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Marine Chemicals Manual

Chemicals Manual

No.1 supplier to the marine market

Wilhelmsen Ships Service

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Chemicals Manual

No.1 supplier to the marine market

Fuel and Oil Treatment

**Cleaning, Maintenance
and Biochemicals**

Water Treatment

Pool Water Treatment

Equipment

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Fuel and Oil Treatment

Marine Chemicals



FUEL OIL TREATMENT

Problem and solution summary



Problem	Solution	Product(s)
Fuel sludging High water content and fuel polymerisation causes sludge formation and filter blocking.	Inhibit polymerisation and disperse sludge into combustible state. Demulsify water and stabilise fuel to restore combustion characteristics.	Fuelcare Gamabreak Burnaid
High temperature corrosion A combination of vanadium and sodium results in highly corrosive ashes with low melting points which attack metals causing damage and failure.	Raise the melting point of the ashes to keep them as solids. The ashes are then ejected with the exhaust gas.	Valvecare Dieselite
Low temperature corrosion Sulphur and high levels of excess air contribute to the formation of diluted sulphuric acid leading to corrosion.	A combustion catalyst enables the reduction of excess air in boilers and reduces the formation of sulphuric acid. In diesel engines the use of ash modifiers inhibits the catalytic action that vanadium has on the $\text{SO}_2 \rightarrow \text{SO}_3$ conversion.	Dual Purpose Plus Burnaid Valvecare Dieselite
Ash deposits Carbon residuals from combustion processes bind ash particles together to form deposits.	Combustion catalyst increases $\text{C} \rightarrow \text{CO}_2$ conversion reducing free carbon.	Dual Purpose Plus Burnaid Dieselite
Smoke and Soot emission Low excess air; pre-heat temperatures too high; burner/injector malfunction; fouled air coolers; incorrect timing; high MCR fuel, resulting in excessive carbon residue.	Check and adjust mechanical functions - e.g. clean air cooler. A combustion catalyst will reduce carbon residue formation.	Dual Purpose Plus Dieselite Burnaid
Deterioration of power output Ash and carbon deposits in combustion zone and exhaust system causing general loss of efficiency in boilers and turbocharger surging in diesel engines.	Combustion catalysts improve combustion. Ash modifiers reduce deposits.	Dual Purpose Plus Dieselite Burnaid Valvecare
Soot and firescale build-up Incomplete combustion causes soot and dense carbon based firescale. Gas flow impaired and heat transfer efficiency reduced. Exhaust systems, economisers etc. become blocked.	Catalytically lower carbon ignition temperature, resulting in soot burn off.	Soot Remover Soot Remover Liquid
Fuel system corrosion Microbiological activity produces a corrosive environment. Salt water contamination of fuel.	Kill microbiological contaminant. Neutralise acid, separate out water.	Biocontrol MAR-71 Fuelcare Gamabreak

FUELCARE

Fuel Conditioner/Stabilizer

Product Description

Fuelcare is a pre-combustion conditioning treatment for residual fuel oils.

Product Properties

Fuelcare prevents and disperses sludge, stops stratification of fuel in tanks, breaks water-in-oil emulsions and gives a better separation of water and sediments from oil. It provides a more homogeneous fuel for combustion. Vessels bunker lines remain cleaner and filter blockages are reduced or prevented. Centrifugal water and contaminant separation is made more efficient and all system components stay cleaner.

Down-time of separators, boilers, engines, etc is reduced due to more effective fuel handling.

The treated oil has improved combustion quality because slow burning fuel components are kept in a finely dispersed state.

An effective corrosion inhibitor coats all fuel system components with a water repellent film. This ensures that the fuel system is protected.

Directions for Use and Dose Rates

Ideally, Fuelcare should be dosed directly into the bunker tank prior to bunkering. However, it can be introduced to the settling tank or during transfer from storage. Dosage rates are best determined from the results of fuel analysis, i.e. sediment content or compatibility test which is easily performed on board using the Compatibility Test Kit.

ASTM SPOT	1	2	3	4*	5*
Sediment %	0.05 or less	0.05	0.1	0.2*	0.5 or over*
DOSE RATE	**1:8000	1:4000	1:2000	1:500	1:200

* Avoid using this fuel if possible.

** Fully compatible blends, with a sediment percentage of less than 0.05, should not require treatment for incompatibility. Marginal number 1 spots may cause sludging if the fuel is not handled carefully, so some treatment may be necessary, especially if other problems such as water content or corrosion are apparent.

If test results are not available, an initial dose of 1:5000 is recommended, and adjustments made as necessary.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	650 766154	25	Steel
	650 766162	210	Steel

Features, Benefits and Applications

- Disperses and prevents sludge formation, keeping fuel systems cleaner
- Stabilises fuel blends, reducing compatibility problems.
- Fuel acids are neutralised. Fuel system components have longer working life, less down-time
- Demulsifies water from fuel and improves centrifugal separation
- Reduces corrosion in tanks and fuel lines
- Prevents filter blockage and improves injector spray pattern
- Limits sludge and tank bottom deposits, maintains a cleaner fuel system
- Can be used as a cleaner for pre-heaters, burner tips, fuel filters, etc.

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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GAMABREAK

Water-in-Fuel Emulsion Breaker

Product Description

Gamabreak rapidly breaks water-in-oil emulsions in all grades of fuel. It assists water removal in the settling tank and fuel centrifuges.

Product Properties

Gamabreak breaks water-in-oil emulsions by lowering the surface tension between the two phases. It is insoluble in water and remains effective even after the water has been removed. Powerful dispersants combat existing sludge formations while homogenising the fuel to prevent new sludge from being formed. Centrifugal separation of catalyst fines is improved, reducing abrasion damage. The homogenising action of Gamabreak keeps heavy fuel particles in suspension, therefore fuel filters block less frequently, tanks and lines remain cleaner, and in general, fuel systems maintenance is minimised. Consequently, a greater proportion of supplied fuel is available for combustion.

Direction for Use and Dose Rates

Dose into the bunker tank prior to, or during bunkering. Allow the product to mix well with the fuel. If fuel analysis is available, the dosage should be based on the water content, as per the following table.

Water %Vol	0.5-1.0	1.0-2.0	Above 2.0
Dose rate	1:4000	1:2000	1:1000 to 1:500

If no analysis is available either from a laboratory or Unitor water-in-oil test kit, use an initial dose rate of 1:4000 and adjust according to the results obtained.

Product Properties

APPEARANCE:	Yellow liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	650 767113	25	Steel

Features, Benefits and Applications

- Rapidly breaks water-in-oil emulsions
- Improves separator efficiency
- Prevents sludge formation in tanks and lines

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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BIOCONTROL MAR-71

Fuel Oil Biocide

Product description

Biocontrol Mar-71 is a specially designed liquid biocide against micro organisms contaminating fuel storage tanks and systems. These micro organisms can cause corrosion, clog filters and nozzles and degrade the properties of the fuel. Biocontrol Mar-71 is effective in layers between water and oil where the bacteria growth is most active.

Directions for Use

Biocontrol Mar-71 is self dispersing and can therefore be added directly to the fuel tank. The preventive dose rate is 0.3 ltr per ton of fuel but in strongly infected fuels the dose rate should be 3 ltr per ton of fuel.

In case of lube oil contamination, see product data sheet for MAR 71.

Product Properties

APPEARANCE: Pale yellow liquid

DENSITY In g/cm³ at 15°C: 0.9

FLASH POINT (PMCC) °C: Above 61

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (in litres)	Container
650 571257	25	Steel

Features, Benefits and Applications

- Kills micro organisms in fuel oil
- Keeps filters and nozzles free from clogging
- Prevents corrosion in fuel systems
- Is not harmful to metal and synthetic rubber
- Does not form corrosive combustion products
- No cases have been reported where bacteria have become immune to Biocontrol Mar-71

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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DUAL PURPOSE PLUS

Fuel Combustion Catalyst

Product Description

Dual Purpose Plus is a concentrated combustion improver for heavy fuel oils. It also has fuel conditioning properties.

Product Properties

The catalysts in Dual Purpose Plus react with heavy fuel particles during combustion. The fuel ignition temperature is reduced, resulting in increased combustion efficiency with less carbon left to form smoke and soot. Engine and exhaust system are kept cleaner with longer service life and less maintenance.

Anti-polymerisation agents inhibit sludge formation, while dispersants stabilise the fuel. This results in a cleaner fuel system and better fuel flow, giving improved fuel atomisation and greater combustion efficiency.

Sulphuric acid corrosion caused by condensing exhaust gases may be seen in any of the cooler parts of the boiler or engine system. Typical problem areas are cylinder liners (clover-leaf corrosion), valve stems and funnel uptakes. Dual Purpose Plus catalytically inhibits the formation of acid gases. This reduces the amount of acid present, thereby reducing acid corrosion.

Directions for Use and Dose Rates

Dual Purpose Plus is completely oil-soluble and should be added via a metering pump into the suction side of the booster pump. Alternatively, it can be added into the settling tank. If so, the dose rate should be increased by 10%. As a general guide, the average dosage should be 1:4000. Alterations can then be made according to operating experience and results obtained.

Where fuel analysis for Micro Carbon Residue, (MCR) is available, dose according to the table below:

MCR%	10	12	14	16	18
DOSE RATE	1:4000	1:3000	1:2500	1:2000	1:1000

Dual Purpose Plus can be dosed using Fuel Oil Treatment Dosing Unit, product No 664 619353.

Product Properties

APPEARANCE:	Dark brown liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	650 571166	25	Steel
	650 571182	210	Steel

Features, Benefits and Applications

- Improves combustion
- Reduces carbon/ash deposits
- Limits soot formation and smoke emissions
- Overall improvement in fuel combustion and economy
- Minimises cold-end corrosion of exhaust trunking, uptakes, cylinder liners, valve stems, etc.

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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BURNAID

Organic Combustion Improver

Product Description

Burnaid is a concentrated organic combustion improver. It contains no metals and can be used in diesel engines and boilers.

Product Properties

The organic compounds in Burnaid promote improved combustion by reacting with fuel particles, thus lowering ignition temperatures. The result is less carbon deposits, soot and smoke. Engine and boiler combustion surfaces are kept cleaner.

Sludge formation is inhibited through the action of anti-polymerization agents. Fuel stability is improved through the action of solvents and dispersants. The results are improved combustion efficiency and fuel atomization.

Directions for Use and Dose Rates

Burnaid is completely oil soluble. The initial dosage rate is one litre to five tons of fuel. Actual dosage rates will be dependent on fuel quality and operating experience. Burnaid should be added via a metering pump. If no metering pump is available, use the suction manometer on the transfer pump as the dosage point. For diesel engines and boilers, Burnaid should be dosed during transfer from storage to the settling tank.

Where fuel analysis for Micro Carbon Residue (MCR) is available, or where CCAI values are known, dose according to the following table:

MCR %	8	9	10	12
Dose Rate	1:8000	1:7000	1:6000	1:5000
CCAI	835	840	845	850
Dose Rate	1:8000	1:7000	1:6000	1:5000

Burnaid can be dosed using Fuel Oil Treatment Dosing Unit, product No 664 619353.

Product Properties

APPEARANCE:	Clear, pale yellow liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	650 767566	25	Steel

Features, Benefits and Applications

- Improves combustion
- Reduces carbon deposits
- Limits soot formation
- Limits smoke emissions
- Reduces corrosion in tanks and fuel lines
- Conditions sludge in fuel
- Improves fuel stability
- Contains no metals
- Reduces the demand for excess air in boilers
- Improves boiler efficiency

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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DIESELITE

Combination Combustion Catalyst / Ash Modifier

Product Description

Dieselite is a multi-functional fuel treatment containing combustion catalysts and ash modifiers. It is intended for use in diesel engines and boilers burning residual fuels.

Product Properties

Carbon residue formation during combustion is inhibited by catalysts that lower the ignition temperature of heavy asphaltenic particles. The combustion time is consequently increased, leading to a reduction of tar deposits and carbonaceous firescale.

Ash modifiers combine with fuel combustion ash to raise the sinter and melting points of the ash above the engine or boiler normal operating temperatures. High temperature corrosion is minimised, reducing maintenance and extending service life. The majority of ash formed is ejected with the exhaust gases in a fine, solid state, and any ash remaining in the exhaust system is easily removed by light brushing.

The conversion of fuel sulphur to potentially corrosive sulphur trioxide gas is also inhibited. Sulphur trioxide reacts with condensed steam in the exhaust trunking, funnel uptakes and other cooler zones to form sulphuric acid.

Dieselite is a wide spectrum additive intended for continuous use.

Directions for Use and Dose Rates

For best results, Dieselite should be dosed automatically using a metering pump to dose into the fuel feed line as near to the injector or burner pump as possible. Where Micro Carbon Residue (MCR) or vanadium/sodium analysis is available, use the following table:

DOSE RATE: 1 ltr Dieselite per: x tons of fuel, see chart.

	Vanadium ppm	50	100	150	200	300	400
	Tons of fuel						
Sodium ppm	25	3	3.5	2.5	2	1	1
	35	2	3.5	2.5	2	1	1
	50	2	3	2.5	2	1	1
	65	1.5	2	2	2	1	1
	75	1.5	2	1.5	2	1	1
	85	1	2	1	2	1	1
	100	1	2	1	2	1	1
MCR%	10	12	14	16	18		
Dose	1:4000	1:3000	1:2500	1:2000	1:1000		

Example: A fuel contains 65 ppm Sodium and 150 ppm Vanadium. The dose rate should therefore be: 1 ltr Dieselite per 2 tons of fuel (1:2000)

If no analysis is available, use an initial dose rate of 1:4000 and adjust according to the results obtained.

Product Properties

APPEARANCE:	Dark brown liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	650 767112	25	Steel

Features, Benefits and Applications

- Reduces smoke, soot and carbon deposits
- Raises the melting point of sodium vanadium fuel ash to reduce high temperature corrosion and ash deposits
- Cold-end corrosion reduced by inhibiting acid flue gas
- Extends service life of engine components

Read the Material Safety Data Sheet before using this product

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Dieselite can be dosed using Fuel Oil Treatment Dosing Unit, product No 664 619353.

VALVECARE

Fuel Oil Ash Modifier

Product Description

Valvecare is specifically intended for treatment and reduction of corrosive deposits formed on exhaust valve seats and turbocharger components.

Valvecare physically modifies fuel ash, raising the sinter and melting points of the ash above the normal engine operating temperatures. Modified ash particles are solid, small and non-adhesive and are ejected with the exhaust gas stream. Valve seatings remain intact as ash deposits on valve seats are reduced. Guttering is minimised and valve cone and seat lives are extended, allowing for greater time between overhauls. Turbocharger and exhaust system fouling is controlled as the ash particles in the gas stream are less adhesive. Exhaust systems remain cleaner and any ash that is formed is friable and easily removed by conventional methods such as brushing.

Another advantage found with Valvecare is acid reduction. Vanadium in the fuel has a catalytic action, increasing the conversion from sulphur dioxide to sulphur trioxide during combustion. The sulphur trioxide then reacts with steam in the exhaust system, increasing the dew point to form sulphuric acid. Valvecare keeps the complex vanadium and sodium ash compounds in a solid, non-molten state, inhibiting fused salt corrosion.

Directions for Use and Dose Rates

Valvecare should be dosed either directly into the service tank or by automatic metering into the suction side of the booster pumps. Typical dose rates vary between 1:1000 and 1:5000 depending on the nature and severity of the problem. Use the table below for optimum dosage.

DOSE: 1 ltr. Valvecare per: x tons of fuel, see chart.

	Vanadium ppm	50	100	150	200	300	400	500
	Tons of fuel							
Sodium ppm	5	4	5	3.5	2.5	1.5	1	1
	35	2.5	5	3.5	2.5	1.5	1	1
	50	2.5	4	3	2.5	1.5	1	1
	65	2	2.5	2.5	2.5	1.5	1	1
	75	2	2.5	2	2.5	1.5	1	1
	85	1.5	2.5	1.5	2.5	1.5	1	1
	100	1.5	2.5	1.5	2.5	1.5	1	1

Example: A fuel contains 50 ppm Sodium and 150 ppm Vanadium.

The dose rate should therefore be: 1 ltr Valvecare per 3 tons of fuel (1:3000)

Valvecare can be dosed using Fuel Oil Treatment Dosing Unit, product No. 664 619353.

Product Properties

APPEARANCE:	Pale coloured liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING: Product No.	Size (in litres)	Container
650 769091	25	Steel

Features, Benefits and Applications

- Raises the melting point of sodium vanadium ash and reduces high temperature corrosion and guttering
- Keeps exhaust valves and turbochargers cleaner
- Reduces the amount of ash deposits throughout the exhaust system
- Extends service life of exhaust valves and extends the service interval for water or granulate washing of turbocharger blades
- Valvecare has been specially formulated to combat exhaust valve burning and erosion problems associated with sodium and vanadium contamination of poor quality heavy residual fuels

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 REMOVER

Soot Deposit Remover

Product Description

Soot Remover is a dry powder compound formulated for safe removal of soot and deposits from boilers and diesel engine exhaust systems.

Product Properties

If deposits are allowed to form on heat exchangers, the loss of efficiency can be directly related to extra fuel consumption. A 1 mm deposit is approximately equivalent to a 10% efficiency loss, a 3 mm deposit can reduce efficiency by up to 50%. The normal ignition temperature of soot is around 600°C. This means that it is burned only in the hottest parts of the boiler or diesel exhaust systems. Due to the catalytic action of Soot Remover, the ignition temperature of the soot/deposit is reduced to less than 280°C. The carbon deposits are thus ignited, leaving an easily removed ash.

The use of Soot Remover not only provides greater fuel efficiency, but also prevents acid formation in areas where severe corrosion could result in expensive damage, i.e. heat exchangers, superheaters, economisers, exhaust paths/stacks.

Directions for Use and Dose Rates

Soot Remover should be introduced to the boiler through a suitable port, preferably with a blower, ensuring that the powder is spread through the flame path towards the back of the combustion chamber.

For Diesel engines, inject Soot Remover directly into the exhaust system upstream of the area to be treated.

Soot Remover is preferably dosed using Unitor's FIXED INJECTOR, product No. 664 572073 and/or Portable Injector, product No. 664 572065.

Boiler

Steam Raised tons/hour	Fuel use tons/day	Dose Rate kg/day
3	5.5	1.0
6	11	2.0
9	16	3.0
12	21	3.5
15	27	4.0
23	41	4.5
31	55	5.0
46	82	5.5
62	110	6.5

Diesel Engines

Fuel Consumption tons/day	Dose Rate kg/day
10	1.5
20	3.0
30	3.5
40	4.0
50	4.5

Product Properties

APPEARANCE:	Blue green powder
DENSITY in g/cm ³ at 15°C:	1.2-1.4
FLASH POINT (PMCC) °C:	Not applicable
COMPATIBILITY:	
Metal:	If moist, may attack mild steel, iron and aluminium
Rubber:	No known effect

PACKAGING: Product No.	(in kg)	Container
650 571240	25	Steel

Features, Benefits and Applications

- Reduces soot and slag deposits
- Reduces cold-end corrosion
- Improves heat transfer
- Increases boiler efficiency
- Assists soot blowing

Read the Material Safety Data Sheet before using this product

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SOOT REMOVER LIQUID

Soot Prevention

Product Description

Soot Remover Liquid is formulated for effective prevention of soot and firescale deposits from boilers and diesel engine exhaust systems.

Product Properties

If firescale is allowed to form on heat exchangers, the loss of efficiency can be directly related to extra fuel consumption. A 1 mm deposit is approximately equivalent to a 10% efficiency loss, a 3 mm deposit can reduce efficiency by up to 50%. The normal ignition temperature of soot is around 600°C. This means that it is burned only in the hottest parts of the boiler or diesel exhaust systems. Due to the catalytic action of Soot Remover Liquid, the ignition temperature of the soot/firescale is reduced to less than 250°C. The carbon deposits are thus ignited, leaving an easily removable ash. The use of Soot Remover Liquid not only provides greater fuel efficiency, but also prevents acid formation in areas where severe corrosion could result in expensive damage, i.e. heat exchangers, superheaters, economisers, exhaust paths/stacks.

