastic material. The shield with adjustable headband is a full-face protection accessory, appropriate for all welding jobs. The face shield with handle, guarantees full protection of the hand holding it. Both shields are equipped with two high quality glasses, a plain and a colored one. All the glasses comply with the DIN standard.

### FACE SHIELD WITH HANDLE

Order number: 332517

### FACE SHIELD WITH ADJUSTABLE HEAD BAND

Order number: 332516

### FACE SHIELD AUTOVISION TYPE 90 x 110

Order number: 332647



332517



332516

## SPARE LENSES

**MARIGASES** offers plain and colored spare lenses, manufactured according to DIN standards, for high visibility and protection. They come in 90x110 mm, with darkness adjustment from 9 - 13 DIN.

### SPARE LENS 90 x 110mm – DARK

Order number: 332520

### SPARE LENS 90 x 110mm – CLEAR

Order number: 332521



332647

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## PROTECTIVE CLOTHING

**MARIGASES PROTECTIVE CLOTHING** is made from specially treated soft leather to ensure maximum safety and comfort. They provide full protection against heat, falling sparks and slag, under the toughest conditions.

### WELDING GLOVES – LEATHER

Order number: 332518

### WELDING APRON – LEATHER

Order number: 332519

### SPATS (LEGGING) LEATHER

Order number: 332570

### WELDER'S PROTECTIVE SLEEVES

Order number: 332712

### WELDING CURTAIN WITH HOOKS 1.4 X 2 MTR

Order number: 332668

332518



332712



332570

332519

## WIRE BRUSH

Order number: 332522

Ideal for cleaning before welding and also de-sludging.



332522

## CHIPPING HAMMER

Order number: 332523

All steel with spring taper handle, hard forged head and bright plated finish.



332523

## HEATED ELECTRODE QUIVERS

Order number: 332711

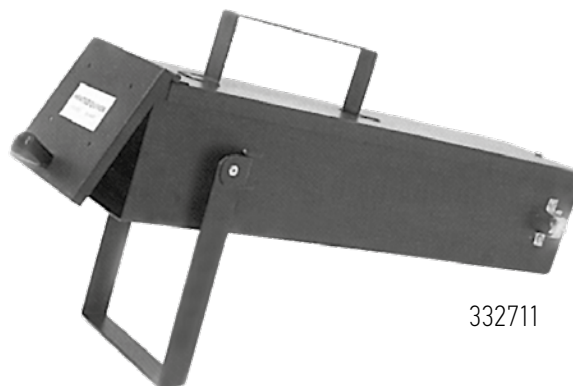
For storage of electrode in dry heated environment until the moment of use. Two models are available, 110V or 240V both operating from either an A.C. or D.C. supply and are complete with power supply lead and plug.

**Capacity:** 7.3kg (20lbs) weight of electrodes

**Max. electrode length:** 450mm

**Temp. Range:** 110°C operating at 110V

**Rating:** 150W



332711

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## TIG WELDING EQUIPMENT PARTS & CONSUMABLES

High quality TIG TORCHES suitable for every type of ARC WELDING MACHINES are offered. Also, parts and TIG electrodes for the TORCHES are available, in order to satisfy the necessities of TIG WELDING.

### CERAMIC GAS NOZZLE, 47mm – short

order number: 332921

### ELECTRODE HOLDER MOUNT Ø 1.6mm

order number: 332932

### ELECTRODE HOLDER MOUNT Ø 2.4mm

order number: 332933

### ELECTRODE HOLDER MOUNT Ø 3.2mm

order number: 332934

### ELECTRODE HOLDER Ø 1.6mm

order number: 332942

### ELECTRODE HOLDER Ø 2.4mm

order number: 332943

### ELECTRODE HOLDER Ø 3.2mm

order number: 332944

### WOLFRAM ELECTRODE Ø 1.6mm

order number: 332952

### WOLFRAM ELECTRODE Ø 2.4mm

order number: 332953

### WOLFRAM ELECTRODE Ø 3.2mm

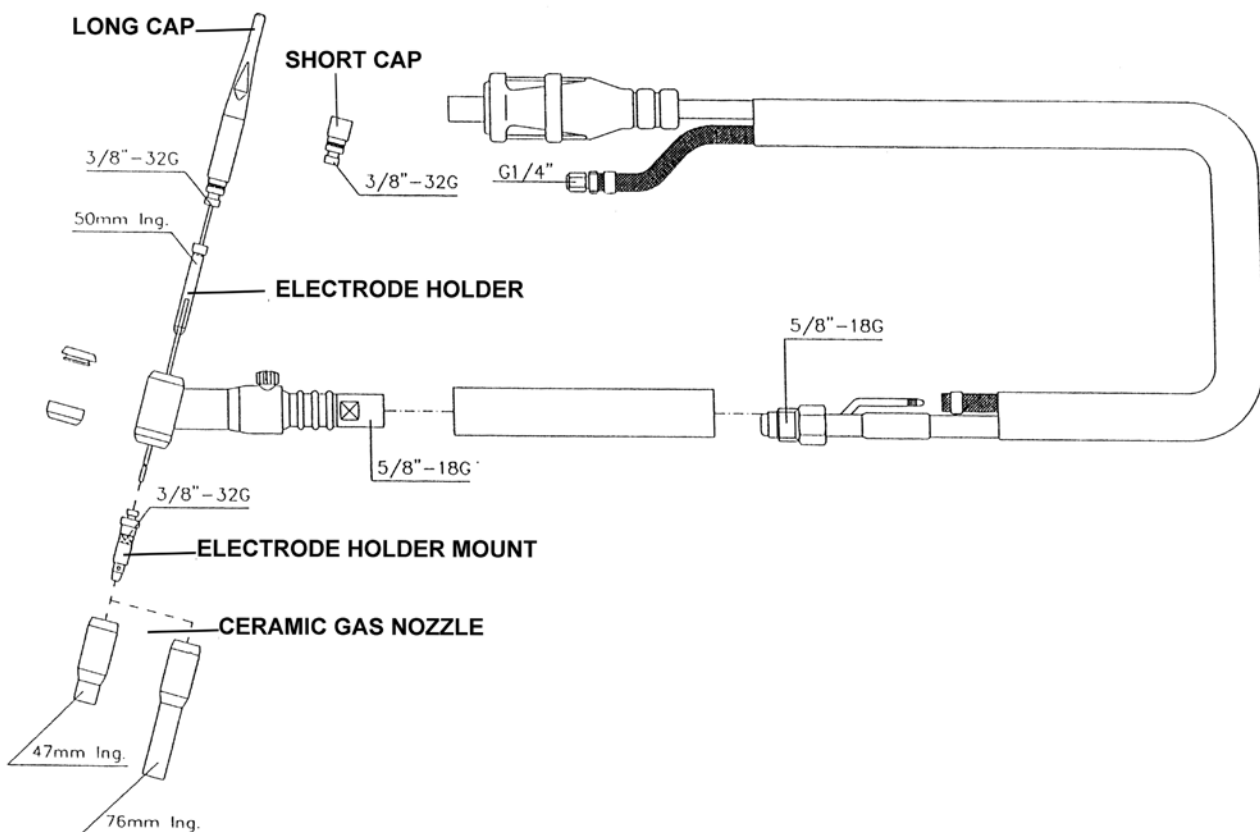
order number: 332954

### LONG CAP

order number: 332926

### SHORT CAP

order number: 332927



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## ARC WELDING CABINET

ARC WELDING CABINET is a complete store for all popular types and diameters of MARIGASES arc welding electrodes (MGPO, MGPR, MLH, MLV, MTENSILE, MSS 18/8, MNiFe, MNICKEL). It is suitable for new shipbuildings but can be adapted into existing vessels as well.

Additionally, MARIGASES offers specific enquiries or specialized design requirements. Consult our service engineers for details.

Dimensions: 600mm x 600mm x 400mm

Order Number: 333051 – Full

Order Number: 333052 – Empty



Each Cabinet includes the following electrodes:

TYPE	DIAMETER (mm)	BOXES	KG / BOX
MGPO	2.6	2	5
MGPO	3.2	2	5
MGPO	4.0	2	5
MSPECIAL	3.2	2	5
MDUPLEX	3.2	2	2
MLH	2.6	1	5
MLH	4.0	1	5
MLHV	3.2	1	5
MLHV	4.0	1	5
MTENSILE	3.2	1	5
MSS 18/8	2.6	1	5
MSS 18/8	3.2	1	5
MNiFe	3.2	1	2
MNICKEL	3.2	1	2

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# MARIGASES

Division  
GASES

Section C

ARC WELDING MACHINES, EQUIPMENT  
ACCESSORIES & CONSUMABLES

Part 1

ARC WELDING MACHINES

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ARC WELDING CONSUMABLES

**ELECTRODES**







AWS E 6013  
 DIN E 43 21 R 3  
 EN E 35 A R 12

## ► MGPO

For welding of steel sheets and light structures

### Applications

Welding of steel sheet structures in ships, railway vehicles and cars.

### Characteristics

MGPO is a medium coated rutil electrode which provides good usability in all positions, including vertical downward welding. The arc is stable with little spatter and the lustrous bead can be obtained. MGPO is suitable for welding steel sheets and light structures because of shallow penetration.