Directions of Use and Dosage Rates

Soot Remover Liquid should be introduced to the boiler through a suitable port, preferably with an injector, ensuring that the liquid is spread through the flame path toward the back of the combustion chamber. For Diesel engines, inject Soot Remover Liquid directly into the exhaust system upstream of the area to be treated.

Soot Remover Liquid should be injected with the following dosing equipment:

Manual Dosing Unit: Product no. 664 625194

Automatic Dosing Unit: Product no. 664 711358

Boiler

Steam Raised tons/hour	Fuel use tons/day	Dose Rate kg/day
3	5.5	1.0
6	11	2.0
9	16	3.0
12	21	3.5
15	27	4.0
23	41	4.5
31	55	5.0
46	82	5.5
62	110	6.5

Diesel Engines

Fuel Consumption tons/day	Dose Rate kg/day
10	1.5
20	3.0
30	3.5
40	4.0
50	4.5

Product Properties

APPEARANCE:	Clear blue liquid
pH:	3
Solubility in water:	100 %
DENSITY, g/cm ³ at 15°C:	1.12
FLASH POINT (PMCC) °C:	Not applicable
COMPATIBILITY:	

PACKAGING: Product No. Size (in litres) Container

650 624627 25 Plastic drum/keg


Features, Benefits and Applications

- For the prevention of soot and firescale deposits in diesel engine and boiler exhaust systems
- For reduction of cold-end corrosion where surface temperatures are lower than the dew point of the exhaust gases
- Reduce soot and slag deposit
- Reduces cold-end corrosion
- Improves heat transfer
- Increases boiler efficiency
- Aids soot blowing

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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Cleaning, Maintenance and Biochemicals

CLEANING AND MAINTENANCE

Problem and solution summary

Problem	Solution	Product(s)
CARGO TANK/HOLD		
Cargo tank cleaning after mineral oils	Solvent emulsion	Seaclean Plus
Cargo tank cleaning after drying, semi-drying and non-drying natural oils and fats	Saponifying and detergents	Alkleen Liquid Alkleen S. Liquid
Cargo tank cleaning after petrochemicals and light hydrocarbons	Detergents	Alkleen S. Liquid Aquabreak PX Unipol
Cargo tank cleaning after general chemical cargoes	Refer to Tank Cleaning Manual	Product choice depends on type of cargo, please consult UNITOR Tank Cleaning Manual
Fuel and lube oil tank cleaning	Tank cleaners for Rock&Roll cleaning method	Seaclean Plus
Hydrocarbon gas-freeing	Following normal or specific cleaning, wash with water based cleaner solution	Alkleen Liquid Alkleen S. Liquid Tankleen Advance
Cargo hold cleaning	Water based cleaner	Aquatuff / Aquatuff High Foam Aquabreak PX
Cleaning chemicals run off from vertical surfaces	Combine alkaline cleaners with a foam additive	Foam-agent
Cargo tank/hold sanitising and deodorizing	Wash with water based cleaner solution	Alkleen Liquid Alkleen S. Liquid Tankleen Advance
Oil spills on sea, in harbors, beaches and rocky shores	Low toxic, biodegradable oil spill dispersants	Seacare OSD Seacare Ecosperse 52
Removal of small oil spills on board	Sorbents + cleaning	Unitor Sorbents Seacare OSD Aquabreak PX
Cleaning and upgrading of coatings	Special purpose organic liquid	Zinc Coat Conditioner
Light cement stains	Liquid detergent containing strong inorganic acid	Metal Brite Metal Brite HD
Solidified cement	Clean with a solution of inorganic inhibited acid	Descaling liquid
Rust removal/metal surface brightener	Clean with a solution of inorganic inhibited acid	Metal Brite Metal Brite HD Tankleen Bright
White residue from epoxy-coating (after carriage of fatty acids etc.)	Clean with a solution of inorganic inhibited acid	Tankleen Bright
Cleaning of reefer containers and reefer cargo holds	Water based cleaner and disinfectant	Reefer Cleaner
Removal of sediments, silts and mud from ballast tanks	Special purpose polymer	Mud & Silt Remover

ENGINE ROOM

Cleaning of bilges, machinery spaces, bulkheads, tank tops and any oil/grease soiled areas	Self-splitting solvent based cleaner	Cleanbreak
Cleaning fuel/lube oil filters	Ultrasonic bath	Aquabreak PX Unitor USC Enviroclean
Cleaning machinery parts	Ultrasonic bath	Aquabreak PX Unitor USC Enviroclean
Degreasing marine diesel engine cooling water systems	Solution of solvent emulsion cleaners	Seaclean Plus
Removal of grease and carbon based deposits from turbocharges and from the air side of air coolers or heat exchangers	Special purpose cleaner	Air Cooler Cleaner ACC Plus Carbon Remover Carbonclean LT
Cleaning the oil side of the lube and fuel oil heat exchangers	Solvent emulsion cleaners of fuel oil treatment compound	Seaclean Plus Fuel Care
Removal of water scale from heat exchangers and boilers	Inhibited acid cleaners	Descaling Liquid Descalex
Cleaning of separator disc stacks	Clean with a solution of inorganic inhibited acid	Disclean
General removal of carbonaceous oil, varnish and grease residue	Special purpose solvents	Air Cooler Cleaner ACC Plus Carbon Remover Carbonclean LT
Removal and passivation of rust and oxidation from ferrous and non-ferrous metals	Use of a solution of inorganic inhibited acid	Metal Brite Metal Brite HD
Cleaning of new boilers and cooling systems	Special purpose water based cleaner	Commissioning Cleaner
Cleaning electrical apparatus	Ultrasonic bath	Electrosolv-E
Effluent treatment	De-emulsification + flocculation	Bilge Water Flocculant

DECK

Brightening up wooden decks	Special powder based product	Teak Renewer
Rust stains from painted, ceramic and wooden surfaces	Clean with a solution of inorganic inhibited acid	Metal Brite Metal Brite HD
Oxide stains on brass, aluminium and stainless steel	Clean with a solution of inorganic inhibited acid	Metal Brite Metal Brite HD
Light rust removal	Clean with a solution of inorganic inhibited acid	Metal Brite Metal Brite HD

Heavily rust removal	Liquid detergent containing strong inorganic acid	Descaling Liquid
Paintwork cleaning	Wash with water based cleaner solution	H.P. Wash Aquabreak PX Fore&Aft Metal Brite
ACCOMODATION		
General shipboard cleaning	General purpose water based cleaners	H.P. Wash Aquabreak PX Fore&Aft Uniwash
General accommodation cleaner	General purpose water based cleaners	Aquabreak PX Fore&Aft Uniwash
Carpets cleaning (spot + deodorizing)	Odor eliminator + cleaning through microbial activity	Gamazyme BOE*
Carpet cleaning	Special water based cleaner	Carpet Cleaner
Cleaning bathrooms	Special purpose bacterial formulation	Gamazyme MSC
Descaling of toilet bowls, drain and pipes	Special acid and bacteria based product	Gamazyme Toilet Descaler
Cleaning toilets	Special purpose bacterial formulation	Gamazyme BTC
GALLEY		
Removal of odor from garbage and waste collection areas	Odor eliminator + cleaning through microbial activity	Gamazyme BOE*
Floor cleaning - fat elimination/reduced slippage and increased safety in galley area	Special purpose bacterial formulation	Gamazyme FC
Cleaning of reefer rooms	Water based cleaner and disinfectant	Reefer Cleaner*
General cleaning	General purpose water based cleaners	Fore&Aft Uniwash Gamazyme MSC
MISCELLANEOUS		
Sewage treatment	Flocculation + dewatering	Bilge Water Flocculant
Foaming in sewage and waste systems	Non-silicone defoamer	Defoamer Concentrate*
Low biological activity in sewage treatment plants and systems	Special purpose bacterial formulation	Gamazyme 700 FN
Grease accumulation in drain lines, grease traps and floor drains	Special purpose bacterial formulation	Gamazyme Digestor*
Loosen corroded parts as nuts, bolts etc.	High speed penetrating oil	Penetron Plus
*) Also available as Bag in a box (Cruise)		

COLDWASH HD

Heavy duty degreaser

Product Description

Coldwash HD is a heavy duty degreaser based on petroleum solvents, emulsifying agents and surfactants.

Applications

This product is excellent for use on soiled surfaces, bilges and machinery parts.

Directions for use and dose rates

This degreaser can be applied neat with a brush, by hand spray, immersion, soaking etc. The contact- or soaking time should be between 15 minutes to 2 hours before washing off with hot or cold water. Hot water will improve the result of the cleaning.

Spot cleaning

Coldwash HD can be sprayed neat onto surfaces to be cleaned. The contact time should be at least 30 minutes or up to 2 hours if time allows. Bulkheads/walls can be washed down by use of high pressure cleaning machines. The best result is achieved with hot water between 60-80°C.

Spray method

Spray Coldwash HD neat onto soiled surfaces. The contact time should be between 15-30 minutes, and then wash off with water. To clean stubborn deposits, mechanical agitation such as scrubbing will improve the cleaning.

Soak method

Immerse the parts to be cleaned into a bath of neat Coldwash HD for 30 minutes, and then wash off with water.

Circulation method

Cleaning of equipment such as lube oil heat exchangers, fuel oil preheaters and filters can be accomplished by circulating undiluted Coldwash HD.

Product Properties

APPEARANCE:	Clear brown liquid
DENSITY in g/cm ³ at 15°C:	0.90
FLASH POINT (PMCC) °C:	Above 61
pH, conc. at 20 °C:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Sythetic rubber:	May swell

PACKAGING: Product No.	Size (in litres)	Container
651 571430	25	Steel
651 571455	210	Steel

Features, Benefits and Applications:

- Splits after cleaning, releasing the oil phase for reclamation
- Powerful degreaser with quick penetration and good emulsifying properties
- The emulsifying agents in this product are biological degradable
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Effective on mineral oils and petroleum based residues
- Safe to use on most metal surfaces and painted surfaces
- Removes oil contamination from machinery, engine parts and bilges
- Soak cleaning of machinery parts
- Rapid rinsing, leaves clean and oil-free surfaces

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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SEACLEAN

Oil and grease remover

Product Description

Seaclean is a highly concentrated cleaner based on petroleum solvents, emulsifying agents and surfactants.

Applications

Seaclean is formulated for cleaning double bottom, deep and wing tanks etc. used for fuel oils.

Directions for Use and Dose Rates

Cleaning of the oil side of the Lube Oil Heat Exchangers.

Cleaning is best achieved by the recirculation method using a heated 20% solution of Seaclean.

The Chemical Cleaning Unit - Product no 613807 - is recommended to be used.

1. Disconnect the heat exchanger's oil inlet and outlet, drain off any remaining oil.
2. Connect the discharge side of the Chemical Cleaning Unit (CCU) to the lower heat exchanger connection and fit the return to the CCU.
3. Add the required solution to the drum and use the installed heater or live steam. Raise the temperature of the cleaning solution between 65-75°C. Maintain the temperature throughout the cleaning operation. Cleaning without heating will extend the cleaning operation.
4. Circulate the solution for 12-15 hours. When the cleaning is completed, drain the cleaning solution.
5. Connect a fresh water supply to the upper heat exchanger connection, and rinse until the water runs clean from the lower connection. Flush thoroughly with fresh water.
6. When rinsing is completed, disconnect the water supply and thoroughly drain and dry the heat exchanger.

For heavy carbonised deposits, see Product Data Sheet for Carbon Remover.

Product Properties

APPEARANCE:	Light brown liquid
DENSITY in g/cm ³ at 15°C:	0.9
FLASH POINT (PMCC) °C:	Above 61
pH, conc. at 20°C:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Sythetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	652 571406	25	Steel

Features, Benefits and Applications

- Highly concentrated cleaner with quick penetration and emulsifying properties.
- The emulsifying agents in this product are biological degradable.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Can be used for general removal of oil and grease from soiled surfaces.
- Economical - very low dosage rates.

Read the Material Safety Data Sheet before using this product

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SEACLEAN PLUS

Tank Cleaner and Degreaser

Product Description

Seaclean Plus is a modern low-toxic, biodegradable solvent based product. It meets IMO's requirements regarding safety and pollution hazards of chemicals.

Applications

This product is excellent as a tank cleaner and degreaser.

Directions for Use and Dose Rates

Direct injection method - for tank cleaning machines

The dose rate should be between 0.1-0.2% i.e. 1-2 litres per ton wash water.

Recirculation method - for tank cleaning machines

It is advised to use a solution of 0.1-0.2% i.e. 1-2 litres per ton wash water mixed in the tank to be cleaned. The washing solution is usually 5-10% of the tank capacity.

Dose rates and results will vary depending on contamination, the temperature of the cleaning solution, and number of tanks to be cleaned with the solution. Best results are obtained when water is heated to a temperature between 65-80°C.

Spot cleaning

Seaclean Plus can be sprayed neat onto tank surfaces to be cleaned. The contact time should be at least 30 minutes. Bulkheads/walls can be washed down by use of tank washing machines or high pressure cleaning machines. The best result is achieved with hot water between 60-80°C. Slops should be constantly stripped from the tank and transferred to a holding tank or pumped ashore to slop tanks.

Rock and Roll method

1. Cleaning of double bottom tanks during voyages.
2. Heat the remaining fuel in the tank, trimming the vessel as required to assist in stripping tank.
3. Flush tank with sea water, stripping constantly.
4. After flushing, ensure all suction and discharge valves in the engine room are closed.
5. Dose tank with Seaclean Plus through the sounding pipe or manhole between 0.5 - 1 litre per ton of water, for 75-80% of capacity of tank to be cleaned.
6. Fill tank to 25% capacity with sea water, raise the temperature up to 60°C and maintain this for 24 hours.
7. Top up tank to 75-80% capacity with sea water and continue to heat for 48-72 hours.
8. Discharge and strip tank. Fill to 50-60% capacity with sea water and allow 2 hours rinsing time.

9. Discharge tank and strip, flushing tank with sea water for 2 hours, stripping continuously. When completed, inspect tank to ascertain if second cleaning is required. If so:
10. Add second dose of Seaclean Plus, fill tank to 75-80% capacity with sea water and raise the temperature to 60°C maximum. Maintain this for 48-72 hours. In calm seas recirculate the solution in tank as long as possible.
11. Discharge and strip tank, flush with sea water, stripping continuously for 2 hours.
12. To gas-free, fill tank with sea water to overflow through vents and sounding pipes, discharge and strip completely.

ROCK AND ROLL CLEANING DOSAGE CHART

Fuel Oil Viscosity Centistokes at 50°C	SEACLEAN PLUS per ton of water	
	1st Stage	2nd Stage
Over 320	1 litre	1 litre
180 to 320	1 litre	0.75 litre
30 to 180	0.75 litre	-
Up to 30	0.5 litre	-

For full cleaning instructions for various types of cargo, please consult the Tank Cleaning Manual.

Degreasing Marine Diesel Engine Cooling Water Systems

(This method can only be used when engine is out of service)

1. Drain the cooling system and flush with water.
2. Refill engine with water adding 20 litres Seaclean Plus per 1000 litres cooling water.
3. Circulate the solution through the system and heat until a temperature of about 60°C.
4. Continue circulation of the solution through the system for a minimum of 5 hours.
5. Drain engine and check the cleaning result. Repeat cleaning procedure if necessary.
6. When cleaning is completed, drain the system, and thoroughly flush with clean water. Refill while adding an anticorrosion treatment such as Dieselguard NB or Rocor NB Liquid.

Seaclean Plus can also be used for local cleaning and degreasing in engine rooms and on deck. It can be applied by brush, hand spray, immersion soaking or any other conventional means. Apply undiluted onto soiled surfaces and allow a contact time of 15-30 minutes before rinsing off with water.

Soak method

Immerse heavily soiled parts into bath of undiluted Seaclean Plus, medium to light soiled parts may be cleaned in a 10-30% solution in water. Parts should be soaked for at least 30 minutes before washing off with water.

See also next page

Spray method

Spray Seaclean Plus undiluted onto soiled areas. Allow between 15-30 minutes of penetration time before rinsing off with water.

Product Properties

APPEARANCE:	Clear pale yellow liquid.
DENSITY in g/cm ³ at 15°C:	0.8
FLASH POINT (PMCC) °C:	Above 61
pH, conc. at 20 °C:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect
Sythetic rubber:	No known effect

PACKAGING: Product No.	Size (in litres)	Container
652 654715	25	Steel
652 654723	210	Steel

Seaclean Plus has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Features, Benefits and Applications

- Highly concentrated tank cleaner with quick penetration and powerful emulsifying properties
- The emulsifying agents in this product are biological degradable
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Versatile, can be used for a wide range of applications.
- Easy to use by any conventional means
- Can be used for cleaning and gas-freeing of double bottom, deep, and fuel oil tanks at sea
- Can also be used for cleaning and gas-freeing of crude and refined mineral oil cargo tanks
- Can be used for degreasing and cleaning of bilge spaces and engine rooms
- Easy rinse off, leaving clean and oil-free surfaces
- Safe to use on most metal surfaces, painted surfaces and tank coatings
- Economical, very low dosage rates
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

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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CLEANBREAK

Self-Splitting Cleaner For Engine Room and Bilges

Product Description

Cleanbreak is a degreaser containing self-splitting emulsifiers. It allows the slop water to break into separate oil and water phases. Solvent based.

Applications:

The main applications are for cleaning in the engine room for machinery spaces, bulkheads, tank tops and on deck.

Directions for Use and Dose Rates

Cleanbreak is recommended for local cleaning and degreasing of engine rooms, bilges and tank tops. It can be applied by brush, spray, immersion, soaking, or any other conventional means. Cleanbreak is used neat. Allow a residence time of at least 30-60 minutes where possible, to ensure good penetration.

Wash down all surfaces using hot water if possible and high pressure water jet.

The emulsion residue after cleaning must be allowed to separate in a holding tank over sufficient time before passing through an oily water separator.

To achieve the best results from the splitting action of Cleanbreak. It is important that no other type of solvent/emulsifying cleaner is used in the engine room.

Product Properties

APPEARANCE:	Clear brown liquid
DENSITY, g/cm ³ at 15°C:	0.8
FLASH POINT (PMCC) °C:	Above 61
pH, conc. at 20°C:	N/A
COMPATIBILITY:	
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	651 571497	25	Steel
	651 571505	210	Steel
	651 765032	1	Plastic

Features, Benefits and Applications

- Highly effective, economical solvent cleaner
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Rapid penetration
- Slop emulsions break into two distinct phases
- Allows oil residues to be reclaimed
- Reduces disposal costs and associated problems
- Low toxicity, non corrosive
- Used for general cleaning of machinery spaces, bulkheads, decks, tank tops and any oil/grease soiled areas
- Should be used where slops are required to pass through oily water separators to meet current IMO-regulations
- Approved by Blohm + Voss AG for OWS type TCS/HD
- Approved by Marinfloc AB for use in engine rooms

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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ENVIROCLEAN

Water Based Cleaner and Degreaser

Product Description

A micro emulsion water based cleaner/degreaser. This product is low toxic, biodegradable and safe to use. It is based on natural citrus oil solvent linked with an advanced surfactant formulation.

Applications

The main applications are for cleaning and degreasing in the engine room and for deck for removal of grease, oil, sludge, polymer compounds, carbon deposits, dirt and grime.

Directions for Use and Dose Rates

1. General cleaning

Enviroclean can be used for all types of cleaning and degreasing and can be applied by brush, hand spray or used in ultrasonic cleaning tanks. Can be used neat or diluted from 1 part up to 15 parts of water according to the amount of soil to be removed.

After use as an engine room cleaner, bilge slops must be given sufficient time to separate before passing through an oily water separator.

2. Spot cleaning

Enviroclean can be hand sprayed neat or diluted up to 5 parts water and left for about 20-30 minutes before washing off with water.

Product Properties

APPEARANCE:	Orange liquid
DENSITY in g/cm ³ at 15°C:	1.0
FLASH POINT (PMCC) °C:	N/A
pH, conc. at 20°C:	7.5
COMPATIBILITY:	
Synthetic rubber:	May soften some rubber.
Metal:	No known effect.
Rubber:	May soften some rubber.

PACKAGING:	Product No.	Size (in litres)	Container
	652 571380	25	Steel
	652 571398	210	Steel
	652 765040	0,5	Steel

Features, Benefits and Applications

- Water based degreaser.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Low-toxic.
- Non-flammable.
- Promotes a pleasant and healthy working environment.
- Splits after cleaning, releasing the oil phase for reclamation.
- Enviroclean has numerous general marine cleaning applications including the removal of greases, oil, sludge, polymer compounds, carbon deposits, dirt and grime.
- As an engine room cleaner it is exceptional as not only can it be used for degreasing, cleaning paint work and carbon removal, but also for use in soak tanks, ultrasonic tanks and high pressure cleaning equipment.
- Approved by Blohm + Voss AG for OWS type TCS/HD.
- Approved by Marinfloc AB for use in engine rooms.

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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SEACARE O.S.D.

Dispersing Oil Spills at Sea and in Port

Product Description

Seacare Oil Spill Dispersant is a biodegradable hydrocarbon based product with high dispersing efficiency and low toxicity. It is approved as a Type I dispersant according to LR448 specifications by the Department for Environment, Food & Rural Affairs (DEFRA) former the U.K. Ministry of Agriculture, Fisheries and Food (MAFF). See definition below.

DEFRA / MAFF-approval Reference No. MFA/FEPA 201/2008.
SOAEFD-approval Reference No. FEP/ DISP/2008/01.

Directions for Use and Dose Rates

Oil Spills at Sea Seacare O.S.D. is used undiluted by direct spraying to clean up oil spills at sea. It can be applied by hand spray, work boats with mounted spray booms, or fire hoses with injectors. Allow some time for the oil to absorb the Seacare O.S.D. and then disperse mixture by vigorous agitation using fire hoses, ship's propeller, breaker boards towed behind work boats, etc.

Seacare O.S.D. should not be used in an area of sea of a depth less than 20 metres or within one mile of such area except in accordance with the advice of the local District Inspector of Fisheries of Ministry or Scottish Office Agriculture, Environmental and Fisheries Department (SOAEFD).

Oil on Beaches and Shore Line

Seacare O.S.D. should be applied neat by spraying over oiled areas. Allow time for the oil to absorb the Seacare O.S.D. then follow by washing down the beach or rocks, etc.

The treatment rate depends on the type and thickness of the oil spill, also on the age and condition. Under conditions where it is a thin slick of oil, 1 litre of Seacare O.S.D. is enough to treat approximately 10 square metres of oil. In many cases, several applications may be necessary.

Oil Spill on Deck

Remove as much of the oil as possible, then spray Seacare O.S.D. over area covered by the oil and allow some time for it to be absorbed. Disperse the mixture with water by means of a fire hose. Depending on type of oil it may be necessary to use several applications.

Definition

Quote: Type I: Conventional hydrocarbon-base - for use primarily undiluted on beaches, but may also be used undiluted from WSL spray sets using breaker boards or other suitable means of application and agitation.

Ministry of Agriculture, Fisheries and Food

Approval of the use of substances produced for the purpose of treating oil on the surface of the sea

Notes for guidance

- Article 3 of the Deposits in the Sea (Exemptions) Order 1985 as read with paragraph 21 of the Schedule to it, provides that a licence is not needed under Part II of the Act to deposit any substance produced for the purpose of treating oil on the surface of the sea provided you meet the following conditions:
 - The substance is one, the use of which, is for the time being approved by the licensing authority;
 - The substance is used in accordance with any conditions to which the approval was subject;
 - No deposits made in an area of the sea of a depth of less than 20 metres or within one mile of any such area, save with the approval of the licensing authority;
 - Similarly a licence is not needed (if conditions are satisfied) for the loading of a vessel aircraft, hovercraft, marine structure or floating container in England and Wales, with products for deposit for the treatment of oil on the surface of the sea, within British Fishery limits (other than waters adjacent to Scotland).

- The Ministry of Agriculture, Fisheries and Food has tested this product for toxicity and found it to be satisfactory at the specified application rate. It has also been tested for efficiency and safety in use by AEA Technology Plc. and similarly found to be satisfactory.
- A person who deposits in the sea a substance not for the time being approved by the licensing authority for the purpose of treating oil on the surface of the sea or not within the terms of this approval, may be in breach of the terms of the Food and Environment Protection Act, 1985.
- A person who intends to use any substance for the purpose of treating oil on the surface of the sea should also consult the Nature Conservancy Council before beginning operations.
- Copies of the current Continental Shelf Operations Notice (CSO 7) are obtainable from the Department of Energy, Petroleum Engineering Division, Thames House South, Millbank, London SW1P 4QJ.
Further information on the use of oil spill dispersants is contained in the Institute of Petroleum (London) publication "Guidelines on the Use of Oil Spill Dispersants" 2nd Edition (1988).

Product Properties

APPEARANCE:	Amber liquid
DENSITY, g/cm ³ at 15°C:	0.8
FLASH POINT (PMCC) °C:	Above 61
pH, conc. at 20°C:	N/A
COMPATIBILITY:	
Metal:	No known effect.
Rubber:	Do not use with natural rubber compounds.
Synthetic rubber:	May swell.

PACKAGING:	Product No.	Size (in litres)	Container
	652 571562	25	Steel
	652 571570	210	Steel

Features, Benefits and Applications

- Approved Type I dispersant according to the latest LR448 specifications of AEA Technology Plc. covering both efficiency and toxicity for use in dispersing oil on sea, beaches and rocks
- Raised standards for operator safety in handling and use, being biodegradable and having low toxicity and a high flash point
- Rapid efficient dispersal of a wide range of oil residues. Converts hydrocarbons into very fine emulsions
- Ready to use product
- Disperses mineral oils, crude oils, residual fuel oils, diesel fuel oil, kerosene, white spirit and lubricant oils
- For use on oil spills that may occur during loading or discharging of cargo or bunkers where allowed
- For cleaning of spills on deck, ships side, piers, wharfs, etc. where allowed

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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UNITOR SEACARE ECOSPERSE 52

Product description

Seacare Ecosperse 52 is a concentrated oil spill dispersant highly efficient for use on a wide range of oils. It converts hydrocarbons into fine emulsions that can be biodegraded much more quickly in sea water. It can be applied by boat or aerial spraying.

When authorized, this product can be used as a concentrate or diluted for many types of oil cleaning operations at sea, on rocky shoreline and beaches.

Seacare Ecosperse 52 is non toxic and biodegradable.

Seacare Ecosperse 52 official approvals and listings:
DEFRA. The UK Department for Environment, Food & Rural Affairs. Reference No. MAFF/FEPA 129/2001. Type II and Type III dispersant
SOAEFD. Scottish Office Agriculture, Environment and Fisheries Department. Reference No. FEP/DISP/2001/7
EPA. U.S. Environmental Protection Agency

Directions for use

Dispersion

Oil Spills at Sea – Application from boat

Seacare Ecosperse 52 can be used neat or diluted with sea water. It can be applied by spray from booms on work boats, hand sprayers or hoses using an injector.

Used neat (Type III for UK & Scotland), 1 litre of Seacare Ecosperse 52 will disperse between 20 and 30 m² of oil depending on the thickness and age of oil being treated.

Used diluted (Type III for UK & Scotland), Seacare Ecosperse 52 can be diluted with seawater at a ratio of 1 to 10. Mix immediately before use. 1 litre of mixture will cover approximately 10 square metres of oil spill. The ratio can vary depending on the type and thickness of oil spill. At sea one part of mixture will disperse 2-3 parts of oil.

To maximize the efficiency of dispersion it is important that a dispersant is used at an early stage of the operation, before oil weathering takes place.

Oil Spills at Sea – Aerial Spraying

In the UK, aircraft using the appropriate form of spraying equipment which has been tested and found satisfactory by AEA Technology Plc. may spray Seacare Ecosperse 52 over the sea, the product being used neat. Seacare Ecosperse 52 has passed tests in accordance with the specification of the UK Ministry of Defence.

Cleaning

Oil on beach and rocky shore

Remove and reclaim as much oil as possible. Then using suitable spraying equipment, spray Seacare Ecosperse 52

over the oiled areas using one part of dispersant to 7-20 parts of oil. Wash down the beach or rocks with water. The quantity of product used depends on the type and thickness of oil spilt, also on the amount of weathering of the oil. In some cases several applications may be necessary.

Use in the UK (Department for Environment, Food & Rural Affairs) & Scotland

Definition

The following classification and definition of oil spill treatment products is valid for the UK and Scotland:

Type II : Water-dilutable Concentrate - for use at sea after dilution 1:10 with sea water and sprayed from WSL spray sets using breaker boards or other suitable means of application and agitation.

Type III: Concentrate - for use undiluted from aircraft, ships or on beaches, using appropriate spray gear.

Notes for guidance

It is the responsibility of the user to comply with the restrictions that can apply for each country regulation and depending if the product is used as a dispersant and/or as a cleaning agent.

International guides for using marine dispersants

- "Using dispersant to treat oil slicks at sea", AIRBORNE AND SHIPBORNE TREATMENT- RESPONSE MANUAL François Xavier Merlin, December 2005, CEDRE (Centre de Documentation, de Recherche et d'Expérimentations sur les Pollutions Accidentelles des Eaux)
- "Dispersants and their role in oil spill response" 2nd edition, 2001
 IPIECA (International Petroleum Industry Environmental Conservation Association)
- "Guidelines on Oil Spill Dispersant Application", IMO (International Maritime Organization)
 Ref. IA575E for english, IA577S for spanish, IA576F for French version
 "Manual on Oil Pollution - Section IV", 2005 Ed, IMO (International Maritime Organization)
 Ref. I578E for english, IA569F for French, IA569S for spanish
- "The use of chemical dispersants to treat oils", TECHNICAL INFORMATION PAPER N° 4, 2005
 ITOPF (The International Tanker Owners Pollution Federation Limited)

See also next page

Features

- Approved by standards internationally recognized:
 - approved by the DEFRA (UK) as a Type II/III dispersant according to the LR448 Specifications of AEA Technology Plc. for dispersion efficiency and the "Fisheries research Technical Report N° 102" covering the toxicity for use in dispersion of oil on sea, beaches and rocks.
 - registered by the US EPA National Contingency Plan (Federal Register, Subpart J - Use of Dispersants and Other Chemicals).
- Used as dispersant :
 - High dispersion efficiency product
 - Accelerate the natural biodegradation of dispersed hydrocarbons
 - Avoid the crude oil to end-up on shore
 - Simple, quick and efficient answer
- Efficient dispersion of wide range of oils in a broad range of temperatures, salinities, and concentrations. Only application in low salinity water is not recommended.
- Used as cleaning agent
 - High efficiency for cleaning hydrocarbons (oils and other related products)
 - For cleaning of hydrocarbons spills on deck, ships side, piers, wharfs, etc., where allowed.
 - Cleaning up after spills that may occur during loading of bunkers where allowed.
- Low stocks required compared to Type I products.
- High standards in operator safety in handling and uses.

Product Properties

APPEARANCE:	Clear, slightly viscous liquid
DENSITY, in g/cm ³ at 15°C:	1.01
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	8-9
COMPATIBILITY:	
Metal:	No Known effect
Coatings:	No Known effect
Rubber:	No Known effect

PACKAGING:	Product No.	Size (in litres)	Container
	659 769653	25	
	659 769661	210	

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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ALKLEEN SAFETY LIQUID

Non Caustic Alkaline Cleaner For Vegetable And Animal Oils

Product Description

Non caustic water based alkaline cleaner, containing corrosion inhibitors to prevent the corrosion of metals such as zinc, aluminium, copper, brass and tin. Alkleen Safety Liquid minimises the hazards in handling caustic based materials.

Directions for Use and Dose Rates

Cargo tank cleaning following discharge of drying, semi-drying and non drying natural oils and fats.

As soon as possible after the cargo has been discharged, the tanks should be flushed with cold water to prevent polymerisation and evaporation of the lighter oil fractions.

Whenever possible, the cleaning solution should be heated to 60-80°C. However, the polymerising nature of some natural oils may demand lower cleaning temperatures.

The most economical method of using Alkleen Safety Liquid is by direct injection followed by recirculation washing, using tank cleaning machines. If this method is not possible, hand spraying provides acceptable options. Refer to dosage table overleaf for dosage rates.

Alkleen Safety Liquid has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Dosage Table

The table below gives approximate solution strengths for various cargo residues.

Cargo Residue	Handspray	Recirculation	Direct Injection	*Approx. recirculation consumption, litres per 1000 m ³ tank space
Fatty acids, fatty alcohols				
Fish oils	100%	3-5%	2-4%	180-300
Drying & semi-drying vegetable oils	100%	3-5%	2-4%	180-300
Non-drying vegetable oils	50-100%	2-4%	1-3%	120-240
	50-100%	2-4%	1-3%	120-240

*When using the recirculation method, the tank to be cleaned is filled with water to a level that the heating coils are covered. As an average, this is approximately 0.6% of the volume of the tank. The figures mentioned in this column are the quantity of Alkleen Safety Liquid required to obtain the recommended solution strengths.

Product Properties

APPEARANCE:	Colourless liquid
DENSITY, in g/cm ³ at 15°C:	1.1
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc. at 20°C:	13
pH, in 1% at 20°C:	11.4
COMPATIBILITY:	
Metal:	The concentrated product may react with aluminium, zinc, tin and their alloys.
Rubber:	May swell.
Synthetic rubber:	May swell.

PACKAGING:	Product No.	Size (in litres)	Container
	652 571513	25	Plastic
	652 571521	210	Steel

Features, Benefits and Applications

- Non-caustic
- Non-flammable
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-corrosive to ferrous metals
- Suitable for all tank-coatings
- Can be used for gas and hydrocarbon-freeing of tanks
- Can be used for deodorizing
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

Read the Material Safety Data Sheet before using this product

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ALKLEEN LIQUID

Heavy Duty Alkaline Tank Cleaner

Product Description

Alkleen Liquid is a heavy duty water based alkaline tank cleaner, containing natural based detergents. For zinc silicate coatings use Alkleen Safety Liquid.

Applications

Alkleen Liquid is a powerful cleaner for cleaning of cargo tanks after discharge of drying, semi-drying and non-drying natural oils and fats.

Alkleen Liquid can be used for tank sanitising and deodorising prior to changing to foodstuffs. To achieve the high standard of cleanliness required, a final wash will be necessary by using this product.

Directions for Use and Dose Rates

Immediately after the cargo has been discharged, the tanks should be flushed with cold water to prevent polymerisation and evaporation of the lighter oil fractions.

Whenever possible, the cleaning solution of 0.2-3% in fresh water should be heated to 60-80°C. However, the polymerising nature of some natural oils demand lower cleaning temperatures.

The most economical method to use Alkleen Liquid is by direct injection followed by recirculation washing by using tank cleaning machines.

If this method is not possible, use other methods such as recirculation or hand spraying.

When changing refrigerated cargoes the need may arise to clean holds to remove animal or vegetable fat and to sanitise and deodorise before the next cargo. A solution of 5-10% in fresh water can be used for this purpose, and may be sprayed on and rinsed off by using hot water and high pressure.

Alkleen Liquid has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.2
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	13
COMPATIBILITY:	
Metal:	Corrosive to aluminium, magnesium, zinc and tin.
Rubber:	No known effect.
Synthetic rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	652 571539	25	Plastic
	652 571547	210	Steel

Features, Benefits and Applications

- Reformulated with improved cleaning properties
- Powerful alkaline tank cleaner containing detergents
- The emulsifying agents are biological degradable
- Non flammable
- Non corrosive to ferrous metals and epoxy coatings
- Rapid penetration and emulsification of vegetable, animal and fish oils
- Rapid rinsing
- Removes hardened oxidised oil and grease deposits
- Used as heavy duty cargo tank cleaner following discharge of drying, semi-drying and non-drying natural oils and fats
- Can also be used as final treatment for cleaning tank from black to white or grain
- Can be used for hydrocarbon freeing of cargo tanks
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

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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FORE & AFT

Multi Purpose Biodegradable Cleaner

Product Description

Fore & Aft is a biodegradable cleaner containing surfactants and alkaline materials.

Applications

Cleaning accommodation and galley areas.

Directions for Use and Dose Rates

Depending on the application, Fore & Aft can be diluted with water in concentrations from 1-50% or used undiluted.

For cleaning of public areas, such as floors, tiles, walls paint work etc., it can be used in concentrations between 1-10% and applied by mops, spray or sponge and rinsed off with water after the cleaning.

For objects such as furnitures, plastics, vinyls etc., a concentration between 1-5% is recommended. Rinse off with water after the cleaning.

Product Properties

APPEARANCE: Blue liquid

DENSITY, in g/cm³ at 15°C: 1.1

FLASH POINT, (PMCC) in °C: N/A

pH, in conc. at 20°C: 12

COMPATIBILITY:

Metal: The concentrated product may react with aluminium, zinc, tin and their alloys.

Rubber: No known effect.

Synthetic rubber: No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 571554	25	Plastic

Features, Benefits and Applications

- Biodegradable cleaner
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-caustic
- Non-flammable
- Economical in use
- Acceptable for use in the food storage areas
- Suitable for cleaning of sanitary fixtures i.e. showers, toilets etc.
- Can be used on windows and port holes
- Phosphate free

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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H.P. WASH

Alkaline Cleaner for High Pressure Washing Machines

Product Description

H.P. Wash is an alkaline cleaner with detergents and surfactants which quickly dissolve grease and dirt deposits.

H.P. Wash is designed for use with high pressure cleaning machines such as Unitor High Pressure Cleaners.

Applications

H.P. Wash is suitable for most painted surfaces and dries leaving a good shine.

Directions for Use and Dose Rates

For high pressure cleaning, apply the cleaning agent in an even layer using low pressure. Allow solution to penetrate soil for about 3-5 minutes before washing off thoroughly with high pressure water.

The recommended dose rates for the application using low pressure side of the cleaning machine, is between 0.5-5% depending on amount and type of soil.

H.P. Wash can be used by conventional cleaning using brush, rag or spray at a dose rate of 5-20% in water depending on the soiling. Allow 5 minutes for penetration, then rinse off with water.

Product Properties

APPEARANCE: Yellow liquid

DENSITY, in g/cm³ at 15°C: 1.1

FLASH POINT, (PMCC) in °C: N/A

pH, in conc at 20°C: 12

COMPATIBILITY:

Metal: In concentrated form, may react with aluminium, zinc, tin and their alloys.

Rubber: May swell natural or synthetic rubber.

PACKAGING: Product No.	Size (in litres)	Container
651 571729	25	Plastic
651 765065	1	Plastic

Features, Benefits and Applications

- Reformulated with improved cleaning properties
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Biodegradable cleaner
- Non-flammable
- Formulated for use with H.P. cleaning machines
- Rapid dispersal of a large range of oils and greases
- Low dose rates 0.5 to 5%
- Leaves a good shine on hard surfaces after cleaning
- H.P. Wash is suitable for hot or cold high pressure spray equipment
- Can be used for general cleaning in the engine room, outside paint work and on the deck
- Can be used on Ro/Ro vessel car decks, for removal of traffic film
- Can be used for cleaning of fish holds and process machinery onboard factory vessels
- Approved by Marinfloc AB for use in engine rooms
- Phosphate free

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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UNI-WASH

General Purpose Detergent

Product Description

Uni-Wash is a liquid detergent with good foaming qualities. It contains wetting agents that allow rapid penetration to remove fat, oil, grease or grime. pH-neutral.

Applications

Cleaning accommodation areas.

Directions for Use and Dose Rates

Depending on the degree of contamination Uni-Wash shall be mixed with warm water at a dose rate of 50-200 ml per 10 litres, i.e. 1 cup to a bucket of water.

Uni-Wash solution can be applied simply by mops, brushes or rags, or dip the soiled articles into the Uni-Wash solution. After cleaning, rinse off with cold or warm water.