### Notes on usage

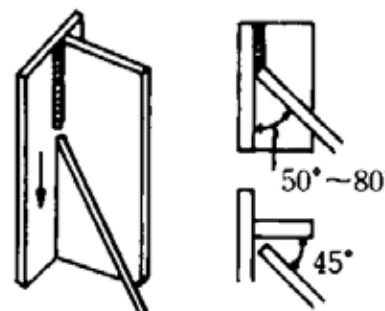
1. In the case of vertical downward welding, manipulate the electrode keeping its tip in contact with mother plate as shown in the sketch.
2. Pay attention not to exceed the range of proper currents. Welding with excessive current not only lowers X-ray soundness, but also causes increase of spatter, undercut and insufficient slag covering.
3. Dry the electrodes at 70–100°C for 30–60 minutes before use. Excessive moisture absorption lowers usability and may result in some porosity.

### Typical chemical composition of weld metal (%)

C	Mn	Si	P	S
0.075	0.6	0.5	<0.025	>0.025

### Typical mechanical properties of weld metal

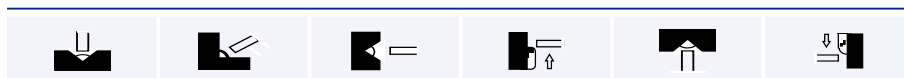
YP N/mm <sup>2</sup>	TS N/mm <sup>2</sup>	EL %
7355	440–570	>22



### Size & recommended current range: ( ~ = - )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MGPO	332537	2.5	350	60–90
	332538	3.25	350	90–140
	332539	4.0	350	120–180

### Welding positions



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AWS E 7024  
DIN E 51 22 RR 11 160  
EN E 38 0 RR 53

## ► MHOP

For highly efficient fillet welding

### Applications

Horizontal and flat fillet welding of ship buildings, bridges, structural steels of buildings, general structures and a surface dressing of multi-layer welds.

### Characteristics

MHOP is a high efficiency rutile-iron powder high titania type electrode which is designed for the purpose of obtaining high efficiency in single pass horizontal and flat welding. It has excellent arc re-striking property and slag is almost selflifting. The head appearance is lustrous. In case of manual welding the applicable speed ratio is wide from 0.8 to 1.6. As its deposition efficiency and deposition rate are high, extremely high working efficiency can be obtained.

### Notes on usage

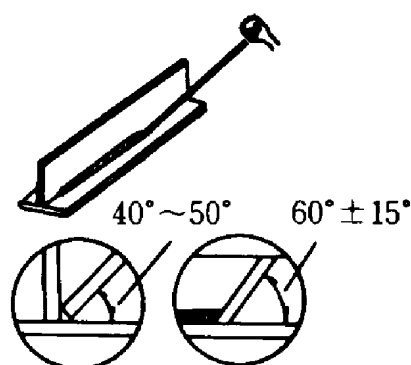
1. In the case of horizontal fillet welding, manipulate the electrode keeping its tip in contact with the mother plate as shown in the sketch.
2. In the case of horizontal fillet welding, keep the optimum speed ratio among 1.0–1.5.
3. Dry the electrodes at 70–100°C for 30–60 minutes before use because excessive moisture absorption causes undercuts and irregular heads.

### Typical chemical composition of weld metal (%)

C	Mn	Si	P	S
0.07	0.70	0.40	<0.025	>0.025

### Typical mechanical properties of weld metal

YP N/mm <sup>2</sup>	TS N/mm <sup>2</sup>	EL %	IV J (kgf-m)
>380	470–600	>22	70 (6.9)



### Size & recommended current range: ( ~ =- )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MHOP	332574	3.25	450	130–160
	332575	4.0	450	180–220
	332595	5.0	450	270–320

### Welding positions



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AWS E 7018  
 DIN E 51 55 B10  
 EN E 42 6 B 42 H10

## ▶ MLH

For high efficient welding of 50kgf/mm<sup>2</sup> class high tensile strength steel

### Applications

Welding of 50kgf/mm<sup>2</sup> class high tensile strength steel of ships, bridges and pressure vessels.

### Characteristics

MLH is an iron powder low hydrogen type electrode for all-position welding. Its usability is the best with direct current application as well as alternating current application.

### Notes on usage

1. Dry the electrodes at 300–350°C for 30–60 minutes before use.
2. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose to prevent blowholes at the arc starting.
3. Keep the arc as short as possible.

### Typical chemical composition of weld metal (%)

C	Mn	Si
0.055	1.1	0.45

### Typical mechanical properties of weld metal

YP N/mm <sup>2</sup>	TS N/mm <sup>2</sup>	EL %	IV J (kgf-m)–20°C
> 420	500–640	> 20	160(16)

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLH	332540	2.5	350	60–90
	332541	3.25	450	90–140
	332542	4.0	450	140–190

### Welding positions



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AWS E 7028  
DIN E 424 B 73 H5

## ► MLHH

For high resistance with approximate recovery of 155%

### Applications

MLHH is a basic type electrode for high resistance with approximate recovery of 155%. Easy to use in flat position by doing contact welding.

### Characteristics

- It is a high recovery electrode.
- It is suitable for economical filling of large joints sections.
- It has good bead appearance with low spatter loss.
- Easy slag removal.

### Materials of application

It is applied in non alloyed structural steels: St 33, St 34, St 46, St 52, St 50(\*), St 60(\*), St 70(\*). It is applied in fine grained structural steels: St E 255 (St E 26), St E 285 (St E29), St E 315 (St E 32), St E 355 (St E36), W St E 255 (W St E 26), W St E 285 (W St E 29), W St E 315 (W St E 32), W St E 355 (W St E 36). Applied, as well, in the following types of boiler plates: H I, H II, H III, H IV (\*), 17 Mn 4, 19 Mn 5 (\*). It is applied on the ship building steels A, B, C, D, E, as well as on the cast steels GS 38, GS 45, GS 52.

N.B.: Where (\*), preheat to 150 – 300°C depending on plate thickness.

### Typical chemical composition of weld metal (%)

C	Mn	Si
0.08	0.85	0.45

### Typical mechanical properties of all weld metal: (Single values are typical values)

Heat Treatment	Tensile Strength (N/mm <sup>2</sup> )	Yield Strength (N/mm <sup>2</sup> )	Elongation (l=5d) (%)	Impact Strength Charpy-v (+20°C) (Joule)
As welded	510–610	> 380	> 24	> 100
Stress relieved (580°C/15h/oven)	480–580	> 380	> 24	> 100
Normalized	400–500	> 290	> 28	> 120

### Size & recommended current range: [ ~ =+ ]

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLHH	333136	4.0	450	180–220
	333137	5.0	450	220–320

### Welding Positions



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AWS E 8018 - C 1  
 DIN E SY 42 87 2 Ni B H5  
 EN E 46 6 2Ni B 42 H5

## ▶ MLHL

For high tensile, fine-grained structural and cryogenic steels

### Applications

MLHL is a low Hydrogen coated electrode used for high tensile, fine-grained structural and cryogenic steels.

### Characteristics

- ▶ Offers good weldability in all positions.
- ▶ Weld metal of extremely high metallurgical purity with very low hydrogen content.
- ▶ Regular seams and easy slag removal.
- ▶ Welds of X-Ray quality.

### Materials of application

It is applied in fine-grained structural steels: TStE 255, TStE 285, TStE 315, TStE 355, TStE 380, TStE 420.  
 DIN

Also applied in cryogenic steels: TT StE 35 N, TT StE 35 N 17 173, 17 174  
 TT StE 35 V, 10 Ni 14.

### Typical chemical composition of weld metal (%)

C	Mn	Si	P	S	Ni	Cu
0.05	1.1	0.30	< 0.012	< 0.012	2.4	< 0.09

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	Yield Strength (N/mm <sup>2</sup> )	Elongation A <sub>5</sub> (%)	Impact Energy (J) ISO-V	
520-700	> 480	> 22	+20°C/170	-60°C/80-100

### Size & recommended current range: ( =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLHL	333134	2.5	350	65-95
	333135	3.25	350	90-130

### Welding Positions



REBAKING: Required, 2 hours at 300-350°C.

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AWS E 8018 - G  
 DIN EY 50 76 Mn 1 Ni B  
 EN E 50 6 1 Ni B 42 H5

## ► MLHR

For producing non-breakable and tough welded joints

### Applications

MLHR is a low Hydrogen electrode used for producing crack-free and tough welded joints. It is used for high-tensile fine-grained structural steels.

### Characteristics

The weld metal is of extremely high metallurgical purity and has good welding ability in all positions. Welds are of X-Ray quality. Low spatter loss. Easy slag removal. Regular seams.

### Materials of application

It is applied on fine grained structural steels: StE 420, StE 460, StE 500, WStE 420, WStE 460, WStE 500, TStE 420, TStE 460, TStE 500.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Ni
0.06	1.6	0.5	0.9

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	Yield Strength (N/mm <sup>2</sup> )	Elongation A <sub>5</sub> (%)	Impact Energy (J) ISO-V	
590-690	> 510	> 23	+20°C/200	-60°C/60

### Size & recommended current range: ( =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLHR	333121	2.5	350	65-95
	333122	3.25	450	90-135

### Welding Positions



REBAKING: Required, 2 hours at 300-350°C.