Due to high foaming properties, Uni-Wash is not recommended for laundry washing machines.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.0
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc at 20°C:	8
COMPATIBILITY:	
Metal:	No known effect.
Rubber:	No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 571745	25	Plastic

Features, Benefits and Applications

- Biodegradable detergent
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-flammable
- Pleasant smell
- Leaves surfaces residue free
- Acceptable for use in food areas
- Suitable for accommodation cleaning of woodwork, leather, desks etc.
- Suitable for cleaning of toilets and showers
- Can be used for cleaning of dishes
- Can be used for cleaning of windows and port holes

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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AQUABREAK PX

Multi Purpose Water-Based Degreaser

Product Description

Aquabreak PX is a multipurpose cleaning and degreasing agent. It is low-toxic, non-caustic, free of hydrocarbon solvents and biodegradable. The surfactant formulation with complex binders has a good cleaning efficiency. Dirt and oily matters is effectively removed without the use of solvents and caustic based cleaners.

Direction for Use and Dose Rates

General Cleaning

Aquabreak PX can be used for all types of cleaning and degreasing, and it can be applied by brush, hand spray or used in ultrasonic bath.

It can be used undiluted or diluted up to 50 parts with water according to the amount and type of soil to be removed.

Aquabreak PX can be applied on vertical surfaces by adding Unitor Foam-Agent (Product no. **651 614537**) for increased resident time.

Tank Cleaning

Cargo tank cleaning after mineral, animal, vegetable and fish oil.

Method for Application and Dose Rates

1. Direct injection method with tank washing machines: Use a dose rate of 0.5-5 litres per ton wash water (0.05-0.5%).
2. Recirculation method: Use a dose rate of 0.5-7 litres per ton wash water (0.05-0.7%).
3. Spot cleaning: Hand sprayed neat or diluted up to 1-5 parts with water. Leave solution for about 20-30 minutes before washing off, but make sure the surface remains wet.
4. For problem deposits, please consult the Unitor Tank Cleaning Manual.

Aquabreak PX can be used on the majority of tank coating materials, painted or lacquered surfaces, light metals, plastics and textiles.

Aquabreak PX has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.0
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	12
COMPATIBILITY:	
Metal:	No known effect.
Rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	651 575613	25	Plastic
	651 575605	210	Steel
	651 773532	1	Plastic

Features, Benefits and Applications

- Water based cleaner
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Low toxic and non-caustic
- Biodegradable
- Non-flammable
- Free from hydrocarbon solvents
- Safe on all materials
- Very effective and economical in use
- Aquabreak PX has numerous general cleaning applications including the removal of grease, oil, sludge, carbon deposits and grime
- Can be used as engine room cleaner
- Suitable for cargo tank cleaning
- Good for use in galleys and on decks
- Suitable for cleaning of soiled textiles as rugs, covers, mats, overalls etc.
- Effectively cleans fiberglass boats
- IMO approved and listed in Annex 10 of the MEPC.2/Circular
- Approved by Marinfloc AB for use in engine rooms
- Approved by NSF

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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AQUATUFF

General Purpose Strong Alkaline Cleaner

Product Description

Aquatuff is a heavy-duty water based alkaline cleaner. It has numerous cleaning applications including removal of greases, waxes, vegetable and animal oils, sludge, soot, carbon deposits, dirt and grime. Aquatuff is also used for cargo hold cleaning after coal and pet coke.

Directions for Use and Dose Rates

General Cleaning

Aquatuff can be used for different types of cleaning, and it can be applied by brush, hand spray, high and low pressure washing machines etc. It can be applied on vertical surfaces by adding Unitor Foam-Agent (Product no. **651 614537**) for increased resident time.

Removal of soot from Inert Gas Systems (IGS)

1. Apply Aquatuff with a Unitor High Pressure Cleaning Machine and use 1:4 with water. However, if used with a hand sprayer, apply the product neat on the surfaces, allowing 1 litre per 12 m².
2. Leave for about 30-45 minutes. The surface remains wet.
3. Wash down with hot water (80°C) and check the results.
4. Repeat the procedure if necessary.

Cargo hold cleaning

Aquatuff can be used for cargo hold cleaning after soot, coal, pet coke and other bulk materials.

Method of Application and Dose Rates

1. Direct injection method with tank washing machines: Use a dose rate of 1-20 litres per ton wash water (0.1-2%).
2. Recirculation method: Use a dose rate of 1-20 litres per ton wash water (0.1-2%).
3. Spot cleaning: Hand spray neat or prepare a 20% solution, and leave for 20-30 minutes before rinsing off with water. The surface should be kept wet.

Product Properties

APPEARANCE:	Orange liquid
DENSITY, in g/cm ³ at 15°C:	1.1
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	13
COMPATIBILITY:	
Metal:	The concentrated product may react with aluminium, zinc, tin and their alloys.
Rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	651 607826	25	Plastic
	651 607827	210	Steel
	651 765030	1	Plastic

Features, Benefits and Applications

- Heavy duty water based cleaner
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Biodegradable
- Free from hydrocarbon solvents
- Removal of soot deposits from inert gas systems
- Aquatuff is most suitable for removal of wax deposits
- It has numerous cleaning applications including removal of grease, vegetable and animal oil, soot and general dirt and grime
- Ideal for cleaning after coal and pet coke
- Effective and economical in use
- Completely safe on epoxy coatings
- Approved by Marinfloc AB for use in engine rooms

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-AGENT

Foam Additive

Product Description

Foam-agent is a water based non-flammable product. When using this foam additive, the cleaning efficiency of the cleaning chemicals will be enhanced. It will also be a more economical use of the cleaning chemicals.

Directions for Use and Dose Rates

Foam-Agent can be used together with the below mentioned water based cleaning chemicals. This makes it possible to apply the chemicals as foam, and prevent that the cleaning chemicals run off from vertical surfaces.

Aquatuff, Aquabreak PX, Alkleen Liquid, Alkleen Safety Liquid, Fore & Aft, H.P. Wash and Reefer Cleaner.

Add 50 ml Foam-Agent per 10 litres washing solution, mix and apply with foam-equipment onto soiled surfaces.

Advice to follow the directions for use for the actual cleaning product.

After the cleaning process.

Defoamer concentrate Product no. 651 661843 can be used to remove undesirable foam.

Product Properties

APPEARANCE: Light yellow liquid

DENSITY, in g/cm³ at 15°C: 1.05 - 1.06

FLASH POINT, (PMCC) in °C: N/A

pH, in conc: 8 - 9

COMPATIBILITY:

Metal: No known effect.

Rubber: No known effect.

Synthetic rubber: No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 614537	5	Plastic

Features, Benefits and Applications

- Biodegradable.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Non-flammable.
- Suitable for use with our water based alkaline cleaning chemicals.
- Prevents that the chemicals run off from vertical surfaces, and increases the resident time.

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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AQUATUFF HIGH FOAM

High Foaming Alkaline Cleaner

Product Description

Aquatuff High Foam is a heavy duty alkaline cleaner with good foaming qualities specially formulated for cleaning cargo holds on bulk carriers and OBOs. The dense foam created prevents the cleaning solution from running off vertical surfaces and thereby enhances the cleaning efficiency. It is water based and is safe to the environment, containing only biodegradable ingredients. It effectively removes most dry cargoes to "water white standard". Aquatuff High Foam is specially developed for cargo hold cleaning, but may also be used for other cleaning applications where Aquatuff normally is used but where high foam is beneficial.

Directions for Use and Dose Rates

Cargo Hold Cleaning Aquatuff High Foam is specially developed to clean vertical surfaces. When applied with the proper spray foam equipment, the dense foam created prolongs the contact time between the cleaning solution and the surface to be cleaned. It effectively removes most dry cargoes, sludge, soot, carbon deposits, fish meal etc., and is used for cargo hold cleaning when going from black to white cargo.

Aquatuff High Foam should not be used on zinc coatings, use then Aquabreak PX (Product no. 651 575613 and 651 575605).

Method of Application and Dose Rates

1. Apply Aquatuff High Foam mixed 10 to 25% (ratio 1:9 to 1:3) in water, using spray foam equipment.
2. Leave for 30 – 45 minutes. The surface remains wet.
3. Wash down with a high pressure unit. For best results, direct the high pressure jet at the lowest parts of the hold first and work upwards.
4. Repeat the procedure if necessary.

If Unitor Slip-Coat (Product no. 652 737015 and 652 737023) is applied to the cargo hold surfaces prior to loading, the concentration of Aquatuff High Foam in the cleaning solution may be reduced.

Product Properties

APPEARANCE:	Orange liquid
DENSITY, in g/cm ³ at 15°C:	1.1
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	13
COMPATIBILITY:	
Metal:	The concentrated product may react with aluminium, zinc, tin and their alloys.
Rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	652 736991	25	Plastic
	652 737007	210	Steel

Features, Benefits and Applications

- Heavy Duty alkaline water based cleaner.
- Specially formulated for the cleaning of cargo holds.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Biodegradable.
- Free from hydrocarbon solvents.
- Ideal for cleaning after coal, pet coke and other difficult cargoes.
- Effective and economical in use.
- Completely safe on epoxy coatings.
- Complies with all environmental regulations and the EU Detergent Regulation.

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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SLIP-COAT

Temporary Cargo Barrier For Dry Cargoes

Product Description

Slip-Coat is a water based liquid product specially formulated to leave a thin, temporary film on cargo hold surfaces. The film provides a barrier between the cargo and the cargo hold surfaces making the cleaning operation after unloading quicker and easier, and optimal cleaning result is achieved. Slip-Coat is safe to the environment and to the personnel handling it, and will not contaminate the cargo. It is non-corrosive and safe on all coatings.

How it works

After drying, Slip-Coat creates a thin, non-sticky film on the cargo hold surfaces. The film substantially facilitate the cleaning before next cargo in two ways:

1. The film fills the minute pores in the surface, and prevents that small particles are trapped in the pores.
2. Small, solid particles can be very difficult to remove especially from organic coatings, even with the use of effective cleaning agents and high pressure water jets. The reason is the build up of electromagnetic forces, and some times the only way to remove the particles is by scrubbing. Slip-Coat provides a barrier between the particles and the surface that minimize this problem, and the particles may now be removed with high pressure water only. The film is completely water soluble and is easy to remove even with cold sea water. To avoid re-deposition of contaminants a cleaning agent should be used, but at lower dosage rates than what normally is required. Slip-Coat may also be sprayed on deck, superstructure and other areas exposed to dust during loading and unloading operations.

Directions for Use and Dose Rates

The cargo hold surfaces should be as clean and dry as possible before treatment. Slip-Coat is supplied at ready-to use concentration and may be applied directly from the drum. Spray the liquid on the cargo hold surfaces by the use of suitable low-pressure spraying equipment. As soon as the surface appears water wet, a proper film is created; do not apply more than necessary. 1 litre Slip-Coat will cover 15-20 m². Allow the film to dry completely before loading the cargo. Depending on air temperature and humidity this will take 1 to 2 hours. After reloading, apply a 2-5% solution of a cleaning agent in water to avoid re-deposition of contaminants, and finally flush with clean, high pressure water. Suitable cleaning agents are:

Aquatuff (Product no. 651 607826 and 651 607827)
Aquatuff High Foam (Product no. 652 736991 and 652 737007)

Aquabreak PX (on zinc silicate coatings, Product no. 651 575613 and 651 607827).

After flushing with water, let the surfaces dry and then repeat the treatment with applying Slip-Coat before next cargo.

Product Properties

APPEARANCE:	Clear, slightly viscous liquid
DENSITY, in g/cm ³ at 15°C:	1.01
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	6
COMPATIBILITY:	
Metal:	No known effect.
Coatings:	No known effect.
Rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	659 737015	25	Plastic
	659 737023	210	Steel
	659 765115	1	Plastic

Features, Benefits and Applications

- Water soluble cargo hold barrier – easily removable with water
- Saves cleaning time and cleaning chemicals
- Ideal when cleaning after coal, pet coke and other difficult cargoes.
- Completely safe on all coatings.
- Prevents even the most difficult cargo to adhere to the coating
- Easy to apply – easy to remove
- Provides temporary protection against corrosion
- Water based – free from hydrocarbon solvents.
- Complies with all environmental regulations

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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SLIP-COAT WR

Water Resistant Cargo Hold Barrier

Product Description

Slip-Coat WR is a liquid, water based product specially formulated to leave a temporary water resistant film on cargo hold surfaces. The film provides a barrier between the cargo and the cargo hold surfaces making the cleaning operation after unloading quicker and easier, and optimal cleaning result is achieved. The film is water insoluble thus making it suitable for typically humid cargoes as sulphur. The cargo hold surfaces are also protected from corrosion making lime wash unnecessary. Slip-Coat WR is safe to the environment and to the personnel handling it, and will not contaminate the cargo. It is non-corrosive and safe on all coatings.

Directions for use

After drying, Slip-Coat WR creates a thin, non-sticky film on the cargo hold surfaces. The film substantially facilitate the cleaning before next cargo in two ways:

1. The film fills the minute pores in the surface, and prevents small particles from being trapped in the pores.
2. Small, solid particles can be very difficult to remove especially from organic coatings, even with the use of effective cleaning agents and high pressure water jets.

The reason is the build up of electromagnetic forces, and some times the only way to remove the particles is by scrubbing. Slip-Coat WR provides a barrier between the particles and the surface that minimizes this problem and in addition gives temporary protection to steel surfaces against highly corrosive cargoes as humid sulphur. After cargo discharge, both the film and cargo residues are easily removed by the use of an alkaline cleaner, a 10% solution of Aquatuff or Aquatuff High Foam in fresh water is ideal. Slip-Coat WR may also be sprayed on deck, superstructure and other areas exposed to dust during loading and unloading operations.

Slip-Coat WR should not be used in cargo holds carrying foodstuff, standard Slip-Coat is then recommended.

Dosing method

The cargo hold surfaces should be as clean and dry as possible before treatment. Slip-Coat WR is supplied at ready-to use concentration and may be applied directly from the drum.

Spray the liquid on the cargo hold surfaces by the use of suitable low-pressure spraying equipment. As soon as the surface appears water wet, a proper film is created; do not apply more than necessary. 1 litre Slip-Coat WR will cover 15-20 m². Allow the film to dry completely before loading the cargo. Depending on air temperature and humidity this will take 1 to 2 hours.

After off-loading, apply a 10% solution of an alkaline cleaning agent in water, leave for 15 - 30 minutes and finally flush with clean, high pressure water. The cleaning solution dissolves the barrier film, cleans the surfaces from cargo residues and prevents re-deposition of contaminants.

Suitable cleaning agents are: Aquatuff (Product no. 651 607826 and 651 607827) Aquatuff High Foam (Product no. 652 736991 and 652 737007) After flushing with water, let the surfaces dry and then repeat the treatment with applying Slip-Coat WR before next cargo.

Features

- Water resistant cargo hold barrier - easily removable with an alkaline cleaner
- Saves cleaning time and cleaning chemicals
- Ideal when cleaning after humid and corrosive cargoes as sulphur.
- Completely safe on all coatings.
- Prevents even the most difficult cargo to adhere to the coating
- Easy to apply - easy to remove
- Provides temporary protection against corrosion
- Water based - free from hydrocarbon solvents.
- Complies with all environmental regulations

Product Properties

APPEARANCE: Clear, slightly viscous liquid

DENSITY, in g/cm³ at 15°C: 1.01

FLASH POINT, (PMCC) in °C: N/A

pH, in conc: 8-9

COMPATIBILITY:

Metal:	No Known effect
Coatings:	No Known effect
Rubber:	No Known effect

PACKAGING:	Product No.	Size (in litres)	Container
	659 757395	25	Plastic
	659 757396	210	Steel

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UNIPOL

Neutral Tank Cleaning Detergent

Product Description

Unipol is a pH-neutral, liquid concentrated detergent with good cleaning qualities. It contains effective but mild and environmentally safe wetting agents and surfactants that allow rapid penetration to remove fats and oils. Unipol is especially suitable for hydrocarbon freeing of tanks, and is safe on all tank coatings including zinc silicate.

Applications

For the removal of traces of hydrocarbons to a hydrocarbon free wall wash test specification prior to loading of sensitive cargoes. Unipol may also be used as a general purpose economical tank cleaning detergent.

Directions for Use and Dose Rates

The most economical method of using Unipol is by recirculation washing, using tank cleaning machines. Make up a solution of 1–5% in preferably fresh water in the tank and recirculate. Whenever possible, the cleaning solution should be heated to 50–80°C. Rinse off with hot fresh water.

Alternatively, hand spray the tank with a 20–50% solution of Unipol and allow to stay for 30–60 minutes before a final rinse with hot water.

When the tank is cleaned to a “water white standard”, remove any free water and ventilate until the tank is dry.

Unipol has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Product Properties

APPEARANCE:	Light yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.1
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc at 20°C:	8-9
pH, in 1% at 20°C:	7–8

COMPATIBILITY:

Metal:	The product is compatible with all normally used metals and their alloys.
Rubber:	No known effect.
Synthetic rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	652 736975	25	Plastic
	652 736983	210	Steel

Features, Benefits and Applications

- Non-caustic, pH neutral.
- Solvent free
- Non-flammable.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Non-corrosive to metals.
- Suitable for all tank-coatings.
- Can be used for gas and hydrocarbon-freeing of tanks.
- Can be used for deodorizing.
- Complies with all environmental regulations and the EU Detergent Regulation
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

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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TANKLEEN ADVANCE

Product Description

A micro emulsion water based cleaner/degreaser. This product is low toxic, biodegradable and safe to use. It is based on natural citrus oil solvent linked with an advanced surfactant formulation.

The main applications are for cleaning and degreasing in the engine room and for deck for removal of grease, oil, sludge, polymer compounds, carbon deposits, dirt and grime.

Directions for use

1. Tank cleaning

Hydrocarbon freeing after cleaning with solvent based cleaners like Seaclean Plus.

Tankleen Advance can be used to clean most of the tank coatings. If in doubt, test the cleaner on a small area of tank coating before full scale cleaning starts.

2. Spot cleaning

Tankleen Advance can be hand sprayed neat or diluted up to 5 parts water and left for about 20 to 30 minutes before washing off with water.

3. Recirculation method of cleaning

Use a solution strength between 0.05 to 0.7% i.e. 0.5 to 7 litres per ton wash water. This solution can be reused until no longer effective.

The best results will be achieved when the wash solution is heated to max. 35°C. However, there is no temperature limitation for the rinse water.

Tankleen Advance has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Features

- Water based degreaser.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Low-toxic.
- Non-flammable.
- Promotes a pleasant and healthy working environment.
- Splits after cleaning, releasing the oil phase for reclamation.
- Enviroclean has numerous general marine cleaning applications including the removal of greases, oil, sludge, polymer compounds, carbon deposits, dirt and grime.
- As an engine room cleaner it is exceptional as not only can it be used for degreasing, cleaning paint work and carbon removal, but also for use in soak tanks, ultrasonic tanks and high pressure cleaning equipment.
- IMO approved and listed in Annex 10 of the MEPC.2/Circular.
- Approved by Blohm + Voss AG for OWS type TCS/HD.
- Approved by Marinfloc AB for use in engine rooms.

Product Properties

APPEARANCE:	Clear, slightly viscous liquid
DENSITY, in g/cm ³ at 15°C:	1.01
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	8-9
COMPATIBILITY:	
Metal:	No Known effect
Coatings:	No Known effect
Rubber:	No Known effect

PACKAGING:	Product No.	Size (in litres)	Container
	659 571489	210	

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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ACC PLUS

Non Toxic Cleaner for Air Coolers and Turbochargers

Product Description

ACC Plus is a powerful cleaning agent for cleaning of diesel engine air coolers, scavenging air systems and the compressor side of turbochargers. ACC Plus is a microemulsion type cleaner, where a synergistic blend of biodegradable surfactants and low toxicity solvents replace the use of the harmful solvents traditionally used in air cooler cleaners, without reducing the cleaning performance. It is formulated to meet the latest environmental standards, and is non toxic both to the environment and to persons handling it. ACC Plus contains no chlorinated or aromatic hydrocarbon solvents, nonyl phenol ethoxylates or other substances harmful to the environment.