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AWS E 8018-B2  
DIN E CrMo 1 B 20

## ▶ MLHT

For welding of 1.25% Cr - 0.75% Mo steel

### Applications

Electrode for welding of creep resistant steels used in the construction of pressure vessels, boilers and piping subjected to operating temperatures up to +570°C.

### Characteristics

MLHT is an iron powder low hydrogen type electrode. Owing to this work efficiency, it is most suitable for welding thick steam pipes and repair welding of cast steel. Welds are of X-ray quality.

### Notes on usage

- ▶ Rebake the electrodes at 300–350°C for about 2 hours before use.
- ▶ Preheating, interpass temperature and post-weld heat treatment in accordance with base metal to be welded.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Mo
0.09	0.87	0.4	1.25	0.75

### Typical mechanical properties of weld metal

YP N/mm <sup>2</sup>	TS N/mm <sup>2</sup>	EL %
> 490	560–660	> 22

### Typical creep rupture strength (690° Cx1hr. S-R)

Test Temperature	550°C
1,000 hrs creep rupture strength	202N/mm <sup>2</sup> (20.6kgf/mm <sup>2</sup> )

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLHT	332593	2.5	350	60–90
	332594	3.25	350	90–140

### Welding Positions



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AWS E 7048  
 DIN E 51 43 B 9  
 EN E 42 2 B 15 H10

## ► MLHV

For vertical downward welding of 50kgf/mm<sup>2</sup> class high tensile strength steel

### Applications

Vertical downward welding of ships, buildings and bridges.

### Characteristics

MLHV is a low hydrogen type electrode for exclusively vertical downward welding. Mechanical properties and crack resistibility of weld metal are good and slag is self – lifting. As higher amperage can be used, the efficiency of vertical welding is remarkably improved compared with vertical upward welding.

### Notes on usage

1. Manipulate the electrode straight downward without weaving and press its tip against the mother plate.
2. Dry the electrodes at 300–350°C for about 60 minutes before use.
3. Keep the arc as short as possible.
4. Adopt back step method or strike the arc on a small steel plate prepared for this particular purpose to prevent blowholes at the arc starting.

### Typical chemical composition of weld metal (%)

C	Mn	Si
0.08	1.1	0.6

### Typical mechanical properties of weld metal

YP N/mm <sup>2</sup>	TS N/mm <sup>2</sup>	EL %
> 420	500–640	> 20

### Size & recommended current range: ( ~ =+ for 3.25 ) ( ~ =- for 4.00 & 5.00 )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MLHV	332543	3.25	350	90–130
	332544	4.00	450	140–200
	332576	5.00	450	220–270

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AWS E 7016  
 DIN E 51 43 B (R) 10  
 EN E 38 B 12 H 10

## ► MSPECIAL

For assembly work, workshop and repair welding

### Applications

MSPECIAL is a low Hydrogen double coated multi-purpose electrode used for assembly work, workshop and repair welding.

### Characteristics

It has outstanding welding ability in A.C. as well as excellent gap bridging properties.

### Materials of application

		DIN
Unalloyed structural steels	St 33 up to St 52-3	17 100
	St 50-2, St 60-2	
Boiler plates	H I, H II, 17 Mn 4	17 155
Pipe steels	Up to St 52.4	1629
	St 35.8 up to 17 Mn 4	17 175
	StE 210.7 up to StE 360.7 Including corresponding TM grades	17 172
Shipbuilding steels	A, B, D, E	
Fine grained structural steels	StE 255 up to StE 355 WStE 255 up to WStE 355	17 102
Cast steels	GS-38 up to GS-52	1681

### Typical chemical composition of weld metal (%)

C	Mn	Si
0.06	0.90	0.70

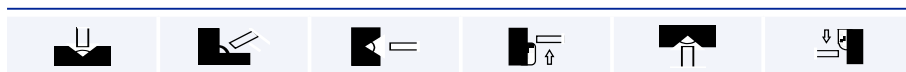
### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	Yield Strength (N/mm <sup>2</sup> )	Elongation A <sub>5</sub> (%)	Impact Energy (J) ISO-V	
470-600	> 380	> 20	+20°C/150	-20°C/100

### Size & recommended current range: ( ~ =± )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MSPECIAL	333126	2.5	350	65-90
	333127	3.25	450	95-150
	333128	4.0	450	140-190

### Welding Positions



### REBAKING:

Required, 2 hours at 300-350°C

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AWS E 2209-16  
EN E 22 9 3 NLR 32

## ► MDUPLEX

Rutile - basic type electrode for duplex stainless steel welding

### Applications

MDUPLEX is a Rutile – basic type electrode for welding the duplex stainless steel used in tanks, cargo loading pipes as well as when used as ladder materials on board.

### Characteristics

It has excellent weldability for filling and for root runs. It is applicable to a service temperature of 250°C. MDUPLEX has high resistance to general, pitting and stress corrosion, as well as to high yield strength.

### Materials of application

Steel Grades	EN 10088-1/-2	W.Nr
Duplex S.S.	X2 CrNiMoN 22-5-3	1.4462/1.4417
	X3 CrNiMoN 27-5-2	1.4460
	X2 CrNiN 23-4	1.4362

It is also applied in dissimilar joints such as alloyed and unalloyed steel to duplex stainless steel.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Ni	Mo	N
0.02	0.80	1.00	22.5	9.5	3.2	0.16

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	Yield Strength (N/mm <sup>2</sup> )	Elongation (l=5d) (%)	Impact Strength Charpy-v (-30°C) (Joule)
> 550	> 450	> 20	50

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MDUPLEX	333131	2.5	350	40-75
	333132	3.25	350	80-110

### Procedural Recommendations

Welding with heat input max. 2.5 KJ/mm. Preheat and interpass temperature max 150°C.

### Welding Positions



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AWS E 316L-16  
 DIN E 19 12 3 LR 26  
 EN E 19 12 3 LR 32

## ► MSS 18/8V

For welding of extra - low carbon 18% Cr - 12% Ni-Mo stainless steel

### Applications

Welding of AISI (SUS) 316L stainless steel.

### Characteristics

**MSS 18/8 V** is rutile covering type electrode for all-position welding. As the weld metal is of austenitic structure containing proper quantity of ferrite crack resistibility is good and usability is also good.

As extra-low carbon weld metal can be obtained, intergranular corrosion resistibility is superior to that of **MSS 18/8 V**. Creep rupture strength is also good. Suitable for operating temperatures up to +350°C.

### Notes on usage

1. Keep the arc as short as possible and choose the welding current as low as possible.
2. Weaving width should be within two and a half times of electrode's diameter.
3. When the electrodes have absorbed moisture, dry them at 250–300°C for 60–90 minutes before use.
4. Remove dirt such as oil and dust from the groove.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Ni	Mo
0.030	0.70	0.70	18.00	12.00	2.80

### Typical mechanical properties of weld metal

0.2% proof stress (N/mm <sup>2</sup> )	TS N/mm <sup>2</sup>	EL %
420	580	33

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MSS 18/8V	332545	2.0	300	30–50
	332546	2.5	300	50–75
	332577	3.25	350	75–110

### Welding positions



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AWS	E 309MoL-16
DIN	E 23 13 2 LR 23
EN	E 23 12 2 LR 12

## ► MSSM 23/14V

For welding of low carbon 22%Cr - 12%Ni-Mo stainless steel

### Applications

Build up welding of Cr-Mo steel or carbon steel. Welding of AISI (SUS) 316 or AISI (SUS) 316L to carbon steel. Clad steel side welding to AISI (SUS) 316 or AISI (SUS) 316L.

### Characteristics:

MSSM 23/14 is rutile covering type electrodes for all-position welding, which have good usability and good weldability. Weld metals provide excellent corrosion resistibility and heat resistibility in the as-welded condition.

As MSSM 23/14 is of low carbon content, it can be used for welding of extra-low carbon stainless steel which contains Mo and for under laying of mother plates which contain considerably high carbon content.

### Notes on usage

1. Keep the arc as short as possible and choose the welding current as low as possible.
2. Weaving width should be within two and a half times of electrode's diameter.
3. When the electrodes have absorbed moisture, dry them at 250–300°C for 60–90 minutes before use.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Ni	Mo
0.025	0.70	0.90	22.50	13.50	2.60

### Typical mechanical properties of weld metal

0.2% proof stress (N/mm <sup>2</sup> )	TS N/mm <sup>2</sup>	EL %
420	640	30

### Size & recommended current range: [ ~ =+ ]

Product name	Order name	Diameter (mm)	Length (mm)	Amp.
MSSM 23/14V	332547	2.5	300	60–90
	332548	3.25	350	90–120
	332549	4.0	350	110–140

### Welding Positions



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AWS E Ni CI  
DIN E Ni BG 22

## ► MNICKEL

For repairing of cast iron products

### Applications

Repairing and filling up of cavities of various kinds of cast iron products such as cylinder covers, motor beds, casings and gears. Repairing of meehanite cast iron, alloy cast iron and malleable cast iron.

### Characteristics

MNICKEL is a graphite type coated electrode, depositing weld metal consisting of almost nickel. Hardening of the weld metal and fusion zone in cast iron is smallest and machining of the welds is comparatively easy. Therefore, it is suitable for welding alloy cast iron of poor weldability, malleable cast iron and hydraulically pressured parts as well as common cast iron.