Directions for Use

Recirculation method in-situ

For this cleaning procedure the engine needs to be stopped and secured. Permanently installed spray nozzles in combination with a cleaning solution tank and pump, such as the Unitor Chemical Cleaning Unit should be used. It is advised to blind off the cooler outlet. Properly mix water and 10-30% ACC Plus, depending on the severity of the contamination, in the tank. Connect the pump's outlet to the nozzle assembly and the air cooler drain to the tank. Start the pump and spray the solution through the nozzles over the entire surface of the cooler and drain back to the tank. Circulate the solution for a period of 1 to 6 hours. After cleaning, rinse with fresh water. Remove the outlet blind and disconnect the pump and tank loop.

Soaking Method In-situ

For this cleaning procedure the engine needs to be stopped and secured. Blind off the cooler outlet and flood the cooler with a solution of 10-30% ACC Plus in water depending on the severity of the contamination. Soak for a period of 1 to 6 hours and drain to slop tank. Agitation by means of steam or compressed air will improve the cleaning effect. After cleaning, rinse with fresh water. Remove outlet blind and close drain.

Out of Service Cleaning:

Soak bath method

Remove the cooler from the engine and place in a soak bath filled with a solution of 10-30%

ACC Plus in water for a period of 1-6 hours. Agitation by means of steam or compressed air will improve the cleaning effect. After cleaning rinse with fresh water and reinstall the cooler. This method is also suitable for machine parts with stubborn carbon deposits.

Hand Spray Method

For this cleaning procedure the engine needs to be stopped and secured. Open the inspection cover on top of the cooler and the drain valve. Spray undiluted ACC Plus into the tube nest, with e.g. a Unitor Jet Spray Unit, and allow to penetrate into the deposits for a minimum of 1 hour. Rinse thoroughly with a high pressure jet such as a Unitor High Pressure Machine. Close inspection cover and drain.

In-service Cleaning

The general principle is to inject a solution of ACC Plus into the air trunking upstream of the charge air cooler followed by a clean water rinse. For efficient cleaning of air coolers, it is necessary to use correctly installed dosing and injection equipment. To calculate the amount of solution required to clean an air cooler, calculate or find the cross-sectional area of the cooler and use 3 litres of cleaning solution per square metre or as table below:

Engine HP.	Solution mix. with 25% ACC Plus
6,000 to 12,000	3 litre mix
12,000 to 24,000	4.5 litre mix
24,000 or more	6 litre mix

For in-service cleaning of air coolers and the air-side of turbochargers, a solution of 25% ACC Plus in freshwater is recommended. The appropriate dosage of cleaner is then placed in the dosing pot and injected up stream of the air cooler for a period of 10 minutes. After a further 10 minutes, a similar quantity of fresh water is injected to rinse off the emulsified deposits. Rate and frequency of application depends mainly on the condition of the air coolers. However when starting with the use of ACC Plus, recommended injection is every 24 hours. After the initial cleaning period, the cleaning effect should last for 48 hours of operational time. Although frequency of cleaning may vary, the calculated cleaning dose should remain the same. This cleaning method is only recommended when approved by the engine manufacturer!

Unitor Air Cooler Cleaner Injection System

Tests show that vessels correctly using this type of injection equipment with chemical cleaners such as ACC Plus, suffer no degradation of cylinder liner lubrication and liner wear rates are not increased. As the Air Cooler size and position, (baffle plates etc.) vary from engine to engine, the engine manufacturer should be consulted before installation. Large engines will normally require two injectors per cooler, but one injector is usually sufficient for medium and small engines.

See also next page

Product Properties

APPEARANCE: Pale yellow liquid

DENSITY, in g/cm³ at 15°C: 1.0

FLASH POINT, (PMCC) in °C: Above 61

pH, in conc: 9

COMPATIBILITY:

Metal: No effect

Rubber: May swell

Synthetic rubber: May swell.

PACKAGING: Product No.	Size (in litres)	Container
651 698704	25	Plastic

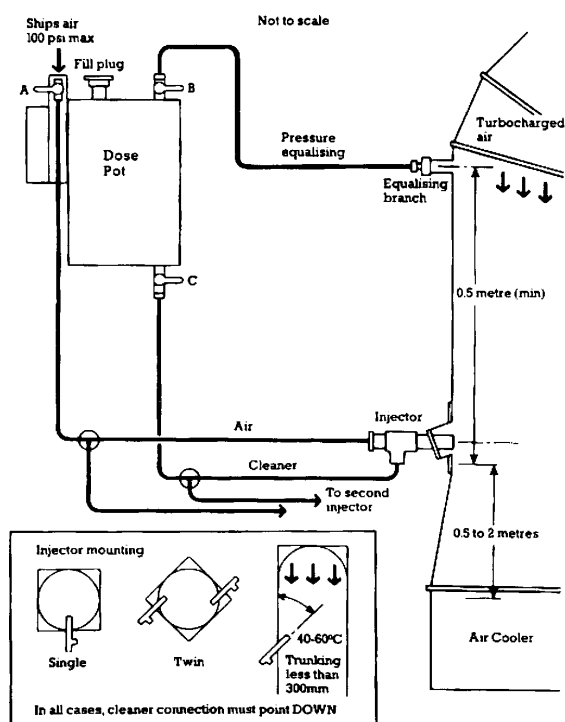
Features, Benefits and Applications

- Meets the latest environmental standards
- Equal cleaning performance to traditional cleaners based on harmful chlorinated solvents
- Low toxicity, low evaporation and pleasant smell
- Formulated to remove oil, grease and carbon deposits from air coolers and scavenging systems
- Efficient and economical
- Maintains, stabilises and maximises air cooler efficiency
- Leaves no residue and has no harmful effect on engine.
- Can be used for handspray cleaning while diesel engine is stationary
- Ideal for use in soak bath or cleaning tanks, such as the Chemical Cleaning Unit and the Ultrasonic Bath

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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NOTE: Always consult the engine manufacturer before installing the injectors.

CARBONCLEAN LT

Low Toxic Solvent Cleaner for Removal of Stubborn Carbon Deposits

Product Description

Carbonclean LT is a non-corrosive, powerful solvent for removal of carbonaceous deposits. Carbonclean LT contains no chlorinated solvents or phenolic compounds and has low toxicity to the environment and to persons handling it.

Directions for Use and Dose Rates

Submerged Method

This is an effective way of cleaning deposits from machine parts. The items to be cleaned are dipped into the solvent. A wire basket can be used for small components. For removal of light deposits or oil, a dilution of up to 1:2 in fresh water can be used. Light deposits will be removed in 1 hour, whereas heavily oxidised deposits may need overnight soaking. After the components have been removed from the soaking bath, remaining solvent is easily flushed off with water.

Due to a very low evaporation rate, no precautions are necessary to prevent loss of liquid, but adequate ventilation is recommended.

Cleaning the Oil Side of Heat Exchangers

Where in-situ cleaning is required, Carbonclean LT can be used neat and circulated through the unit in question. Time required for this process will again depend on extent of fouling and may take up to 24 hours.

The Chemical Cleaning Unit - Product no. 664 737189 - is recommended to be used.

1. Disconnect the heat exchanger's oil inlet and outlet, drain off any remaining oil.
2. Connect the discharge side of the Chemical Cleaning Unit (CCU) to the lower heat exchanger connection and fit the return to the CCU.
3. Add Carbonclean LT to the drum and heat, maintaining the temperature (max 60°C), throughout the cleaning operation. If heat is not available the cleaning time will need to be extended.
4. Circulate for 12 hours. When the cleaning is complete, disconnect the lower heat exchange connection and drain out the cleaning solution.
5. Connect a fresh water supply to the upper heat exchanger connection. Rinse until water runs clear.
6. Disconnect the water supply, drain and dry the heat exchanger.

The Chemical Cleaning Unit can also be used for cleaning by soaking or circulation. Results can be achieved with maximum efficiency and with minimum use of Carbonclean LT.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.0
FLASH POINT, (PMCC) in °C:	Above 61
pH, in conc:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	651 575696	25	Plastic

Features, Benefits and Applications

- Reformulated with improved cleaning properties
- Can be used for cleaning engine parts like:
 - Pistons
 - Piston rings
 - Valves
 - Valve cages
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-corrosive, safe on all light metals, including aluminium
- Quickly dissolves deposits containing carbon, resins or varnishes
- Simple and economical to use by soaking or circulation method
- Eliminates need for hard scraping
- Low toxicity
- Low evaporation rate
- No phenolic or chlorinated compounds
- Can be used for removal of carbon type deposits from burner tips, fuel injectors and all components fouled by carbon, resin or varnishes
- Cleans oil side of fuel and lube-oil heaters, oil coolers, etc.
- Removes carbon based deposits from fuel and lube oil filters

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

Cleaner for Air Coolers and Turbochargers

Product Description

Air Cooler Cleaner is a powerful solvent emulsion cleaner for cleaning of diesel engine air coolers, scavenging air systems and compressor side of turbochargers.

Directions for Use

In-service cleaning - the procedure is to inject a solution of Air Cooler Cleaner into the air trunking upstream of the charge air cooler, followed by a clean water rinse. For efficient cleaning of air coolers, it is necessary to use correctly installed dosing and injection equipment.

To calculate the amount of solution required to clean an air cooler, determine the cross-sectional area of the cooler and use 3 litres of cleaning solution per square metre or as shown in the table below:

Engine HP.	Solution mix. with 25% Air Cooler Cleaner
6.000 to 12.000	3 litre mix
12.000 to 24.000	4.5 litre mix
24.000 or more	6 litre mix

For in-service cleaning of air cooler and air-side of turbochargers, a solution of 25% Air Cooler Cleaner in fresh water is recommended.

The appropriate dose of cleaner is then put in the dosing pot and injected up-stream of the air cooler for 10 minutes. After this a similar quantity of fresh water is injected to rinse off the emulsified deposits.

Rate and frequency of application depends mainly on the condition of the air coolers. However, when starting with the use of Air Cooler Cleaner, we recommend injection every 24 hours. After initial cleaning period, the cleaning effect should last for 48 hours of operational time. Although frequency of cleaning may vary, the calculated cleaning dose should remain the same.

This cleaning method is recommended only if approved by engine manufacturer.

Out of service cleaning

Handspray Cleaning - in this situation the engine must be stopped.

Open an appropriate air trunking inspection cover.

Open air cooler drain valves.

Using a pressure handspray, apply undiluted Air Cooler Cleaner all over the cooler coils. Allow the Air Cooler Cleaner to penetrate the deposits for a minimum of 1 hour, then use a high pressure lance or water jet to wash off the loosened deposits.

After satisfactory cleaning and flushing through with fresh water, close air cooler drains.

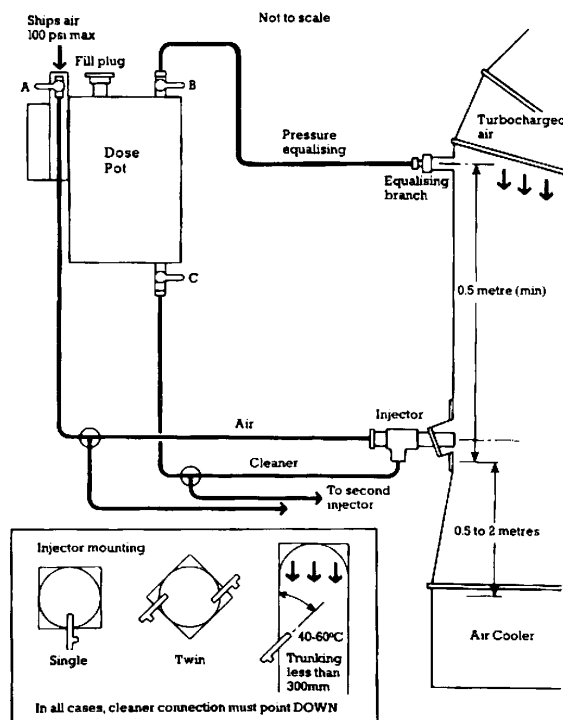
Soak Method - this method may be used for machine parts with stubborn carbon deposits. Put parts to be cleaned into a bath of undiluted Air Cooler Cleaner and allow deposits to be broken down and loosened before removal, then rinse.

Unitor Air Cooler Cleaner Injection System

The engine manufacturer should be consulted before installing injectors.

Large engines will normally require two injectors per cooler, but one injector is usually sufficient for medium and small engines.

See also next page



Dosing Procedure

1. Check that all valves are closed A, B & C.
2. Thoroughly mix up a 25% solution of Air Cooler Cleaner and fresh water and pour this into the dosing pot through the filter funnel, closing filter valve afterwards.
3. Open valve 'A' allowing compressed air to the injector nozzle.
4. Open valve 'B' and 'C' to balance trunking pressure in dosage vessel. Emulsion solution will now be drawn down into the injector and be atomised in the scavenge air trunking. It should take about 10 minutes to empty the dosage vessel.
5. Close all valves A, B & C.
6. After a residence time of 10 minutes, repeat sequence of operation above using one full dosing vessel of fresh water.
7. Repeat this procedure every 24 to 48 hours, depending on the requirements of the type of engine and sizes of air coolers.

Product Properties

APPEARANCE:	Light yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.1
FLASH POINT, (PMCC) in °C:	Above 61
pH, in conc:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	May swell slightly.
Synthetic rubber:	May swell

PACKAGING:	Product No.	Size (in litres)	Container
	651 571588	25	Steel

Features, Benefits and Applications

- Formulated to remove oil, grease and carbon deposits from air coolers and scavenging systems
- Efficient and economical
- May be used for in-service cleaning
- Renders surfaces oil-repellent
- Maintains and stabilises air cooler efficiency at maximum
- Saves time, maintenance costs and avoids risks of damage when dismantling
- Leaves no residue and has no harmful effect on engine
- Product in water solution is non-flammable, non-explosive and has no flash point
- Can be used for light carbon removal from machinery parts

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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CARBON REMOVER

Heavy Duty Solvent Cleaner for Removal of Stubborn Carbon Deposits

Product Description

A powerful non-corrosive solvent for breaking down carbon deposits

Directions for Use and Dose Rates

SOAK METHOD - This is an effective way of cleaning deposits from components and machine parts. In order to reduce the evaporation of Carbon Remover both on the pure product as well as on its emulsions, a skin is formed when exposed to air.

The items for cleaning are submerged into the active solvent. A wire basket can be used for small components. Immersion time will depend upon the nature of the deposits to be removed. Light deposits will be removed in 1 hour, whereas heavy oxidised deposits might need longer time.

The components should be rinsed thoroughly before handling.

Cleaning the Oil Side of Heat Exchangers

The Chemical Cleaning Unit - Product no. 664 737189 - is recommended to be used.

1. Isolate the oil supply, disconnect the heat exchanger oil inlet and outlet, drain off any remaining oil.
2. Connect the discharge side of Chemical Cleaning Unit (CCU) to the lower heat exchanger connection and fit the return to the CCU.
3. Add Carbon Remover to the drum and heat, maintaining the temperature (max 50°C) throughout the cleaning operation. If heating is not available, the cleaning time will need to be extended.
4. Circulate for 12 hours. When the cleaning is complete, disconnect the lower heat exchanger connection and drain.
5. Connect a high pressure fresh water supply to the upper heat exchanger connection. Rinse until water runs clear.
6. Disconnect, drain and dry.

Product Properties

APPEARANCE:	Clear brown liquid
DENSITY, in g/cm ³ at 15°C:	1.0
FLASH POINT, (PMCC) in °C:	Above 61
pH, in conc:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	Avoid natural and synthetic rubber

PACKAGING:	Product No.	Size (in litres)	Container
	651 571604	25	Steel

Features, Benefits and Applications

- Quickly dissolves deposits containing carbon, resins or varnishes
- Simple and economical to use
- Eliminates need for hard scraping
- Non flammable
- Removes carbon type deposits from burner tips, fuel injectors and all components fouled by carbon, resin or varnishes
- Cleans oil side of fuel heaters, oil coolers, etc.
- Removes carbon based deposits from fuel and lube oil filters
- Can be used for cleaning of: - Pistons - Piston rings - Valve cages

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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COMMISSIONING CLEANER

Cleaner for New Boiler and Cooling Systems

Product Description

Commissioning Cleaner is a multifunctional water based cleaner. It is the new generation in one step cleaner product. Low foaming.

Applications

Commissioning Cleaner is for cleaning of new boilers and cooling systems on board new buildings. It will remove scale, rust, oil and grease at the same time from the systems. The product is recirculated through the system, using an external circulation pump.

Directions of Use and Dose Rates

Use the dosage 5-10% solution depending on the grade of contamination.

Degreasing and descaling of boiler and cooling water systems

The Unitor Chemical Cleaning Unit -

Product no. **664 737189** - is recommended to be used.

1. Drain system to be cleaned if necessary.
2. Inspect as completely as possible to determine the extent of contamination and general condition of system.
3. Fill with fresh water.
4. Add a solution 5-10% strength of Commissioning Cleaner.
5. Circulate through the system for 5 to 8 hours at the maximum temperature allowed by the system.
6. Drain system completely and flush thoroughly the entire system and all components with fresh water until effluent is clear.
7. Reinspect to determine results of the cleaning process.
8. If unsatisfactory, repeat steps 3 through 7.
9. Refill system with distillate or good quality fresh water and dose the required amount of cooling or boiler water treatment.
10. Test system on a regular basis to insure chemical residuals are maintained with specific limits.

Product Properties

APPEARANCE:	Light yellow liquid.
DENSITY, in g/cm ³ at 15°C:	1.112 - 1.122
FLASH POINT, (PMCC) in °C:	N/A
pH, in 20%-solution:	8.5 - 9.0
COMPATIBILITY:	
Metal:	No known effect.
Rubber:	No known effect.
Synthetic rubber:	No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 624932	25	Plastic

Features, Benefits and Applications

- Water based multifunctional cleaner
- Biodegradable
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Cleaning of new systems for mill scale, rust, oil etc.
- Cleans water systems with light scale and a thin oil film
- Provides a temporary protection against corrosion by passivation
- No need of neutralization chemicals afterwards
- Safe on aluminium, zinc, tin and their alloys
- Quick separation of oil after cleaning

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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DISCLEAN

Separator Disc Cleaner

Product description

Disclean is a water based blend of inhibited acids, surfactants and emulsifying agents. Disclean removes the heavy tenacious deposits which collect in fuel and lube oil centrifugal separators, and it is extremely effective in removing these deposits without the necessity of separating the discs from the stack.

Directions for Use and Dose Rates

Disclean may be used undiluted or diluted down to 20% by volume with fresh water, depending on the severity of contamination, availability of heat and time to complete cleaning operation. The higher the concentration the more efficient the cleaning action. The time for a cleaning operation will vary from 30 minutes to maximum 2 hours, depending on the above factors. Faster and more efficient cleaning can be accomplished by heating to a maximum temperature of 60 °C. After the unit or parts have been satisfactorily cleaned, they shall be rinsed thoroughly with fresh water to remove all traces of contamination and Disclean. It is recommended that this product is not used on zinc, tin, galvanised surfaces or anodised aluminium. The Unitor Chemical Cleaning Unit (Product no. **664 737189**) can be used for soak cleaning of disc stacks.

Method of cleaning

Separators can be cleaned by:

1. Removing the separator disc stack and soaking in a solution of Disclean. Circulating the solution and heating will enhance the cleaning.
2. Removing the separator discs and dismantling stack, then soaking discs in Disclean. Circulating and heating the solution will enhance the cleaning. Discs can be sprayed if soaking tank is not available.

Product Properties

APPEARANCE:	Light yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.3
FLASH POINT, (PMCC) in °C:	N/A
pH, 1 vol-%:	2
COMPATIBILITY:	
Metal:	Corrosive to mild steel, cast iron, aluminium and alloys, brass, tin or galvanised material.
Rubber:	No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	651 571687	25	Plastic

Features, Benefits and Applications

- Acid based product contains surfactants
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-flammable
- Remove heavy tenacious deposits
- Cleans down to metal surfaces
- Leaves no film or residue
- Reduces down time
- Allows cleaning of discs without dismantling of disc stacks
- Cleans all types of separator discs
- Approved by Marinfloc AB for use in engine rooms

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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DESCALEX

Powder Acid for Removal of Scale and Rust

Product Description

Descalex is a dry acid cleaner formulated to remove rust and scale deposits.