### Notes on usage

1. Clean base metal before welding.
2. If there is a possibility that cracking spreads, make the stopholes at both ends of repairing part.
3. Keep bead length less than 50mm to disperse welding heat. Adopt back steps, stepping stone or symmetry method by turns.
4. Hot peen in every pass.
5. It is not necessary preheating and postheating in general but satisfactory results can be obtained by preheating at 100–200°C in accordance with kind, shape and size of base metal.

### Typical chemical composition of weld metal (%)

C	Fe	Ni
1.15	3	95

### Typical mechanical properties of weld metal

0.2% proof stress (N/mm <sup>2</sup> )	Elongation %	TS N/mm <sup>2</sup>
200	5	400

### Size & recommended current range: ( ~ == )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MNICKEL	332550	2.5	300	50–80
	332551	3.25	350	80–110

### Welding Positions



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AWS E NiFe CI  
DIN E NiFe BG 22

## ► MNIFE

For repairing of cast iron products

### Applications

For welding of nodular cast iron, repairing and joining of various cast iron products. Also suitable for underlaying of hardsurfacing.

### Characteristics

MNIFE is a graphite type coated electrode whose weld metal has the composition of 55% Ni–45% Fe. As the hardening of fusion zone in cast iron is small and the coefficient of thermal expansion of the weld metal is about the same as that of cast iron, mechanical properties and crack resistibility of the weld metal are good.

### Notes on usage

1. Clean base metal before welding.
2. If there is a possibility that cracking spreads, make the stopholes at both ends of repairing part.
3. Keep bead length less than 50mm to disperse welding heat. Adopt back step, stepping–stone or symmetry method by turns.
4. Hot peen in every pass.
5. It is not necessary preheating and postheating in general but satisfactory results can be obtained by preheating at 100–200°C in accordance with kind, shape and size of base metal.

### Typical chemical composition of weld metal (%)

C	Ni	Fe
0.50	53	42.79

### Typical mechanical properties of weld metal

0.2% proof stress (N/mm <sup>2</sup> )	Elongation %	TS N/mm <sup>2</sup>
300	10	450

### Size & recommended current range: [ ~ == ]

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MNIFE	332552	3.25	300	90–110
	332553	4.0	350	130–170

### Welding Positions



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## ► MCH

For chamfering and gouging

### Applications

MCH are electrodes with special coating for cutting all steel types, grey cast iron and non-ferrous metal.

### Characteristics

It is a special covering type of electrode very useful in repair and demolition work

### Materials of application

It is applied in all steels (particularly for stainless and manganese steels which cannot be cut by the oxy-acetylene process).

It can also be applied for cast iron, copper and its alloys.

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MCH	333133	3.25	450	160–200

► **IMPORTANT NOTICE:** Use dry electrodes only

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AWS E 312-16  
 DIN E 29 9 R 26  
 EN E 29 9 R 12

## ► MTENSILE

For welding of dissimilar metals

### Applications

Welding of 29%Cr–9%Ni cast steel, dissimilar metals such as carbon steel or low alloy steel to austenitic stainless steel.

Welding of AISI (SUS) 304 clad steel.

Under laying build up of hard surfacing.

### Characteristics:

MTENSILE is a rutile covering type electrode for all–position welding, depositing weld metal of 29%Cr – 9%Ni. As the weld metal contains large quantity of ferrite, its crack resistibility is good. It is used for welding dissimilar metals and under laying welding of hard surfacing.

### Notes on usage:

1. Choose the welding current as low as possible to prevent cracking of plate.
2. When the electrodes have absorbed moisture, dry them at 250–350°C for 60–90 minutes before use.
3. Weaving width should be within two and a half times of electrode's diameter.
4. It is necessary to preheat the plate at 200°C and over in the case of welding of special steel such as high alloy tool steels.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Ni
0.1	1.1	1	29	9

### Typical mechanical properties of weld metal

0.2% proof stress (N/mm <sup>2</sup> )	Elongation %	TS N/mm <sup>2</sup>
450	20	750

### Size & recommended current range: [ ~ =+ ]

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MTENSILE	332578	3.25	350	75–110
	332557	4.0	350	110–150

### Welding Positions



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AWS E EcoCrA

## ► MIMPACT

For corrosion and high temperature abrasion

### Applications

Hard surfacing of sleeves of high pressure pump, cutting knives, liners, valve seats and discs.

### Characteristics

MIMPACT is cobalt base lime/rutile electrode. Corrosion, heat and wearing resistibility of the weld metal are superb. Its toughness is rather good and it is resistable to impact at elevated temperatures and room temperature. The hardness of weld metal is about Hv420 at RT.

### Notes on usage

Dry the electrodes at 200°C for 30–60 minutes before use.

Preheat the base metal at 150–350°C to reduce a crack tendency and cool slowly.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	W	Co
1.20	0.10	1.00	28	5	Bal

### Typical mechanical properties of weld metal (Hv)

Product Name	RT	HIGH TEMPERATURE		
		300°C	500°C	700°C
MIMPACT	420	375	340	290

### Size & recommended current range: ( ~ == )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MIMPACT	332579	3.25	350	80–120
	332580	4.0	350	110–150

### Welding Positions



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AWS E 307 - 15  
 DIN E 18 8 Mn B 20 +  
 EN E 18 8 Mn B 42

## ► MWEARMAX

For welding of dissimilar steels and for surfacing purposes

### Applications

MWEARMAX features high resistance to cracking and is therefore indicated for difficult to weld steels and depositing stress-relaxing buffer layers on crack sensitive base metal or beneath hard facing deposits.

The highest operating temperature of dissimilar steel joints is +300°C.

Weld metal will work harden.

### Characteristics

The weld metal consists of austenitic Cr-Ni-Mn steel with possible small amounts of delta-ferrite; it is non-scaling up to +850°C.

### Materials of application

It is applied to dissimilar steels (unalloyed to austenitic steels), to difficult to weld steels (e.g. heat treatable and tool steels) and to high manganese steels.

### Typical chemical composition of weld metal (%)

C	Mn	Si	Cr	Ni
0.11	6.4	0.6	18.5	9.5

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	0.2% Proof Strength (N/mm <sup>2</sup> )	Elongation A <sub>5</sub> (%)	Impact Energy (J) ISO-V	
650	400	> 35	+20°C/100	-60°C/60

### Size & recommended current range: ( =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MWEARMAX	333123	2.5	300	65-70
	333124	3.25	300	95-120
	333125	4.0	340	110-160

### Welding Positions



REBAKING: Generally not required, 2 hours at 300-350°C

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AWS E Cu Mn Ni Al

## ▶ MALBRONZE

For welding of copper alloys

### Applications

MALBRONZE is recommended for the surfacing of mild steel, low alloyed steel and on copper alloys in order to combat impairments resulting from corrosion, cavitation, friction and erosion.

### Characteristics

The MALBRONZE electrodes' high tensile and good elongation secures resistance to cracking on possible violent cooling after welding.

### Materials of application

It is widely applied in rails, crane rollers, axle's repairs as well as in the functional surfacing of machines' weird parts which are of medium hardness.

### Typical chemical composition of weld metal (%)

Al	Fe	Mn	Ni	Cu
7.0	2.50	13.50	2.20	Balance

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MALBRONZE	332554	3.25	450	95–120

### Welding positions



**IMPORTANT NOTICE:** Use dry electrodes only

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DIN EL - AISi 12

## ► MALUMINUM

For welding Aluminum

### Applications

**MALUMINUM** is recommended for joining and building up aluminum and cast aluminum alloys with silicon content up to 12%. It can also be applied for welding dissimilar aluminum alloys.

### Characteristics

It is an electrode with special covering for welding aluminum–silicon forged and cast alloys. It is also applicable as a surfacing electrode. It offers good weldability and has no porosity.

### Materials of application

It is widely applied in aluminum–silicon cast alloys with silicon content up to 12%, such as G–AlSi 12, G–AlSi 12 (Cu), G–AlSi 10 Mg, G–AlSi 10 Mg (Cu) and G–AlSi 6 Cu 4.

### Typical chemical composition of weld metal (%)

Si	Mn	Al
12	0.2	Balance

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	0.2 % Proof stress (N/mm <sup>2</sup> )	Elongation A <sub>5</sub> (%)
180	80	5

### Size & recommended current range: ( =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MALUMINUM	332555	3.25	350	80–110

### Welding Positions



► **IMPORTANT NOTICE:** Redrying is required for 2 hours at 110–120°C

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AWS ECu Sn – A  
DIN ECu Sn 6

## ▶ MTINBRO

For assembly and surfacing welds on copper alloys

### Applications

MTINBRO is a basic electrode for the rebuilding of bearing seats, joining of phosphor–bronze alloys and for the welding of other copper alloys. Also, it can be for overlaying on wrought and cast steels.

### Characteristics

It is suitable for depositing a bronze layer on steel, cast steel and cast iron. Particularly recommended for surfacing welds on bronze bearings in machine–building. Offers a smooth running.

### Materials of application

It is applied in assembly and surfacing welds on tin–bronze materials, red brass and copper as weld as for depositing a bronze layer on steel, cast steel and cast iron.