Directions for Use and Dose Rates

The most effective descaling is accomplished by circulation. In the case of small components, the soak method in an immersion bath can be used.

If the equipment to be cleaned is contaminated by oil, grease and sludge, pre-cleaning should be done with Seaclean Plus or Enviroclean.

Depending on the extent of scaling, use a solution of 2.5-10% Descalex. The solution will have a red colour which becomes clear when the solution is neutralised. Whenever possible, the solution should be heated to 60°C.

Neutralised solutions can be reactivated by adding more Descalex until the red colour reappears. This should not be done more than twice.

Descalex should not be used on aluminium, zinc, tin or galvanised surfaces.

Descaling of Boilers, Descaling of Diesel Engine Cooling Water Systems, Condensers, Evaporators, Calorifiers, Heat Exchangers:

See Practical Application Manual or Water Treatment Handbook.

After use of Descalex a 0.5% solution of Alkalinity Control in fresh water should be used for neutralisation.

Product Properties

APPEARANCE: Reddish powder

DENSITY, in g/cm³ at 15°C: 1.2

FLASH POINT, (PMCC) in °C: N/A

pH, in 10 wt-%: 1.1

COMPATIBILITY:

Metal: Avoid aluminium, zinc, tin and their alloys and galvanised surfaces.

Rubber: No observed effect.

PACKAGING: Product No.	Size (in kg)	Container
651 571646	25	Steel

Features, Benefits and Applications

- Dry acid cleaner contains inhibitors to protect metals
- Contains colour indicator to show the strength of the solution and anti-foam agent
- Safe and easy handling and storage
- Fast and effective scale remover
- Removes scale from boilers
- Removes scale from diesel engine cooling water systems
- Removes scale and rust from condensers, evaporators, heat exchangers etc.
- Approved by the Norwegian National Institute of Public Health for cleaning of evaporators

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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Notes regarding safety in descaling operations:

Descalex contains strong acids. Handle with care and pay special attention to Material Safety Data Sheet and/or Product Label. Use personal protection equipment as recommended.

Reaction products from acid components in descaling products may include gases like carbon dioxide and hydrogen. Formation of hydrogen gas can be monitored with gas detection equipment on the vents. To avoid suffocation and potentially explosive atmosphere, gasses should be removed safely by purging system with water after draining the cleaning solution. Vent of system during descaling operations must be provided for same reason. Always use gas detection equipment to check that the atmosphere is safe before entering confined spaces for inspection after descaling operations. When circulating the descaling solution, always circulate with inlet at the bottom to avoid air pockets and potential entrapment of gaseous reaction products.

DESCALING LIQUID

Liquid Acid for Removal of Scale and Rust

Product Description

Descaling Liquid is a liquid acid containing descaling accelerators, corrosion-inhibitors and wetting agents.

Directions for Use and Dose Rates

The most effective descaling is accomplished by circulation for large systems or components. In the case of small components, the soak method in an immersion bath can be used.

If the equipment to be cleaned is contaminated by oil, grease, sludge or carbonised oil, then pre-cleaning with Seaclean or Enviroclean is necessary.

Descaling Liquid should always be used in plastic bucket. Acid should always be added to water, and never the reverse.

Descaling Liquid should be mixed with fresh water to form a solution of 10-30%, depending on the extent of scaling.

After using Descaling Liquid it is essential to thoroughly rinse all metal surfaces at least once with a 0.5% solution of Alkalinity Control in fresh water. This solution should be circulated for 2-4 hours or until an acceptable pH value is obtained. This will neutralize any remaining acidity and passivate steel surfaces.

Descaling Liquid should not be used on aluminium, zinc, tin, or any galvanised surfaces for which a special grade cleaner should be used.

Wilhelmsen Ships Service has developed a 210 litre capacity cleaning unit designed for use with chemical acid solutions for cleaning boilers, calorifiers, heat exchangers and other types of equipment where rust and scale form.

Chemical Cleaning Unit: Product no. **664 737189**

Descaling Boilers, Condensers, Evaporators, Calorifiers and Heat exchangers:

See Practical Application Manual or Water Treatment Handbook.

Product Properties

APPEARANCE:	Pale yellow liquid
DENSITY, in g/cm ³ at 15°C:	1.2
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc:	< 1.5
COMPATIBILITY:	
Metal:	Avoid aluminium, zinc, tin and their alloys and galvanised surfaces.
Rubber:	No known effect.
Synthetic rubber:	May swell.

PACKAGING: Product No.	Size (in litres)	Container
651 571653	25	Plastic

Features, Benefits and Applications

- Acid based product contains inhibitors against attack on ferrous metals
- Unlimited shelf life
- Easy to rinse off
- Fast and effective scale remover
- Removes scale and rust from condensers, evaporators, heat exchangers, etc.
- Removes water scale from boilers
- Approved by the Norwegian National Institute of Public Health for cleaning of evaporators

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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Notes regarding safety in descaling operations:

Descaling Liquid contains strong acids. Handle with care and pay special attention to Material Safety Data Sheet and/or Product Label. Use personal protection equipment as recommended.

Reaction products from acid components in descaling products may include gases like carbon dioxide and hydrogen. Formation of hydrogen gas can be monitored with gas detection equipment on the vents. To avoid suffocation and potentially explosive atmosphere, gasses should be removed safely by purging system with water after draining the cleaning solution. Vent of system during descaling operations must be provided for same reason. Always use gas detection equipment to check that the atmosphere is safe before entering confined spaces for inspection after descaling operations. When circulating the descaling solution, always circulate with inlet at the bottom to avoid air pockets and potential entrapment of gaseous reaction products.

METAL BRITE

Rust Stain Remover

Product Description

Liquid detergent compound containing rust dissolving acids, emulsifiers and passivators.

Directions for Use and Dose Rates

Metal Brite should always be used in a plastic bucket. The acid should always be added to water, never the reverse.

For removal of rust stains and oxide stains on aluminium, brass, copper and stainless steel, apply Metal Brite (after removal of oil and grease) neat with a brush, rag, etc. Wash off after 15 minutes. Repeat if necessary. Do not let Metal Brite dry on surfaces as it may leave a hard white deposit.

For steel surfaces; remove oil, grease and old paint. Wet down entire surface with neat Metal Brite and allow to dry. Second wash may be necessary. Surface should have a grey/white appearance when the Metal Brite is dry. Steel surfaces will have a resistance to rust and will render a good base for paint.

For removal of rust stains on painted surfaces and wood, Metal Brite should be applied at full strength for heavy stains, or diluted to 30-50% for light stains. Allow to soak for 20 to 30 minutes and wash off with water. A second application may be necessary to remove the stubborn stains.

Product Properties

APPEARANCE: Light yellow liquid

DENSITY, in g/cm³ at 15°C: 1.2

pH, in 1 vol - %: 2

COMPATIBILITY:

Metal: Long term exposure will cause corrosion of mild steel, cast iron, aluminium and alloys, brass, tin or galvanised material

Rubber: No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	651 571661	25	Plastic
	651 765073	1	Plastic

Features, Benefits and Applications

- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-flammable
- Prevents flash rusting
- Surfaces rendered suitable for painting
- Surface brightening
- When cleaning aluminium, brass and copper flush with water upon completion of cleaning

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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METAL BRITE H.D.

Rust and Metal Tarnish Remover

Product Description

Liquid detergent compound containing phosphoric acid and non-ionic surfactants, used for rust removal and as a surface brightener.

Directions for Use and Dose Rates

Metal Brite H.D. should always be used in a plastic bucket. Acid should always be added to water, never the reverse.

Remove dirt, rust flakes, oil and grease prior to using Metal Brite H.D.

Apply Metal Brite H.D. to surfaces to be cleaned or pickled as follows:

For severely corroded surfaces and pickling of welding repairs, use 50% solution to neat.

For less severely corroded or soiled surfaces and tarnish on copper and brass, use a solution of 20-50%, and rinse off surface with water after 15-40 minutes.

On aluminium, use a solution of 10-30%, but rinse off surface maximum 5 minutes after application

For removal of rust stains on painted surfaces, a solution of 10-30% should be sufficient. Rinse off with water after 15-20 minutes.

For removal of rust stains on ceramic tiles, enamels, porcelain, glass etc., use a solution of 20-50%, depending on stains and soiling. Rinse off with water after 20-40 minutes.

For removal of light cement stains and lime, apply a 50% solution, and high pressure wash after 30-40 minutes, and for solidified cement use Descaling Liquid.

For removal of light rust and scale in pipelines and tanks, recirculate a solution of 5-10% Metal Brite H.D. For discoloration of stainless steel and epoxy coated tanks, use the same method.

Product Properties

APPEARANCE: Light yellow liquid

DENSITY, in g/cm³ at 15°C: 1.3

FLASH POINT, (PMCC) in °C: N/A

pH, 1 vol-%: 2

COMPATIBILITY:

Metal: Long term exposure may lead to corrosion of mild steel, cast iron, aluminium and alloys, brass, tin or galvanised material.

Rubber: No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 571679	25	Plastic
651 655506	210	Plastic

Features, Benefits and Applications

- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Non-flammable
- Removes light rust and rust stains
- Cleans and passivates ferrous metal surfaces, inhibits further corrosion, and gives a base which paint will adhere
- Removes tarnish from non-ferrous metals
- Surface brightening including aluminium
- Removes rust stains from painted, ceramic and wooden surfaces
- Economical in use
- Approved by the Norwegian Institute of Public Health for use as cleaner of tanks in contact with cooking 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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TANKLEEN BRIGHT

Product Description

Liquid detergent compound containing phosphoric acid and non-ionic surfactants, used for rust removal and as a surface brightener.

Dosing method

Takleen Bright should always be used in a plastic bucket. Acid should always be added to water, never the reverse.

Remove dirt, rust flakes, oil and grease prior to using Tankleen Bright.

Apply Tankleen Bright to surfaces to be cleaned or pickled as follows:

For severely corroded surfaces and pickling of welding repairs, use 50% solution to neat.

On aluminium, use a solution of 8-25%, but rinse off surface maximum 5 minutes after application

For removal of rust stains on painted surfaces, a solution of 8-25% should be sufficient. Rinse off with water 15-20 minutes after application.

For removal of white residues from epoxy-coatings that sometimes remains after carriage of Stearin, Olein, Palm fatty acid etc., recirculate a solution of 3-6% Tankleen Bright. When injected, use a 3% solution. Recirculate or inject until residue is removed.

Tankleen Bright has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Features

- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Non-flammable.
- Removes light rust and rust stains.
- Cleans and passivates ferrous metal surfaces, inhibits further corrosion, and gives a base which paint will adhere.
- Removes tarnish from non-ferrous metals.
- Surface brightening including aluminium.
- Removes rust stains from painted, ceramic and wooden surfaces.
- Economical in use.
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

Product Properties

APPEARANCE: Light yellow liquid

DENSITY, in g/cm³ at 15°C: 1.2

pH, in 1 vol - %: 2

COMPATIBILITY:

Metal: Long term exposure will cause corrosion of mild steel, cast iron, aluminium and alloys, brass, tin or galvanised material

Rubber: No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	651 766097	190	

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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DECK CLEAN NP

Product Description

Deck Clean NP is a liquid cleaning formulation containing acids, emulsifiers and passivators used for removal of rust and water born stains on super structure and on decks.

Deck Clean NP is free of phosphoric acid and is readily biodegradable.

Dosage and control

Deck Clean NP should always be added to water, never the reverse. Remove dirt, rust flakes and oil/grease prior to using Deck Clean NP. Required dosage may vary slightly depending on degree of stain.

In general for the removal of rust stains on painted surfaces and wood, Deck Clean NP should be applied at full strength for heavy stains, or diluted to 10-30% strength for light stains.

Allow to soak for 20-30 minutes and rinse off surface with water. A second application may be necessary to remove the stubborn stains.

Deck Clean NP can be used for brightening of teak, mahogany and oak decking and to remove rust and water stains on Wood and Varnished wood.

Make up to a 10% solution of Deck Clean NP and allow to soak for about 20 minutes and rinse of surface with water. Do not let Deck Clean NP dry on surface.

Features

- Highly concentrated
- Water borne
- Removes water born stains from windows
- Removes light rust and rust stains from painted and wooden surfaces, metals and glass.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Phosphoric acid free
- Readily biodegradable
- Easy to rinse off
- Non-flammable

Product Properties

APPEARANCE: Light yellow liquid

DENSITY, in g/cm³ at 15°C: 1.3

FLASH POINT, (PMCC) in °C: N/A

pH, 1 vol-%: 2

COMPATIBILITY:

Metal: Long term exposure may lead to corrosion of mild steel, cast iron, aluminium and alloys, brass, tin or galvanised material.

Rubber: No known effect.

PACKAGING: Product No.	Size (in litres)	Container
651 765990	25	

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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TEAK RENEWER

Wooden Deck Brightener

Product Description

Teak Renewer is a dry acid product formulated for brightening wooden decks. For removal of oil and fat and for daily cleaning use Aquabreak PX or HP-Wash.

Applications

Teak Renewer is used to remove wood discolouration commonly found on untreated teak, mahogany and oak decking.

Directions for Use and Dose Rates

1. Dissolve 5-10% Unitor Teak Renewer in fresh water.
2. Apply the solution on the surface with a chemical spray unit.
3. Leave for 30-45 minutes.
4. Wash off with fresh clean water.

Product Properties

APPEARANCE: White crystalline powder

DENSITY, in g/cm³ at 15°C: 1.6

pH, in 10% solution: 1

COMPATIBILITY:

Metal: Long term exposure will cause corrosion

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (in kg)	Container
651 758623	20	Steel

Features, Benefits and Applications

- Dry acid deck cleaner
- Surface brightening of wood
- Removes stains and discolouration
- Water soluble for ease of use
- Quick, efficient cleaning power

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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ELECTROSOLV-E

G.P. Cleaner and Degreaser for all Electrical Parts

Product Description

A non-chlorinated solvent with a controlled evaporation rate, for cleaning and degreasing electrical equipment.

Directions for Use and Dosage Rates

Electrosolv-E must only be used in sufficiently ventilated areas.

Electrosolv-E should always be used undiluted.

It can be applied by brush, swab, or as a fine spray using suitable hand held spray equipment.

NOTE: Never open flame when using fine spray.

Small components may be cleaned by brief immersion in a bath of Electrosolv-E.

The most suitable way of applying Electrosolv-E is by using hand spray or syphon spray guns. Once the deposits of dirt and grease have been flushed away with Electrosolv-E the remaining solvent may be evaporated by using clean compressed air at low pressure and high volume.

Caution: Never use Electrosolv-E on a running generator or motor.

Electrosolv-E can be used to clean virtually all electrical equipment and components although it may affect some types of rubber and plastic. Either remove rubber and plastic parts from component or test on small area for any reaction before cleaning.

After cleaning motors or generators insulation resistance to ground should be tested to check that it is within its specified limits.

Sprayers: a range of spray equipment is available for use with Electrosolv-E and other solvents.

Product Properties

APPEARANCE: Clear, colourless liquid

DENSITY, in g/cm³ at 15°C: 0.8

FLASH POINT, (PMCC) in °C: Above 61

COMPATIBILITY:

Metal: No known effect

Rubber: May swell

PACKAGING: Product No.	Size (in litres)	Container
651 604389	25	Steel
651 765057	1	Plastic

Features, Benefits and Applications

- Contains no chlorinated solvents
- Powerful solvent with controlled evaporation
- Rapid penetration and action
- Efficient cleaning with no grease film or moisture residue
- Harmless to electrical insulation. Tested for break-through voltage after DIN-57370 to 209 KV/cm.
- Non-corrosive - can be used on all normal components with no risk of corrosive damage
- Cleans and degrease electrical parts and equipment without the need for rinsing

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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UNITOR USC ULTRASONIC CLEANER

Water-Based Cleaner

Product Description

Unitor USC is a water-based alkaline low-toxic product with an exceptional solvency power on soil and oily matter. It is specially developed for ultrasonic cleaning applications. It is free from hydrocarbon solvents, biodegradable, and safe to handle.

Applications

Suitable for cleaning engine components like fuel and lube oil filters, pump components, inlet and exhaust valves etc.

Direction for Use and Dose Rates

Unitor USC is specially formulated for use in the ultrasonic cleaning tank, Unitor Ultrasonic T-1040/HM.

Fill the ultrasonic unit with approx. 30 litres of clean, fresh water.

Prior to use, the ultrasonic bath must be de-gassed. Allow the bath to run for 1-2 minutes without any objects or cleaning agent until the evolution of gas bubbles ceases. This is to enhance the cleaning effect.

Mix in 1 litre Unitor USC. For stubborn deposits, a second litre may be added.

Best results are obtained at temperatures of 60-80°C.

Time necessary for cleaning depends on the nature and thickness of the deposits. 20-30 min. will suffice for most applications. Hardened, carbonised or aged deposits may require up to 4 hours.

If the cleaning solution is not heavily contaminated, it may be re-used at a later stage.

Product Properties

APPEARANCE: Green.

DENSITY, in g/cm³ at 15°C: 1.0

COMPATIBILITY:

Metal: May attack zinc, aluminium and magnesium at concentrated solutions

Rubber: No known effect

pH neat: 12

Synthetic rubber: May swell

PACKAGING:	Product No.	Size (in litres)	Container
	651 607819	1 in cartons of 12 bottles	Plastic

Features, Benefits and Applications

- Water-based
- Low-toxic
- Biodegradable
- Non-flammable
- Free of hydrocarbon solvents
- Specially developed for use with ultrasonic cleaning baths
- Removes grease, oil, carbon deposits, soil and grime
- Keeps loosened deposits in suspension preventing re-deposition
- Effective and economical in use
- Self splitting

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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NATURAL HAND CLEANER

Skin Cleaner

Product Description

Natural Hand Cleaner is an orange gel skin cleaner containing natural ingredients such as citrus oils. The product is effective and mild to the skin and contains no petroleum solvent derivatives. It removes the most severe industrial grime, oil and grease in complete safety. It incorporates poly beads to assist removal of the most severe industrial grime.

Directions for Use and Dose Rates

Natural Hand Cleaner should be massaged onto the soiled skin without the use of water. The skin should then be rinsed with clean water and dried thoroughly with a towel or tissue.

Product Properties

APPEARANCE:	Orange gel
DENSITY, in g/cm ³ at 15°C:	1.0
FLASH POINT, (PMCC) in °C:	N/A
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	651 571752	Box containing 4x5 ltr	Plastic
	651 765091	0,5	Plastic

Features, Benefits and Applications

- Does not contain nonyl phenol ethoxylates or other estrogenic compounds
- Pleasant citrus smell
- Mild antiseptic properties
- Contains poly beads which act like a light scrubbing brush to assist the cleaning action. The poly beads are harmless to bilge pumps
- Effective and suitable for the most severe soiling. Due to its mildness it can be used safely day after day
- Easier to rinse off than many other gel cleaners
- Approved by The Royal Institute of Public Health

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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GAMAZYME BOE

Odour Eliminator

Product Description

Gamazyme BOE is a new approach in odour control technology. It provides deep and effective cleaning through microbial activity. After odour elimination, the odour causing compounds are biodegraded by the bacteria strains.

Gamazyme BOE provides a powerful combination of a fast-acting neutraliser for immediate odour relief, and bacteria adapted for degradation of organic compounds.

Gamazyme BOE eradicates odours by attacking and degrading the organic source of the odour.

4 way action:

1. Fragrance for rapid action
2. Binding for capturing odour
3. Cleaning action by organic breakdown
4. Accelerated microbial degradation

Gamazyme BOE is a specialised bacterial formulation designed to eliminate odour in garbage and waste collection areas, rest rooms, galleys, etc.

Directions for Use and Dose Rates

Use Gamazyme BOE neat for the applications, but consider dilution of the product for greater surface coverage.