### Typical chemical composition of weld metal (%)

Cu	Sn	Mn	P
91	7.5	0.4	0.3

### Typical mechanical properties of all weld metal: (Single values are typical values)

Tensile Strength (N/mm <sup>2</sup> )	Hardness (HV 30)
300–350	70–100

### Size & recommended current range: ( ~ =+ )

Product name	Order number	Diameter (mm)	Length (mm)	Amp.
MTINBRO	332556	3.25	350	70–120

### Welding Positions



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# MARIGASES

Division  
GASES

Section D  
REFRIGERATION PRODUCTS







MARICHEM MARIGASES has integrated the latest technology and incorporated state of the art features while having reliability and speed in order to provide a **Complete Refrigerant Recovery System** that complies fully with US, EU and IMO regulations. According to the United States Environmental Protection Agency the venting to atmosphere of all Class I and Class II ozone-depleting substances (i.e. CFC/HFC) is strictly prohibited under Section 608 of the Clean Air Act. Hence, in order to avoid the former common practice of refrigerant venting during routine servicing the Refrigerant Reco-ving Unit has become mandatory. MARICHEM MARIGASES offers a **Complete Refrigeration Recovery System** that fulfills the pre-mentioned requirements. This system is beneficial as it reduces the amount of ODSs (Ozone Depleting Substances) such as R-12 and global warming gases, such as R-134A, from entering the environment. There are also cost benefits involved such as lower refrigerant purchasing and the reduction need of using 3rd party contractors to carry out refrigerant recovery during maintenance or repair.

## REFRIGERANT RECOVERY SYSTEM

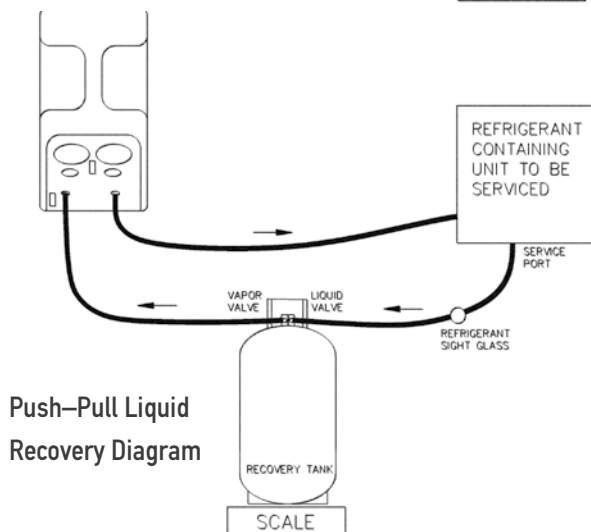
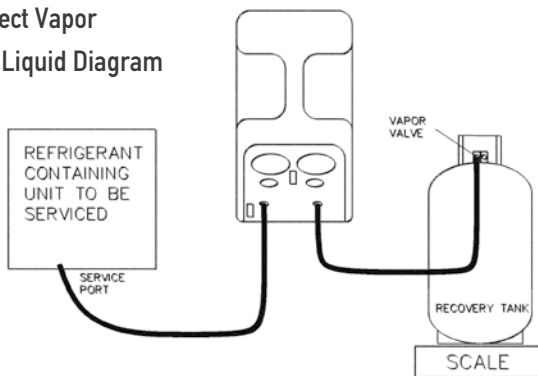
### PRODUCTS FOR REFRIGERANT RECOVERY



#### REFRIGERANT RECOVERY UNIT 400

Order Number: 333108/2 (115/230V-50/60Hz)

#### Direct Vapor or Liquid Diagram



#### Push-Pull Liquid Recovery Diagram



#### VACUUM PUMP (110V/230V-50/60Hz)

Order number: 333103



#### RECOVERY CYLINDER

Order number: 380006

Refrigerant recovery cylinder with double valve (liquid/vapor).



## REFRIGERATION EQUIPMENT

**REFRIGERATION TOOL BOX**

ORDER NUMBER 333114

contains: carrying case, 2-way manifold, refrigerant charging hoses set (3pcs), adjustable wrench 12", flaring tool, tube cutter, inner-outer reamer, ratchet wrench, refrigerants adaptors set (3pcs).



333114

**INFRARED THERMOMETER**

ORDER NUMBER 333109

10mm LCD (3 digits) and temperature range of  $-42^{\circ}\text{C}$  –  $+480^{\circ}\text{C}$ .



333109

**4-WAY MANIFOLD IN PROTECTIVE CASE**

ORDER NUMBER 333092

4 valve manifold with superior refrigerant metering capabilities and maximum unrestricted refrigerant flow.



333092

**2-WAY MANIFOLD SET**

ORDER NUMBER 333091

Suitable for use with all kinds of refrigerants.

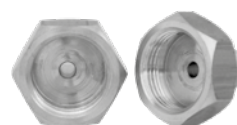


333091

**CHARGING HOSES SET 3x1.8mtr, 1/4"**

ORDER NUMBER 333093

Flexible 3pcs high quality hoses set at 3,000psi bursting pressure.



333093

**REFRIGERANTS ADAPTORS SET**

ORDER NUMBER 525255

Brass made adaptors of most common conversion requirements.

525255

**TUBE CUTTER**

ORDER NUMBER 333117

Heavy duty CUTTER for 1/8" to 1 1/8" pipes.

Equipped with a spare cutting blade.



333117

**FLARING TOOL**

ORDER NUMBER 333116

A high quality 450 Diamond type FLARING TOOL, for use with tubes of 3/16" to 5/8" O.D.



333116

**INNER-OUTER REAMER**

ORDER NUMBER 333118

Zinc body INNER-OUTER REAMER, for reaming both inside and outside edges of tubing.

For use with tubes of 1/4" to 1 5/8" O.D.



333118

**RATCHET WRENCH 3/16", 1/4", 9/16", 1/2"**

ORDER NUMBER 333115

4 Sizes Ratchet Wrench:

3/16" square, 1/4", 9/16", 1/2" hex ratchet.



333115

**ADJUSTABLE WRENCH 12"**

ORDER NUMBER 333119

Universal adjustable wrench, up to 12"



333119

**HAND OIL PUMP**

ORDER NUMBER 333110

Hand operated oil pump for refrigeration systems.



333110

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**ELECTRONIC LEAK DETECTOR**

ORDER NUMBER 333106

Microprocessor control with advanced digital signal processing. Detects ALL refrigerants. Spare sensors (2pcs) and protective carrying case included.

**ELECTRONIC CHARGING SCALE**

ORDER NUMBER 333104

High capacity refrigerant charging/recovery scale.

**VACUUM GAUGE, DIGITAL**

ORDER NUMBER 333105

Advanced measurement with digital readout on large LCD.



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# Fire, Rescue & Safety Services

TO FEEL SAFE IS TO BE SAFE



**MARICHEM®**



**MARICHEM WORLDWIDE SERVICES** is your partner in **Fire, Rescue & Safety Services**

## INTRODUCTION

Long established in the Maritime Industry, we have earned the trust of our customers by providing top rank quality services for more than 3 decades.

- 🔗 MARICHEM MARIGASES Worldwide Services provides the most professional service through a well-established network, in order to assist modern shipping meet today's demanding standards. The international regulations governing safety at sea get tougher every year, with the strict International Safety Management (ISM) Code, operators and ship managers are becoming even more alert to the fulfillment of all requirements for safety equipment.
- 🔗 Our **F.R.S. Services** rely on the strength of long-term, steady co-operation with Safety Inspectors and qualified Technicians of many years experience.

- 🔗 MARICHEM MARIGASES Worldwide Services **FIRE – RESCUE & SAFETY SERVICES** are approved by Classification Societies such as:

- American Bureau of Shipping
- Bureau Veritas
- Det Norske Veritas
- Germanischer Lloyd
- Lloyd's Register
- Nippon Kaiji Kyokai
- Polish Register
- Registro Italiano Navale
- United States Coast Guard



- 🔗 Our Division makes it possible for these services to be offered in more than 1,500 ports around the world.
- 🔗 Our range of services includes the testing, refilling, repair, maintenance and supply of:
  - Portable and wheeled fire extinguishers of all types, CO<sub>2</sub>–Dry Powder–Foam–Water.
  - Fixed CO<sub>2</sub> system, Foam Tank analysis, calibration of gas instruments.
  - Breathing Apparatus sets.
  - Life Rafts of all makes and types, lifeboats and other marine safety equipment.
  - Immersion suits, Thermal protective aid.
  - Life jackets, Life jacket lights, Lifebuoys.
  - Pyrotechnical equipment.

**Fire, Rescue & Safety Services** can be provided in a worldwide basis



## THE CARBON DIOXIDE FIRE EXTINGUISHING SYSTEM

The CARBON DIOXIDE (CO<sub>2</sub>) system is the most vital part of the vessel and can be assimilated to the heart of the latter as it will control all the parts that can be endangered.

### Carbon dioxide as extinguishing agent

1. Carbon dioxide gas is stable and does not wield influence on oil, metal or electric insulator.
2. Since no pollution is caused at the fire fighting, the equipment, which is not damaged by the fire, can resume the operation immediately after the fire is put off.
3. As carbon dioxide has higher electric insulation property than air, it can be safely used to the electric equipment.
4. Since it can penetrate to any gap, the fire is extinguished completely no matter what complicated form the burning object may have.
5. The quality is not deteriorated if stored over a long period.