Product Properties

APPEARANCE:	Colourless liquid
Bacterial Pathways:	Aerobic and facultative anaerobic
DENSITY, in g/cm ³ at 15°C:	1.0 - 1.05
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING: Product No.	Size (in litres)	Container
656 624077	20	Bag in box (Cruise)
656 624619	12 x 1	Plastic

Features, Benefits and Applications

- Water based neutral odour control
- Fast-acting environmentally friendly odour controller with the effectiveness of deep cleaning microbes
- Rapidly neutralises and eliminates odours without relying on the use of odour masking or hazardous chemical oxidisers
- Enhances the activity of the natural bacteria, resulting in higher rates of degradation
- Removes odours from garbage and waste collection areas, rest rooms, galleys, etc.
- Rapid and long term effect
- Available in 20 ltr. bag in a box & easy to use ltr. bottles

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

Wilhelmsen Ships Service or any associated or subsidiary company's warranties of fitness and merchantability, if any, as well as any expressed warranties regarding this product shall not be effective or actionable unless the goods are used as directed herein and in no other manner due to potential hazards from improper use of the goods described herein.

GAMAZYME BTC

Biological Toilet Cleaner

Product Description

Gamazyme BTC is a unique biological active liquid formulation containing specialised bacterial strains, biodegradable low foaming chemical cleaners and anti foam agents.

How it works

Gamazyme Biological Toilet Cleaner is specifically formulated to replace aggressive, toxic toilet cleaners that can disable the sewage treatment plant by killing the naturally occurring bacteria that are essential to its operation. Conventional toilet cleaners may also cause foaming in the vacuum inductor which destroys the vacuum in the sanitary flushing system.

Gamazyme BTC effectively cleans the toilets and doses millions of selected safe bacteria into the sanitary system. These powerful specialised bacteria colonise the organic waste lining the pipe system and remove the organic deposit. On draining to the sewage treatment plant, the bacteria will enhance the biological activity, reducing solids and odours.

Grease, fats, starch and other organic compounds are digested by Gamazyme BTC. The degradation of paper, protein, waste product residuals and other odorous materials is also enhanced.

Gamazyme BTC cleans more thoroughly and deeply compared to conventional cleaning products. The use of cleaning products containing hazardous chemicals such as acids, caustics, bleaches, disinfectants, etc., can be reduced.

Directions for Use and Dose Rates

Use Gamazyme BTC daily as a normal toilet cleaner. Lift up seat, open the bottle and direct nozzle downwards. Squeeze and direct the jet to adequately cover the surface of the toilet bowl. After some minutes scrub vigorously with a toilet brush and flush with water.

For removal of water scale, uric acid and rust stains, use Gamazyme Toilet Descaler. See product data sheet.

For heavy soil pipes dose Gamazyme DPC to initiate the cleaning process and continue with Gamazyme BTC. See also product data sheet for Gamazyme DPC.

The use of toilet cleaners containing toxic ingredients as acids, disinfectants, bleaches, etc., will have a detrimental effect on the biological activity and should not be used with Gamazyme BTC.

Product Properties

APPEARANCE:	Green liquid
pH, in conc:	9
DENSITY, in g/cm ³ at 15°C:	1.0
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING: Product No.	Size (in litres)	Container
656 589945	Non-returnable boxes of 12x1 litres	Plastic plastic bottles

Features, Benefits and Applications

- Easy to use
- Biodegradable
- Suitable for use in all marine sanitary and sewage treatment systems
- Cleans toilets, sinks, showers, etc.
- Digests faeces, grease, fat, starch and other solid waste materials
- Removes obnoxious odours from the sanitary system
- It is safe and has no special handling requirements
- Replaces conventional cleaners potentially harmful to the biological sewage system

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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GAMAZYME TOILET DESCALER

Descaling of Toilet Systems

Product Description

Gamazyme Toilet Descaler is used for descaling toilet bowls, toilet systems, drains and pipes.

Gamazyme Toilet Descaler is based on weak acids, bacterial strains and enzymes formulated to dissolve organic materials, uric acid and scale. It is packed in 50 gram water soluble sachets.

Acts immediately due to its chemical composition. Secondary action due to its micro-organisms capable of digesting fat, grease and oil found in toilets, drains and pipes. No need for dismantling of drains and pipes when used either on a preventative or on a regular service basis.

Directions for Use and Dose Rates

Descaling of Toilet Bowl:

1. Add 50 grams (one sachet) to each toilet once a week as a minimum.
2. Let the sachet stand for one minute for complete dissolution.
3. Brush the bowl and flush water into the toilet.
4. Repeat the treatment if necessary.

Descaling of Drain, Pipes, Toilet Circuits

1. To remove scale in drain, pipes and toilet circuits add 50 grams (one sachet) to each toilet twice a week as a minimum.

Product Properties

APPEARANCE: Light blue powder
Bacterial Pathways: Aerobic and facultative anaerobic

DENSITY, in g/cm³ at 15°C: 1.2 /1.3
pH in 1%: 1.4

COMPATIBILITY:

Metal: Avoid aluminium, zinc, tin, and their alloys and galvanised surfaces
Rubber: No known effect

PACKAGING: Product No.	Size in kg:	Container
656 743146	5 (100 sachets of 50 grams)	Carton

Features, Benefits and Applications

- Biological powder descaler
- Formulation based on weak acids, bacterial strains and enzymes
- Removes uric acid and deposits
- Descales both inorganic and organic material
- Immediate action due to its chemical composition
- Digests fat, grease, and oil in toilets, drains and pipes
- Descales toilet bowls, toilet systems, drain and pipes
- Leaves a fresh smell

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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GAMAZYME BUB BIOLOGICAL URINAL BLOCKS

Gamazyme BUB (Biological Urinal Blocks) is a blend of selected bacteria strains and chemical cleaners, formulated to reduce odour problems and blockages in urinals and pipe work.

Directions for use

By using Gamazyme BUB the frequency of urinal flushing can be reduced without danger of scale build-up and odour problems. Gamazyme BUB is suitable for use in all types of urinals, stainless steel and porcelain troughs.

Keep container tightly closed when not in use.

Dosing method

For heavily soiled or blocked pipes use Gamazyme TDS (Toilet Descaler) until pipes are clear and continue with regular use of Gamazyme BUB. To maintain clear and odour free urinal traps and pipe work place 1-2 blocks in each urinal or 1 every 40-50 cm in trough urinals. Replace when block has dissolved to maintain max. efficiency.

Features

- Water soluble blocks
- Biodegradable
- Easy to use
- Cleans and freshens
- Removes obnoxious odours and prevents blocked urinal traps and pipe work
- Contains odour controlling perfume
- Can be handled without danger - environmentally safe
- Enhance the biological degradation taking place in sewage treatment systems and collecting tanks
- Non-corrosive to all metals and synthetic materials

Product Properties

APPEARANCE: Blue solid blocks

DENSITY, in g/cm³ at 15°C: N/A

FLASH POINT, (PMCC) in °C: N/A

pH, in conc: 7

COMPATIBILITY:

Metal: No known effect

Coatings: No known effect

Rubber: No known effect

PACKAGING:	Product No.	Size:	Container
	656 743153	3kg (150 blocks of 20g)	Plastic tube
	656 743161	1,8kg (20 blocks of 90g)	Carton
	656 743179	1kg (12 blocks of 90g w/ plastic screen)	Carton

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Ideal for use on
Cruise Ships

Ideal for use on
Cruise Ships

GAMAZYME MSC

Multi Surface Cleaner Carpet Deodoriser

Product Description

Gamazyme MSC is a unique biologically active liquid formulation containing specialised bacterial strains and biodegradable chemical cleaners.

How it works

On soft surfaces such as carpet, Gamazyme MSC is formulated to spot clean and deodorise the surface by digesting organic substances over time.

Three-way action:

- Chemical cleaning action by removing solids from surfaces.
- Immediate odour control by fragrance masking.
- Deep cleaning from biological action for removal of residual organic matter.

Gamazyme MSC is effective in cleaning or removing organic residues from hard and soft surfaces, such as urine, dog faeces, food, milk, chocolate syrup, tomato sauce, etc.

Directions for Use and Dose Rates

Carpets and upholsters, drapes, laundry:

To remove stains of food and other organic wastes: After taking away the solids, spray the carpet with Gamazyme MSC neat, use a wet sponge to brush, scrub and humidify the surface. Let it stand overnight, if possible, then vacuum. The bacterial action will digest deep down soil and stains and remove unpleasant odours. Repeat the operation if necessary.

Hard surfaces:

- Accommodation and general cleaning:
Use from 50 ml up to 500 ml to half a bucket of luke warm water, depending on the surface to clean and the deposition, for cleaning decks, showers, floors, sinks, tiled areas, etc.
- For carpet machine:
To deodorise a large surface use the product as a normal carpet cleaner in carpet shampoo equipment diluted 1:10 with water. For odour control on these surfaces spray diluted 1:2 with luke warm water. Wait as long as possible and rinse.
- Pipe cleaning and deodorising:
A nightly squirt into galley and bathroom sinks will keep drain pipes clean and clear of organic residual wastes and overcome unpleasant drain odours.

Product Properties

APPEARANCE:	Opaque liquid
pH, in conc:	9
DENSITY, in g/cm ³ at 15°C:	1.0
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect
Synthetic Rubber:	No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	656 587618	Non-returnable boxes of 12x1 litres	Plastic bottles

Features, Benefits and Applications

- Unique liquid biological formulation for easy use
- Biodegradable
- A unique technology to remove odours on surfaces and specially on carpets
- Replaces harsh cleaners which often require haz-chem labelling and may be hazardous to the user and the environment
- Spot cleaning of carpets, drapes, laundry
- Cleans sinks, showers, decks, tiles and bathrooms
- Removes obnoxious odours from drains and scuppers
- It is safe and has no special handling requirements

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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GAMAZYME DPC

Biological Drain and Pipe Cleaner

Product Description

Gamazyme DPC is a concentrated biologically active powder formulation containing a blend of patented bacterial strains, specifically developed to deal with sewage wastes. It is packed as water soluble sachets (Solupac).

How it Works

Gamazyme DPC is formulated to degrade excess residual organic waste products causing blockage, or slow draining in sinks, showers, scuppers, drains, etc. The specialised bacterial strains and enzymes in Gamazyme DPC will digest grease, fats, starch and other organic compounds.

The bacteria in Gamazyme DPC will colonise the waste soil, which lines the pipe work system, and degrade the waste all the way down to carbon dioxide and water, until the system is clean. On draining to the holding tank or sewage treatment plant, Gamazyme DPC will greatly enhance the biological activity breaking down solids and removing obnoxious odours which can vent back through the systems.

Directions of Use and Dosage Rates

Pipe Cleaning

Maintenance dosing will keep sinks, scuppers and waste food disposal units clean, clear and odour free.

A liquid solution should be prepared by adding one solupac to 10 litres of hand hot (35°C) fresh water and left for 15 minutes (stirring periodically) for the bacteria to activate. Initial doses of 0.5 litres of this solution should be applied into sinks, scuppers, drains, waste food disposal units, etc. A maintenance dose once or twice a week can then be applied to keep the pipes in clean condition. Harsh toxic cleaners (acids, caustics, disinfectants) should not be used as these will kill off the bacterial action in the pipes. Before plumbing work for pipe modification or retrofits, pipes can be cleaned by isolating the system and filling pipes with the solution for up to 48 hours before draining. If necessary, further applications should be made until drains run clean.

Holding Tanks

Organic wastes can be kept liquid and pumpable. Tanks can be cleaned without manual entry and without the use of harsh toxic cleaning chemicals.

Prepare a solution of one solupac to ten litres of hand hot (35°C) fresh water and left for 15 minutes (stirring periodically) before dosing into the holding tank once or twice a week. The dose rates should be approximately one solupac per 1000 litre waste in the tank. Tank cleaning should be carried out using Gamazyme 700FN.

NOTE: Severly scaled systems should be acid cleaned.

Product Properties

APPEARANCE: Tan, saw dust like powder in sealed solupacs

pH, in conc: N/A

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING:	Product No.	Size:	Container
	656 587055	Non-returnable 4 kg in sealed 0.23 kg solupacs.	Plastic containers. Approx.

Features, Benefits and Applications

- Powder biological formulation for easy use
- Biodegradable
- Clears pipes and systems blocked by organic waste residuals
- Eliminates obnoxious odours from soiled pipe lines
- Cleans fouled pipes and systems, particularly long horizontal runs
- Keeps holding tank organic waste liquid pumpable and odour free
- Cost effective, saves the time, money and manpower of plumbing operations to clear blocked pipe work
- Overcomes potential safety problems associated with the use of toxic cleaning chemicals

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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Ideal for use on
Cruise Ships

GAMAZYME 700FN

Biological Booster for Sewage Treatment Plants And Systems

Product Description

Gamazyme 700FN is a concentrated biologically active powder formulation containing a blend of patented bacterial strains, specifically developed to deal with sewage wastes.

How it Works

Gamazyme 700FN is formulated to degrade excess residual waste products in shipboard sanitation pipe work systems, holding tanks and marine sewage treatment plants. The specialised strains in Gamazyme 700FN will digest grease, fats, sewage, starch and other organic compounds. The degradation of paper, protein and waste product residuals is greatly increased, and the odours that these produce, are reduced.

The bacteria in Gamazyme 700FN will colonise the waste organic material which lines the pipework/tank system and degrade the waste until the system is clean. The biological activity in the marine sewage treatment plant is greatly increased, so the plant can thus handle more waste. The obnoxious smells in toilet areas and scuppers, normally associated with overloaded or blocked systems, are reduced.

Directions of Use and Dose Rates

Sewage treatment plant Direct dosing to the sewage treatment plant or via the nearest toilet will greatly enhance the biological activity and keep the plant at peak operating efficiency.

A) On Ships Except Passenger Vessels

Ineffective or septic sewage treatment can be reactivated and maintained in peak operating efficiency by dosing Gamazyme 700FN direct in the tank or via the nearest toilet. To reactivate the plant, 1 kg Gamazyme 700FN should be mixed with 10-15 litres of hand hot (35°C) fresh water, left for 10-15 minutes (stirring periodically) for the bacteria to activate before dosing into the tank daily until the system is operating efficiently. Maintenance dosing of 0.1 - 0.25 kg weekly will keep the system operating effectively. Replacing the toilet cleaner in use by Gamazyme BTC (biological toilet cleaner) will dose millions of specialised bacteria into the system. These powerful bacteria will digest organic material lining the pipes and boost the bacterial activity in the sewage treatment plant, keeping it operating at peak efficiency.

B) On Passenger Vessels

The applications is the same as mentioned above, but the dose rates are different.

The dose rate depends on the number of people on board the vessel. As a rule of thumb use 50 grams per m³ of the volume of the sewage tank, followed a weekly dosage of 10 gram per m³ of the volume of the sewage tank.

An example of a cruise vessel with a sewage tank of 100 m³ and 2500 people and on a two weeks cruise. What is the consumption of Gamazyme 700FN?

Initial dosage: (50 g/m³ x 100 m³):1000 = 5 kg

Weekly dosage: (10 g/m³ x 100 m³):1000 x 2 weeks = 2 kg

On this cruise, will be used. 7 kg of Gamazyme 700FN

Tank Cleaning

Holding tanks can be cleaned periodically or prior to entry without the use of dangerous toxic chemicals.

Grey and black water holding tanks, sewage tanks, sewage treatment plant should be flooded and pumped empty to clear excess soil before cleaning. Holding tanks must be fitted with an air manifold connected to a low pressure air line of sufficient volume to gently turn the mass of water within the tank. In sewage treatment tanks the normal air supply will suffice. The tank should be filled to 75% capacity with fresh or sea water and the air supply turned on. Approximately 0.5 kg of Gamazyme 700FN in 5 to 10 litres of fresh hand hot (35°C) water should be mixed and left for 10-15 minutes before dosing into the tank. Dosing can be either direct or via the nearest toilet. The tank should then be filled and left with the air on for at least 48 hours. The dose rate should be approximately 0.5 kg per 500 litres tank capacity with a minimum dose of 5 kg. Although Gamazyme 700FN is formulated for use in cold (15°C minimum) sea water, performance will improve with lukewarm (35°C) fresh water or sea water.

Pipe cleaning

Maintenance dosing will keep galley and sewage pipes clean and clear of organic residual wastes.

A liquid solution should be prepared by mixing of 0.5 kg of Gamazyme 700FN in 15-20 litres of hand hot (35°C) fresh water. Stir it and, if possible, leave for 15 minutes to reactivate the bacteria. Whilst constantly agitating this solution, 1 litre should be dosed into sinks, scuppers, showers, drains, waste disposal units, etc. each evening until the blockage is cleared. A maintenance dose once or twice a week can then be applied to keep the pipes in clean condition. Harsh toxic cleaners (acids, caustics, disinfectants) should not be used as these will kill off the bacterial action in the pipes. Alternatively, the pipes should be isolated and filled with the solution and left for up to 48 hours before draining. If necessary, further applications should be made until drains run clear.

See also next page

NOTE: Severly scaled systems should be acid cleaned.

Features, Benefits and Applications

- Powder formulation for easy use
- Biodegradable
- Reactivates biological activity in systems which have been rendered inactive by overloading, washout or use of aggressive cleaning products
- Eliminates the odours associated with sanitary systems which are overloaded or blocked
- Cleans sewage holding tanks without the need for manual entry
- Clears pipes and systems blocked by organic waste matter
- Clears organic materials in slow draining pipes and scuppers
- Restarts septic sewage treatment plant.
- Keeps complete sanitary systems in optimum operational condition
- Eliminates the need for hazardous chemicals
- Cost-effective, saves time, money and manpower

Product Properties

APPEARANCE: Tan brown, saw dust like.

pH, in conc: N/A

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	656 571711	Non-returnable	Plastic
		containers	
		containing 12 kg.	

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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Ideal for use on
Cruise Ships

GAMAZYME DIGESTOR

Drain and Pulper Cleaner

Product Description

Gamazyme Digestor is a patented formulation containing a synergetic blend of highly specialised bacteria. The mix of micro-organisms in this product increases organic degradation performance.

Utilising active enzymes to eat through biological and organic waste products, Gamazyme Digestor is a safe and non-corrosive product used to restore flow in drains where grease accumulation is a problem.

Gamazyme Digestor's biochemical formulation is designed to provide exceptional performance in clogged drain lines, grease traps and floor drains. It restores slow running drains and reduces odours due to organic build-up.

Directions for Use and Dose Rates

1. Drain Cleaner

Use 500 ml of Gamazyme Digestor per 5 cm drain diameter to restore flow in drains and to keep them free flowing. Repeat the operation if necessary.

Use regularly, once a day or several times a week to maintain drains free of grease.

2. Cleaning of Pulpers

Flush the whole system at the end of the day including pulpers, pipes, etc. with warm water (maximum 60°C) and Gamazyme Digestor.

Dose the product undiluted in the economiser tank by using a dosing pump. Use a dosage rate of approximately 2 litre per m³ water.

Product Properties

APPEARANCE: Green liquid

Bacterial Pathways: Aerobic and facultative anaerobic

ODOUR: Herbal/Lemon

DENSITY in g/cm³ at 15°C(59°F): 1.0

ACTIVE TEMP. RANGE: 10 to 60°C (50 to 140°F)

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (in litres)	Container
656 624015	20	Bag in a box (Cruise)

Features, Benefits and Applications

- Water based biological drain cleaner for slow running drains
- Patented, environmentally friendly bioenzymatic formulation designed to restore flow in drain systems containing greasy deposits
- Results in increased bacterial activity in a variety of organic wastes
- Environmentally friendly
- Free of harsh chemical compounds normally associated with acid and caustic drain openers
- Provides penetration, breakdown and degradation of organic drain line deposits and blockages
- Ideal for applications subject to aerobic and anaerobic environments

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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GAMAZYME FC

Biological in-depth floor cleaner for fat elimination in galley areas

Product description

A technologically advanced Floor Care product that provides deep and effective cleaning through microbial activity. Gamazyme FC is based on patented fatty acid degrading bacteria strains and biodegradable surfactants. Regularly use of Gamazyme FC provides improved safety and hygiene in galley areas.