Since a large amount of oil is found in the engine room, boiler room, pump room, e.t.c. the fire may be spread rapidly. In the case of the engine room, therefore, it is necessary that 85% of required amount of carbon dioxide is discharged within 2 minutes for the prompt fire extinguishments.

The fire extinguishing system in the room consists of discharge nozzles, the carbon dioxide gas cylinders and the large type selection valve, the latter two being connected with the fixed piping for pressure use.

### Maintenance and inspection

The daily maintenance and inspection work are quite important, if the performance of this unit, which is rarely used is to be exploited fully at the fire fighting time.

#### 1. Arbitrary inspection

Visual inspection and checking for the deformation or damage of the tube, pipe, valve, electric wire or other accessories. These have to be kept in well-maintained status.

#### 2. Half-yearly inspection

Inspection on the sounding of audible alarms such as sirens, bells, etc. Also checking and inspection of the electric safety circuits like the emergency stop of the ventilating device.

#### 3. Yearly inspection

Weighting of the carbon dioxide cylinder and inspection of the filled gas amount. If the filled amount is reduced by more than 10%, it has to be refilled.

#### 4. Two year inspection

Blow-through the lines of carbon dioxide or compressed air to the respective pipe system and checking for the pipe clogging, leakage or other abnormality.

#### 5. Record after inspection

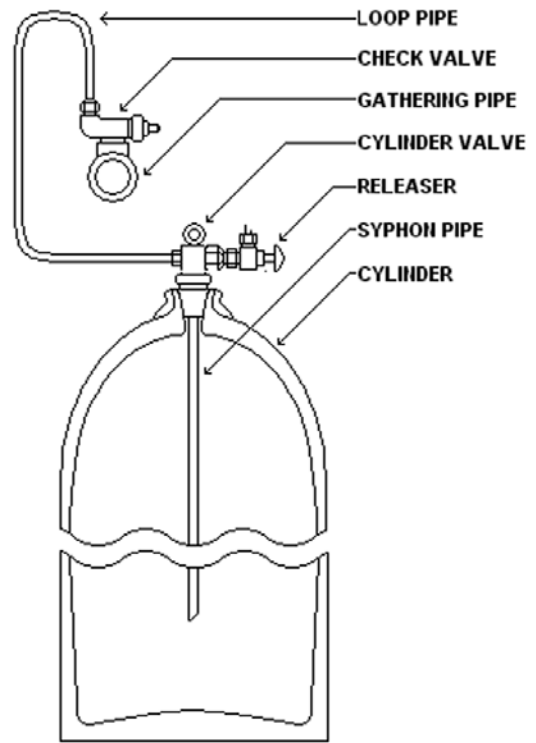
Records of the results must be kept in a record form, certificates.



**Component of the system**

**Carbon dioxide gas cylinder**

The carbon dioxide gas cylinder for fire extinguishments is equipped with the dip tube and the cylinder valve for the rapid discharge. The cylinder valve is connected to the check valve and gathering pipe by means of the connecting pipe. The cylinders usually have the net volume of 68litres, to which 45.4kg of carbon dioxide is filled.



**Cylinder valve and releaser**

**1. Manual operation**

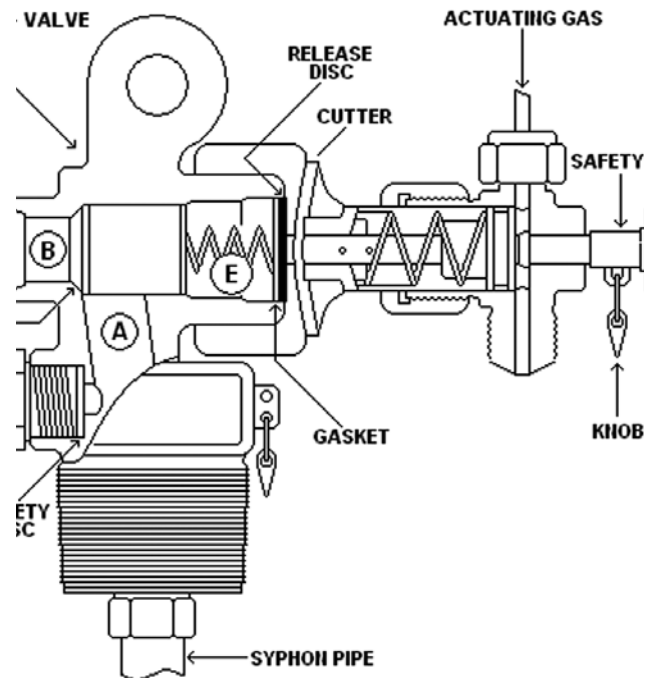
Disengage the safety clip of the releaser and push the knob for operation.

**2. Automatic operation by gas pressure**

Even if the safety clip remains, the automatic activation can be made, when the gas pressure drives the needle cutter.

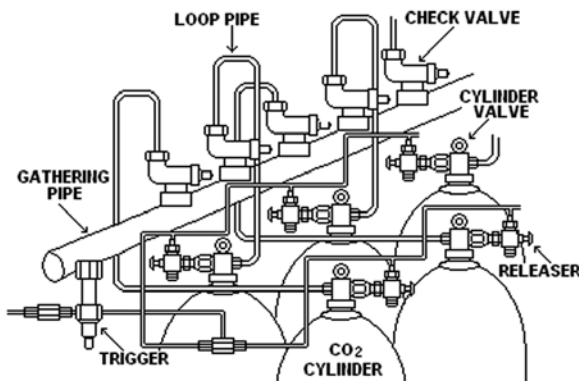
**3. Gas discharge**

When the release disc is ruptured by the needle cutter, the gas in E chamber is purged into the air. Then, the piston retreats by the pressure of D section, and the valve is instantaneously open to the full extent. The gas in the cylinder is discharged from A via B.



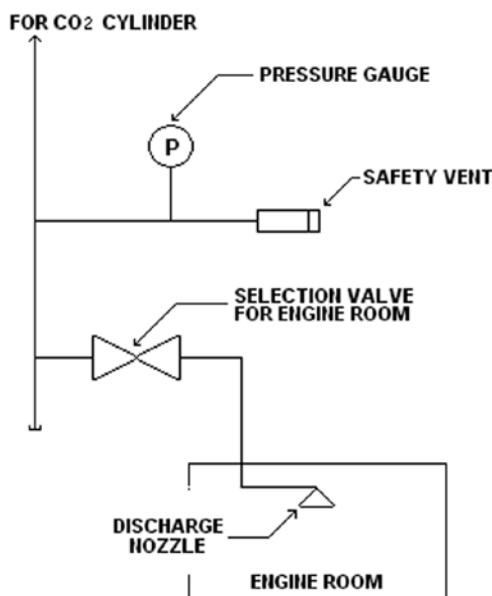
**Group release mechanism**

In case many carbon dioxide gas cylinders are to be discharged by manual operation at the same time, the trigger is used. The trigger is mounted at the gathering pipe and is connected to the cylinder discharge device via the control copper pipe.



**Selection release mechanism**

In order to use the carbon dioxide cylinder for fire extinguishment for the engine room and pump room in common, the selection valve is installed at each compartment. The selection release mechanism consists of:

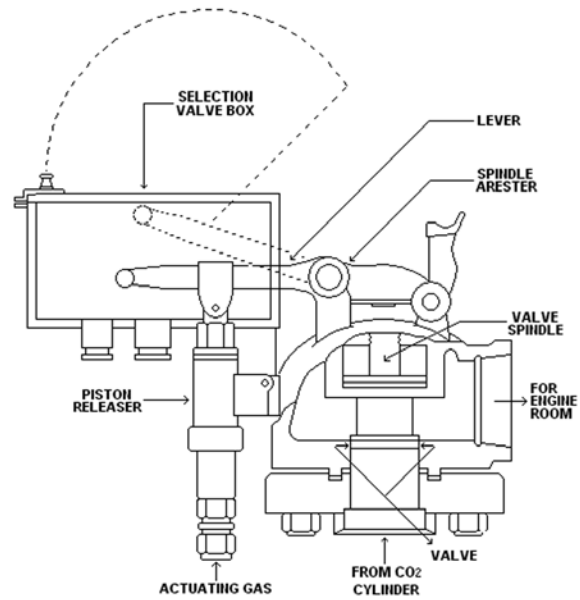


**1. The selection valve**

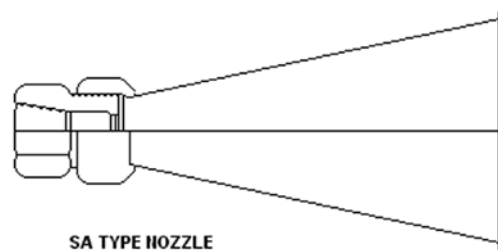
This is used for the rapid release of the carbon dioxide gas to the room. When the actuating gas drives the piston releaser, the lever is actuated and the valve is opened. It is also possible to open the lever directly by hand. After the use, push the valve spindle in, hang the spindle hanger on the pin and fix the lever at the original position.

**2. The selection valve box**

If the selection valve is to be opened by hand at the fire in the room, first open the door of the selection valve box. The alarm switch interlock is arranged at the door, so that the alarm may sound without fail before the gas is released.



**3. The discharge nozzle**



## THE PORTABLE & WHEELED FIRE EXTINGUISHERS

There are four main types of classification and combinations for which specific kinds of fire extinguishers can be used. The table below points out the proper agent to use for each case of fire:

Class of fire	Type of hazard	Water	Foam	ABC Dry Chemical	CO <sub>2</sub>	Halon
<b>A</b>	Ordinary Combustible Wood, Cloth, Paper Rubbish	Yes	Yes	Yes	No	No
<b>B</b>	Flammable Liquids and Grease, Gasoline, Oil, Paint, Grease, Natural Gas, Manufactured Gas	No	Yes	Yes	Yes	Yes
<b>C</b>	Electrical Equipment Wiring, Controls, Panels, Motors	No	No	Yes	Yes	Yes
<b>A + B</b>	Combination of Ordinary Combustible and Flammable Liquids and Gases	No	No	Yes	No	No
<b>A + C</b>	Combination of ordinary Combustible and Electrical Equipment	No	No	Yes	No	No
<b>B &amp; C</b>	Combination of Flammable Liquids and Gases and Electrical Equipment	No	No	Yes	Yes	Yes
<b>A, B &amp; C</b>	Combination of Ordinary Combustible and Flammable Liquids & Gases and Electrical Equipment	No	No	Yes	No	No



## CARBON DIOXIDE EXTINGUISHERS

**Carbon Dioxide extinguishers** should be of black colour. CO<sub>2</sub> is stored in these extinguishers as a liquid under pressure and is discharged onto the fire as an electrically non-conductive gas, which extinguishes burning material by excluding Oxygen.

Moreover, CO<sub>2</sub> is a clean, dry gas and a non-conductor of electricity. It leaves no residue and can be used on delicate electric equipment.

## DRY POWDER EXTINGUISHERS

**Dry powder extinguishers** should be of blue colour. BC powder is a foam compatible fire extinguishing dry powder based on sodium bicarbonate with flow and moisture repellent additives.

ABC powder is a fire extinguishing dry powder with a high ammonium phosphate content having the ability to form an Oxygen excluding crust over hot surfaces.

## FOAM EXTINGUISHERS

**Foam extinguishers** should be of yellow colour. For inflammable liquid fires it is essential to choose the foam concentrates suitable for the specific fire. The following foam concentrates are available for various fire types:

1. Fluoroprotein foam	3%	Low expansion foam
2. AFFF (Aqueous Film Forming Foam)	3% or 6%	Low expansion foam
3. Protein foam	3% or 6%	Low expansion foam
4. Alcohol resistant fluoroprotein foam	6%	Low expansion foam
5. Alcohol resistant AFFF foam	6%	Low expansion foam
6. Synthetic foam	3%	High expansion foam

### Protein Foam Concentrate – Regular

Standard or "Regular" protein Foam can be applied on flammable liquids as well as on toxic non-flammable liquids to reduce vapor release.

### Fluoroprotein Foam Concentrates Plus - F & FP

The best form of protein based foam liquid combining rapid-fire knockdown with excellent burn back resistance. Stable and yet fluid foams, which quickly smother fires involving hydrocarbons, may be produced using low expansion equipment.

### Alcohol Resistant Aqueous Film Forming Foam Concentrate

All-purpose AFFF is an alcohol resistant type foam liquid (AR) specially formulated to extinguish alcohol or polar solvent fuel fires in addition to fires involving hydrocarbon fuels.

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## LIFE SAVING EQUIPMENT

### INFLATABLE LIFERAFTS

A wide variety of models from different manufacturers are available and their names are **Mitsubishi, Fujikura, Toyo, Sumitomo, R.F.D., Beaufort, Berwyn, Dunlop, Elliot, BF Goodrich, Viking, Ballon-fabrik** etc.

They are all conform to **SOLAS** regulations of 1960, 1974 and 1981 and appropriate government regulations and are furnished with standard equipment if customer requirements specify, such as hydrostatic release, etc.

All these products are fully supported throughout the world with a comprehensive network of distributors and Approved Servicing Agents.

One of the above common models is, for example, described below in details just for reference.

#### CONSTRUCTION

The buoyancy chambers are manufactured from polyurethane proofed nylon fabric.

They are superimposed and independent airtight compartments.

The boarding step is so designed that the buoyancy chamber will not deflate should it become damaged. The canopy is double skinned for insulation.

The outer surface is orange for high visibility, the inner is blue for the comfort of the occupants. Retro-reflective tape together with a rain attachment strip are fitted on the outside.

At the top there is a dry cell automatic sea light meeting the 2-mile visibility and exceeding the 12-hour duration requirement. It has a switch which enables it to be turned off during the day. The doorway closure ensures a completely weather tight seal with simplicity of operation.

The floor can be inflated by the survivors for insulation against the cold. Stability for the raft is provided by high volume, weighted water pockets on the underside of the floor and by the anti-tangle conical drogue.

A ladder across the underside of the floor assists in righting the raft, should inverted deployment occur due to extreme conditions.

#### STANDARD EQUIPMENT

- ⊕ External and internal automatic dry cell
- ⊕ Sea light unit
- ⊕ Rain catchment
- ⊕ Retro-reflective tape



- 🔧 Scale A or B emergency pack (inside)
- 🔧 Rescue line & quoit (inside)
- 🔧 Safety knife (inside)
- 🔧 Paddles (inside)
- 🔧 Topping up pump (inside)
- 🔧 Leak stoppers (inside)
- 🔧 Torch (inside)
- 🔧 Signal code card (inside)
- 🔧 Repair kit (inside)
- 🔧 Immediate action card (inside)
- 🔧 Bailer (inside)
- 🔧 Drogue
- 🔧 Boarding step/rungs
- 🔧 Towing point
- 🔧 External and internal life lines
- 🔧 Righting ladder (underneath)
- 🔧 Water pockets

**FURTHER EQUIPMENT TO CUSTOMER REQUIREMENT**

- 🔧 Hydrostatic release
- 🔧 Deck Cradle
- 🔧 Radar Reflector
- 🔧 Smoke Floats
- 🔧 Survival Bags



**INFLATION**

The buoyancy chambers, boarding step and canopy support are inflated by a stored gas system. Excess pressure discharge on initial inflation or due to high temperature is to the atmosphere via pressure relief valves.

**INSPECTION, SERVICE AND CERTIFICATION OF VARIOUS BRANDS OF LIFE RAFTS**

Upon request, we can supply new or second hand life raft, any equipment such as lifeboat, man overboard, safety signs, immersion suit, thermal protective aid, life jacket, life jacket lights, life buoys, fire hose, fire-man's equipment.

**BENEFITS**

**MARICHEM** secures a worldwide availability for annual inspections by classification approved service suppliers at the most competitive prices of the market. In addition, we propose a free of charge constant follow-up of your entire fleet's certificates and recommend the most advantageous port of assistance.

**For further information or details about our services and products, feel free to send us your inquiry at our headquarters. We will be glad to submit our full quotation for any required inspection.**

MARICHEM MARIGASES Worldwide Services or any subsidiary or associated companies warranties of merchantability and competence, if any, along with any expressed warranties concerning this merchandise, shall not be actionable or pertinent or effective if the good is used contrarily or differently to the directions herein and in no other way due to impending hazards from inappropriate use of the good explained herein. Merchandise might vary insubstantially depending on country of origin. The information provided concerning merchandise is exclusively presented to the customer.

## PERSONAL PROTECTIVE EQUIPMENT

Persons handling chemicals must always wear proper chemical Personal Protection Equipment (PPE) for the task being performed. MARICHEM MARIGASES with its great experience has chosen and provides such equipment for the safety of your staff on board.

### FULL FACE RESPIRATOR AND FILTERS

The Full Face Respirator is used with lightweight filters by a simple bayonet attachment system.

#### Advantages

- ⊕ Lightweight and well balanced
- ⊕ Silicone face-piece material
- ⊕ Easy to use
- ⊕ Wide field of vision with a scratch and chemical resistant polycarbonate lens
- ⊕ Low maintenance Flexible system
- ⊕ CE marked
- ⊕ Tested and certified as per Standard EN136
- ⊕ Complying with the provisions of Council Directive 89/686/EEC of the European Union



#### CHEMICAL PROTECTIVE FULL FACE MASK

Order No: 710811

**Filters available worldwide for use with the Marichem Full Face Respirators, are according EN141 ABEK2P3SL for Organic vapours, Inorganic gases, Acid gases & Ammonia.**

#### FILTER ABEK2PESL FOR FULL & HALF FACE MASK

Order No: 710815



### CHEMICAL PROTECTIVE SUITS

The MARICHEM chemical protective suit is fully complying with the provisions of Council Directive 89/686/EEC of the European Union and with the requirements for PPE of category III.

Splash liquid resistant, having hood with elastic face opening for tight fit around respirator, stitched and over-taped seams, double adhesive storm flap, elasticated cuffs, ankles and waist, 100% particle tight, excellent barrier against concentrated inorganic chemicals and biological hazards, thumb loops.

Size	Order Number
MARICHEM chemical protective suit - S	710801
MARICHEM chemical protective suit - M	710802
MARICHEM chemical protective suit - L	710803
MARICHEM chemical protective suit - XL	710804
MARICHEM chemical protective suit - XXL	710805

MARICHEM chemical protective suits are available in all sizes, S to XXL.

**The chemical protective suit surpasses the minimum performance requirements specified in the European standards EN463, EN 468, EN 468 modified by EN 13034**



## CHEMICAL RESISTANT BOOTS AND GLOVES

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The Personal Protective Equipment is also including chemical resistant boots and gloves, made to comply with the European specifications and meet stringent demand for safety and durability under all conditions.



**CHEMICAL RESISTANT BOOTS**

Order No: 710821



**CHEMICAL RESISTANT GLOVES**

Order No: 710826

**For further information on MARICHEM's, PERSONAL PROTECTIVE EQUIPMENT, please contact your local sales agent or the European administration office.**

Read the MSDS before using any product. For detailed information on safety and health, please refer to MSDS and/or product label.

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## BREATHING AIR COMPRESSOR BAC-M6ET

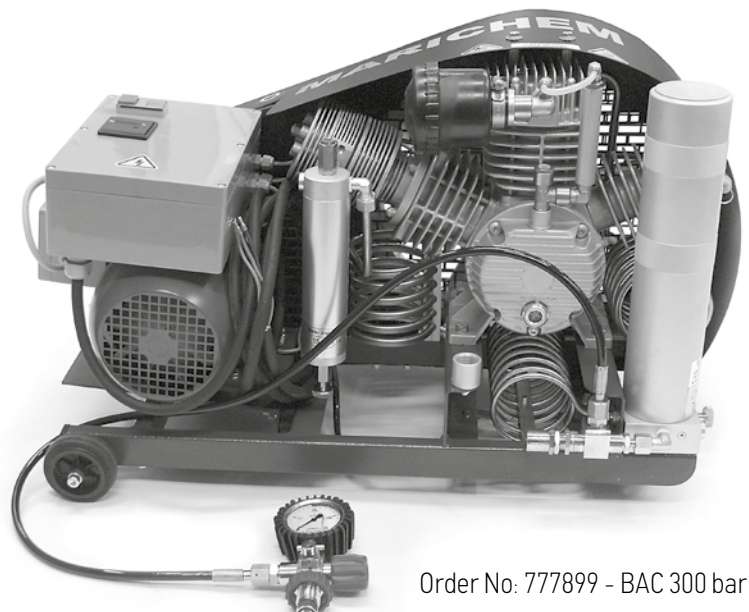
### DESCRIPTION

Marichem high-pressure **Breathing Air Compressor BAC-M6ET** is portable, 3-staged, air-cooled, oil lubricated. Its compact dimensions and light weight make it very easy to transport and operate. It is ideal for all shipping, diving and fire-fighting applications. **BAC-M6ET** is equipped with cable, plug start-stop switch and hour counter.

The electric motor is running on low speed (1200 RPM) which extends its lifetime. Low noise, almost no vibration and excellent purification system ensures reliable operation for many years and pure breathing air (pre-filter and active carbon/molecular sieve cartridge), exceeding the requirements of the highest European standards (EN 12021).

### FEATURES

- ⊕ Sturdy and compact design
- ⊕ Low motor speed (1200 RPM)
- ⊕ Pre-filter installed before the filter
- ⊕ Safety valves at all stages
- ⊕ Pressure gauge
- ⊕ Operating Hours counter
- ⊕ Start/stop switch
- ⊕ Motor thermal overload protection
- ⊕ Filling hose (1.2 mtr) with connector
- ⊕ Automatic belt tensioning system
- ⊕ Wheels for easy transport
- ⊕ Large cooling fan
- ⊕ Air Intake filter
- ⊕ Water separator after 2nd stage

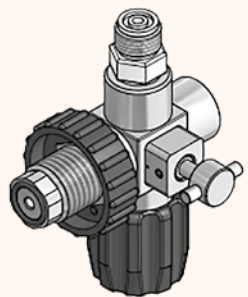



Order No: 777899 - BAC 300 bar

### TECHNICAL SPECIFICATIONS

Air Delivery		103 ltr/min - 6.2m <sup>3</sup> /h
Max Working Pressure	bar	330
Working Pressure	bar	200/300
Stages		3
Cylinders		3
Speed Rotation	rpm	1200
Transmission		V-Belt
Operating Voltage	V/Hz	3x440/60
Motor		2.2Kw, Class F, IP55
Dimensions	cm	72 x 38 x 47
Weight	kg	80 Kg

### ACCESSORIES & SPARE PARTS

777958	Filling Adaptor 200Bar + Safety Valve	
777897	Clamp Int'l Type "A" Adaptor Din200	
777898	Overhauling Repair Kit B.A.C. 200/300 (1000 Hrs)	
777956	Spare Filters Set (3Pcs)	



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## LIFE BOATS, RESCUE BOATS & FAST RESCUE BOATS

### LIFE BOATS

### RESCUE AND FAST RESCUE BOATS

### LAUNCHING APPLIANCES

### ON-OFF LOAD RELEASE GEAR SYSTEM

**Marichem Marigases** provide annual & 5 yearly inspections conforming to SOLAS regulations msc.1/circ.1206/rev.1. This incorporates Inspection, Service and Certification of various makers of Life Boats, Rescue and Fast Rescue Boats, Launching Appliances and On-Load Release Gear. This is supplied by fully supported service stations, which are certified and approved by major classification societies.

Our Range of Services Includes installation Of New Life Boat Davits, Life Boats, Rescue and Fast Rescue Boats. Upon the installation, all Reports, Records and Drawings will be prepared and submitted to Classification and Flag Authorities by Certified Technical Offices.

### MARINE EVACUATION SYSTEMS

**Marichem Marigases** provide Inspection, Service, Certification and Supply of various manufacturers of Marine Evacuation Systems and their Launching Appliances for Passenger vessels and RO-RO/PAX Vessels. These services comply with SOLAS requirements, and are approved by all Major Classification Service Stations and Manufacturers of Marine Evacuation Systems.

**Marichem Marigases** also offer Supply & Installation of New Marine Evacuation Systems. Installation is carried out by Certified Workshops, who provide all Reports, Records and Drawings, which will be submitted to relevant Classification and Flag Authorities by Certified Technical Offices.

### ADVANTAGES

**Marichem Marigases** provides worldwide availability of Annual and 5 yearly inspection, by classification approved service suppliers, at the most competitive prices within the market.

In addition, we propose a free of charge constant follow-up of your entire fleet's certificates and recommend the most advantageous port(s) for assistance.



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## DETECTION EQUIPMENTS

### Multi Gas Detection Instruments for Measuring Various Gases

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### Oxygen Analyzers for Measuring Oxygen Concentration

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### Alcohol Analyzers for Measuring Alcohol Concentration

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Marichem-Marigases provide above detection equipment from a variety of manufactures.

They all conform to appropriate governmental regulations and are supplied with standard equipment.

All of these detection units are fully supported for calibration services throughout the world, with a comprehensive network of approved servicing workshops.

## CALIBRATION SERVICES

Calibration services as per maintenance manual schedule of each model of multi gas detectors, Oxygen analyzers, and alcohol analyzers are fully supported throughout the world, with a comprehensive network of Certified Workshops.

## CALIBRATION GAS MIXTURES

Calibration Gas Mixtures available in Disposable -Non Refillable Cylinders in order to perform Calibration to Portable and Non Portable detection equipments/devices are available for supply World wide.

Products delivered with Certificate of Analysis and MSDS.

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## Conversion Tables

WEIGHT		
Metric		Imperial
1 milligram	=	0.0154 grains
1 gram	=	0.0353 ounces
1 kilogram	=	2.2046 pounds
1 tonne	=	0.9842 tons
Imperial		Metric
1 ounce (oz)	=	28.35 grams
1 pound (lb)	=	0.4536 kilograms
1 stone	=	6.3503 kilograms
1 hundredweight (cwt)	=	50.802 kilograms
1 ton (t)	=	1.016 tonnes

LENGTH		
Metric		Imperial
1 millimetre	=	0.0394 inches
1 centimetre	=	0.3937 inches
1 metre	=	1.0936 yards
1 kilometre	=	0.6214 miles
Imperial		Metric
1 inch	=	2.54 centimetres
1 foot	=	0.3048 metres
1 yard	=	0.9144 metres
1 mile	=	1.6093 kilometres

VOLUME		
Metric		Imperial
1 cubic centimetre	=	0.0610 cubic inches
1 cubic decimetre	=	0.0353 cubic feet
1 cubic metre	=	1.3080 cubic yards
1 litre	=	1.76 pints
1 hectolitre	=	21.997 gallons
Imperial		Metric
1 cubic inch (in <sup>3</sup> )	=	16.387 cubic centimetres
1 cubic foot (ft <sup>3</sup> )	=	0.0283 cubic metres
1 fluid ounce (fl oz)	=	28.413 millilitres
1 pint (pt)	=	0.5683 litres
1 gallon (gal)	=	4.5461 litres

AREA		
Metric		Imperial
1 square centimetre	=	0.1550 square inches
1 square metre	=	1.1960 square yards
1 hectare	=	2.4711 acres
1 square kilometre	=	0.3861 square miles
Imperial		Metric
1 square inch	=	6.4516 square centimetres
1 square foot	=	0.0929 square metres
1 square yard	=	0.8361 square metres
1 acre	=	4046.9 square metres
1 square mile	=	2.59 square kilometres

TEMPERATURE
Celsius to Fahrenheit [Celsius degrees x 9:5] + 32
Fahrenheit to Celsius [Fahrenheit degrees – 3] x 5:9