How it works

Gamazyme FC is a unique floor care product that degrades and eliminates accumulated grease and other organic materials. Patented fatty acid degrading bacteria strains produce enzymes specific for the breakdown of the harder to degrade fatty acid components of oils and fats used in galley area. Excellent cleaning properties eliminate grease from floor surfaces resulting in reduced slippage and improved safety. Ingredients in Gamazyme FC enable it to penetrate and clean embedded residual organics left in pores, cracks, corners, crevices and microscopic pores in floor surfaces. Regularly use of Gamazyme FC will eliminate odours that attract insects; the residual organics that they feed on will be eliminated.

Directions for Use and Dose Rates

Gamazyme FC can be used for cleaning hard and soft floor surfaces as well as porous materials.

Mix 50 - 100 ml to half a bucket of hand hot-water, depending on the surface and amount of deposits to clean. Use a mop or sponge to clean the surface and let stand. No rinsing required. Spray cleaner etc. can be used for removal of embedded residual organics left in cracks, corners etc.

Features, Benefits and Applications

- Excellent in-depth cleaning properties
- Reduced slippage and improved safety conditions in galley area
- Penetrates porous floor surfaces to degrade accumulated grease and other organic materials
- Contains specialized patented bacterial strains forming enzymes that break down fatty acid components of grease
- Eliminates odours that attract insects; the residual organics that feed them are eliminated
- Friendly bacterial strains replace pathogenic bacteria for improved hygiene
- Results in a fresher smelling galley area
- Safe to use on all surfaces
- Environmentally friendly

BIO-ENZYMATIC CLEANING

CLEANING THAT DOESN'T STOP WHEN YOU PUT AWAY THE MOP

Product Properties

Appearance:	Blue liquid
pH, in conc.:	7.5-9.0
Density, in g/cm ³ at 15°C:	1.0
Flash Point, (PMCC) in °C:	N/A

Compatibility:

Metal:	No known effect
Rubber:	No known effect

PACKAGING: Product No.	(in litres)	Container
656 659391	5	Plastic

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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CARPET CLEANER

Soil extraction cleaner for carpets

Product description

Carpet Cleaner is a soil extraction cleaner for use on a wide range of carpets. Low foaming with a unique surfactant system that leaves no residue that contributes to resoiling.

How it works

Carpet Cleaner is designed for use with carpet cleaning machines that force the cleaner into the carpet and quickly vacuum it out again. As the exposure of soils to the cleaner last only a few seconds, selected surfactants will easily emulsify and remove the soils through the extractor vacuum pick up process.

Directions for Use and Dose Rates

For use with carpet cleaning machines dose rates should be 2%-5% depending on the quantity of soil.

To clean and deodorize carpets of organic residues such as urine, dog faeces, tomato sauce, chocolate etc., spot cleaning with Gamazyme MSC is recommended before treatment with Carpet Cleaner.

Features, and benefits,

- Compatible with all known carpet cleaning machines
- Low foaming detergents
- Leaves no sticky residue that contributes to resoiling
- Biodegradable
- Safe to use, no special handling requirements
- Free of colorants
- Leaves a fresh odor

Product Properties

Appearance:	Yellow white liquid
pH, in conc:	9-10
Density, in g/cm ³ at 15°C:	1.0
Flash Point, (PMCC) in °C:	N/A

Compatibility:

Metal:	No known effect
Rubber:	No known effect

PACKAGING:	Product No.	(in litres)	Container
	651 659409	Non-returnable boxes of 12x1 litres plastic bottles	Plastic

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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DEFOAMER CONCENTRATE

Antifoam

Product Description

Defoamer Concentrate is a non-silicone based water dispersible, liquid defoamer. It controls foaming in sewage and waste water systems, and it is stable in alkaline conditions.

Defoamer Concentrate can be used to remove foam in water based systems and collecting tanks in vacuum toilet systems.

Directions for Use and Dose Rates

Effective dosage will vary depending on foam origin, stability and the area of defoamer application. Trials are always the best way to determine defoaming capabilities and efficiency.

Typical dosage is 10-30 ml/tonne, but proper dosage rate to be determined by site testing.

The recommended dosing method for sewage systems is to premix 1 part of Defoamer Concentrate with 5 parts of fresh water and pump this into the EVAC ejector tank. The dosing is done about 1/2 hour before top load.

Product Properties

APPEARANCE: Yellow brown liquid

ODOUR: Slight odour

DENSITY in g/cm³ at 15°C(59°F): 0.83

pH in dilution: Neutral

FLASH POINT (CC): 85°C (125°F)

SHELF LIFE: 3 years

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (in litres):	Container
659 624314	20	Bag in a box (Cruise)
651 661843	25	Steel

Features, Benefits and Applications

- Non-silicone defoamer
- Stable in alkaline conditions
- Can be used in sewage and waste water systems
- Outstanding for all atmospheric, pressurised and continuous waste equipment
- Excellent to control foaming and remove foam when necessary
- Approved by ZENON Environmental Inc. for use in membrane bio reactor systems

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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Ideal for use on
Cruise Ships

BILGE WATER FLOCCULANT

Treatment of Oily Bilge Water

Product description

Bilge Water Flocculant is a very effective liquid treatment based on Poly Aluminium Chloride (PAC) to separate oil residues from bilge water. It is iron-free, and is completely safe to the environment.

Applications

International environmental regulations set strict limits on the oil content in effluent water from ships. To meet these regulations, a combination of mechanical and chemical cleaning is necessary. Bilge Water Flocculant is used in combination with multistage bilge water cleaning systems that include mechanical separation of free oil, emulsion breaking, flocculation and filtration. After dosing, Bilge Water Flocculant breaks the oil-in-water emulsion created by contaminants in lubricating and fuel oils, emulsifying cleaning agents etc. It then destabilises the remaining small oil droplets and agglomerates them into larger particles (flocs) that are easily collected by filtering.

The efficiency of flocculants is normally strongly dependent upon the water pH. Bilge Water Flocculant is recognised as being effective in a wide pH range, from 5.5 to 9.5. The optimum pH range is 7.0-9.5, which is the typical range for bilge water. This means that additional adjustment of the pH, with acids or alkalis, is unnecessary. Bilge Water Flocculant is also an excellent product for the removal of residual organic matter in sewage. Typical dosage is 70 to 150 ml/tonne of sewage.

Directions for use and dose rates

Typical dose rate: 100 - 500 ppm (0.1 - 0.5 litre/m³ of water)

In a multistage bilge water cleaning system, Bilge Water Flocculant is fed undiluted through a dosage pump connected to the pressure side of the oil descaler. The flocc tank is fed according to the flow of the bilge water pumped into it. The feed is adjusted in connection with the installation and normally needs no alteration. If required, dosing can also be controlled by measuring the level in the container.

Product Properties

APPEARANCE: Clear liquid

BULK WEIGHT: 1.3 kg/l

pH at 20°C: 1.3

COMPATIBILITY:

Metal: Corrosive to cast iron as concentrate.
Non-corrosive to all metals at use concentration.

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (in litres):	Container
651 690669	25	Plastic

Features, Benefits and Applications

- Cost-effective bilge water treatment based on specially selected Poly Aluminium Chloride
- Iron-free. Completely safe to the environment
- Acts by both breaking the oil-in-water emulsion and by building flocs
- Helps to meet environmental regulations on oil content. Discharged water contains normally less than 3 ppm oil
- Remaining oil sludge can be burned onboard or pumped ashore-contains very little water
- Low dosage, economical use
- Effective over an extended pH-range. Eliminates the use of pH-stabilising chemicals
- Approved by manufacturers of bilge water cleaning systems

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

Wilhelmsen Ships Service or any associated or subsidiary company's warranties of fitness and merchantability, if any, as well as any expressed warranties regarding this product shall not be effective or actionable unless the goods are used as directed herein and in no other manner due to potential hazards from improper use of the goods described herein.

REEFER CLEANER

Cleaning of Refrigerated Rooms

Product Description

Reefer Cleaner is a combination of a highly effective alkaline cleaners and disinfectant in one product. It removes fat, grease and general dirt, leaving a clean surface, free from bacteria and other micro-organisms. Contains no chlorine, phenols or heavy metals.

Reefer Cleaner is used for cleaning and disinfection of reefer cargo holds and storage spaces, deep freezers, galleys and other food areas. Effective against viruses, bacteria, algae, fungi and other micro-organisms.

Reefer Cleaner cleans and disinfects effectively even in the presence of large quantities of organic materials such as blood and proteins.

Directions for Use and Dosage Rates

For general purpose cleaning duties use Reefer Cleaner in 1-5% solution with fresh water. Apply solution by spray, brush, sponge or rag to the surface to be cleaned.

For cleaning large surface areas such as reefer cargo holds, use Reefer Cleaner in 1-10% solution with fresh water. Apply solution by low pressure spray onto the soiled surfaces, and follow by a rinse with a high pressure fresh water spray or jet.

A final rinse with a 1% solution of Reefer Cleaner in fresh water, applied by low pressure spray, will give the surface a temporary protection against new growth of micro-organisms.

Reefer Cleaner can be applied on vertical surfaces by adding Foam-Agent (Product no. **651 614537**) for increased resident time.

Product Properties

APPEARANCE:	Light yellow liquid
DENSITY in g/cm ³ at 15°C:	1.03
pH in conc.:	12.5
COMPATIBILITY:	
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING:	Product No.	Size (in kg):	Container
	651 623983	20	Bag in a box (Cruise)
	651 661827	25	Plastic
	651 765107	1	Plastic

Features, Benefits and Applications

- Water based alkaline cleaner and disinfectant
- Biodegradable
- High tolerance in hard water
- Does not build up any resistance
- Cleans and disinfects in one operation
- Removes bad odours
- Effective against both gram negative and gram positive bacteria, fungi, mould, algae and mildew
- Safe to use on all types of surfaces including aluminium and plastic
- Approved by The Norwegian Directorate of Fisheries

Read the Material Safety Data Sheet before using this product

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Ideal for use on
Cruise Ships

MUD & SILT REMOVER

Ballast Tank Mud Lifter

Product Description

Mud & Silt Remover is a liquid compound. It keeps mud in suspension and cleans fouled systems completely.

Applications

Mud & Silt Remover removes sediments, silt and mud from ballast tanks, cooling water systems, pipelines, etc.

Directions for Use and Dose Rates

Mud & Silt Remover should be injected in small quantities into the ballast or cooling water of the system to be treated, prior to filling the tanks or the system. Heavy deposits may require several treatments.

If product is regular dosed each time tanks are ballasted, a maintenance dosage of 2.5 Ltr/100 tonnes of ballast water is recommended.

To clean heavy accumulation a dose rate of 10 Ltr Mud & Silt Remover per 100 tonnes of ballast water is recommended.

Inject Mud & Silt Remover preferably into the suction line of the ballast or cooling water pump, to ensure thorough mixing with the incoming water. If possible, circulate the water through the tanks and the suspended mud and silt will be pumped out when deballasting.

Caution!

Spillages of Mud & Silt Remover should be avoided, as floors, decks, etc. will become very slippery. Clean as soon as possible.

NOTE: SHELF LIFE - 24 MONTHS FROM PRODUCTION

Product Properties

Appearance	White viscous liquid
Density, g/cm ³ at 15°C:	1.0
FLASH POINT, PMCC) in °C:	N/A
pH, conc. at 20°C:	7-8
Shelf life:	24 month from production
Compatibility:	
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING:	Product No.	Size (in litres):	Container
	652 635326	25	Plastic
	652 661702	210	Plastic

Features, Benefits and Applications

- No acids, alkali or solvent
- Biodegradable
- Non-toxic
- Non-flammable
- Keeps mud in suspension and cleans fouled systems
- Removes sediments, silt and mud from ballast tanks, cooling water systems, pipelines, etc.
- Inject in small quantities into the ballast or cooling water system to be cleaned
- Effective and economical in 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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PENETRON PLUS

Penetron Plus

Product Description

Penetron Plus is a fast acting liquid compound containing special oils and solvents that penetrate iron oxides and loosens carbon deposits.

Applications

Penetron Plus loosens corroded parts as nuts, bolts, etc.

Directions for Use and Dose Rates

Penetron Plus can be applied by brush, spray, spout from can or used in a soak tank.

For nuts, bolts and other corroded parts a few drops of Penetron Plus on the thread and nut is usually sufficient to free a seized thread.

Small rusty and soiled parts can be immersed in a tank, to remove rust scale and soiling i.e. grease, tar and oils.

Use a brush or spray to prepare larger machinery parts for dismantling, to free nuts and bolts and clean parts.

For protection against rust, brush or spray a coating over parts to be protected.

Always use Penetron Plus undiluted.

Product Properties

Appearance: Clear red liquid

Density, g/cm³ at 15°C: 0.8

FLASH POINT, PMCC) in °C: Above 61

pH, conc. at 20°C: N/A

Compatibility:

Metal: No known effect

Rubber: Do not use with natural rubber compounds

PACKAGING: Product No. Size (in litres): Container

651 575506

0,5

Can

Features, Benefits and Applications

- Liquid oil based product
- Low-toxic, emits no toxic fumes or vapours
- Fast acting penetration of rusty seized up parts
- Avoids cutting or burning off bolts from engines or machinery
- Keeps tools clean and rust free
- Dismantling of assemblies seized up from rust and soiling
- Cleaning of rusty and soiled metal parts
- Protection of machinery parts and tools

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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ZINC COAT CONDITIONER

Cleaner For Zinc Based Tank Coatings

Product Description

Zinc Coat Conditioner is a clear organic liquid based on acetates.

Applications

Zinc Coat Conditioner cleans and upgrades coated cargo tanks that have contained leaded gasoline, carbon tetrachloride, methylene chloride or virgin naphtha.

It is a cost effective way to remove lead, chloride, zinc, salts and iron sulphite from the pores of zinc silicate and epoxy coatings.

Direction of Use and Dose Rates

Zinc Coat Cleaner can be used neat on the surfaces to be cleaned if the normal cleaning procedures have failed to remove metallic salts from the micro pores of the tank coating leaving the cargo tank unacceptable for the next cargo.

It is recommended to establish the average penetration time of Zinc Coat Conditioner carrying out some tests on small areas.

Spray Method

1. Apply 1 litre Zinc Coat Conditioner per 3-5 m² of tank surface.
2. Leave for about 15-45 minutes penetration time.
3. Wash down with fresh water and check the result.
4. Repeat the procedure if necessary.

Recirculation method

1. A washing solution of max. 10% Zinc Coat Conditioner with fresh water should be prepared in a mixing tank.
2. The cleaning solution should be heated up to max. 45°C.
3. Using tank cleaning machine the solution should be recirculated up to 45 minutes.
4. Rinse with freshwater and check the result.
5. Repeat cleaning procedure if necessary.

Zinc Coat Conditioner has been evaluated by the BLG Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals (ESPH) and found to meet the requirements of paragraph 13.5.2 of the MARPOL Annex II and is consolidated into annex 10 of the MEPC.2/Circular.

Product Properties

Appearance:	Clear liquid
Density, g/cm ³ at 15°C:	1.0
FLASH POINT, PMCC) in °C:	N/A
pH, conc. at 20°C:	5.5
Compatibility:	
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING:	Product No.	Size (in litres):	Container
	652 661801	25	Plastic
	652 625558	210	Plastic

Features, Benefits and Applications

- Organic based liquid cleaner
- Biodegradable
- Free from hydrocarbon solvents
- Removal of white deposits (metallic salts) from tank coatings
- Can clean and upgrade coated cargo tanks after leaded gasoline, carbon tetrachloride, methylene chloride and virgin naphtha
- Cost effective in use
- IMO approved and listed in Annex 10 of the MEPC.2/Circular

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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Water Treatment

WATER TREATMENT

Problem and solution summary

Problem	Solution	Product(s)
Boiler water Treatment Scale deposits in auxiliary or low pressure boilers causing reduced efficiency.	Condition hardness salts for blowdown. Maintain correct alkalinity for scale and corrosion control	Combitreat Liquitreat Autotreat
Corrosion in low pressure boilers as a result of high boiler water acid levels (low alkalinity).	Increase alkalinity to neutralise acids, precipitate salts and corrosion control	Combitreat Liquitreat Autotreat
Scale deposits in boilers of all pressures Efficiency reduced by scale deposits caused by excess of hardness salts. Results: scale reduced efficiency.	Condition hardness salts for blowdown. Maintain optimum pH, alkalinity and phosphate levels for scale and corrosion control.	Hardness Control, Alkalinity Control
Corrosion in boilers as a result of dissolved oxygen.	Remove dissolved oxygen	Oxygen Control Cat Sulphite L (CSL) Oxygen Scavenger Plus
Corrosion in feedwater and condensate systems as a result of dissolved CO ₂ .	Increase and maintain condensate pH to neutralise acids by using a volatile amine.	Condensate Control
Sludge deposits in boiler systems, causing reduced flow and inefficient heat transfer.	Use sludge conditioner to prevent the formation of adherent deposits.	Boiler Coagulant
Oil contamination of boilers, steam systems and feedwater.	Coagulate oil for removal by blowdown. (As a temporary measure, increase alkalinity).	Boiler Coagulant
Cooling water Treatment Corrosion in closed circuit cooling or heating systems - e.g. diesel engines.	Passivate metal surfaces and maintain stable pH to prevent damage to the system	Dieselguard NB Rocor NB Liquid
Corrosion in closed circuit cooling systems with Aluminium components	Protect the metal surface while maintaining low Alkalinity	Cooltreat AL
Bacterial contamination in cooling water system	Kill bacteria	Mar-71
Sea water Treatment Sea water intakes and sea water systems blocked by mussels and barnacles.	Inject dispersant into seachest to deter biological contamination.	Bioguard
Corrosion in sea water lines, bilges and ballast tanks.	Condition metal surfaces to inhibit corrosion.	Bioguard
Evaporator Treatment Scale deposits in sea water evaporators, causing restriction of water flow, reduced heat transfer efficiency, lower output, risk of foaming, carry over and contamination of condensate.	Prevent crystal growth and scale formulation.	Vaptreat MultiVap
Potable Water Treatment Corrosion in potable water system, "Red water"	Corrosion prevention.	Potable Water Stabiliser

COMBITREAT

Boiler Water Conditioner for Low Pressure Boilers (Up to 16 Bar)

Product Description

Combitreat is a dry powder containing alkalinity builders, phosphates and sludge conditioners.

Directions for Use

The main attributes of Combitreat fall into the following categories:

Control of alkalinity:

The correct level of alkalinity ensures that optimum conditions exist for:

Precipitation of hardness salts in conjunction with phosphate.

Neutralisation of acidic conditions.

Avoidance of caustic corrosion.

Control of magnesium and calcium salts.

Control of hardness: Combitreat provides a phosphate reserve to effectively react with and precipitate the hardness salts introduced with the feedwater.

Conditioning of sludge: Boiler sludge can only be removed by blowdown if it is free flowing, Combitreat will ensure this by preventing the sludge from adhering to metal surfaces. The resulting sludge is composed of small particles flowing towards the bottom of the boiler.

Dosing Methods

Combitreat is best dosed by means of a bypass pot feeder directly into the boiler feed line.

Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. The sample should always be taken from the same point after blowdown, cooled and tested immediately. Follow the Spectrapak Test Kit instructions and log the results on the log sheets provided by Unitor. These log sheets should be sent to Unitor's Rapid Response centre for review and comments. It is important that regular testing is carried out to ensure that treatment levels are correct.

Product Dosage and Control Limits

Initial dosage for an untreated system is 400 grams Combitreat/1000 litres of boiler capacity. This will bring the treatment up to a suitable level of 200 ppm p-Alkalinity.

The dosage chart given below is for convenience in calculating the amount of Combitreat required to bring the level to the point between the minimum and maximum (mid point: 200 ppm. p. Alkalinity.)

P-Alkalinity (as ppm CaCO ₃)	0	50	100	150	200	225	300	350	400
Dosage of Combitreat Kg/1000L	0.4	0.3	0.2	0.1	0	0	0	blowdown	

Our recommended control limits are:

p-Alkalinity: 100-300 ppm CaCO₃ Chlorides: 200 ppm
Cl max. Condensate pH 8.3-9.0

These are recommended values based on experience, and are in no way intended to replace the boiler manufacturers specifications, or company regulations.

Excessive chlorides are removed by blowdown.

Product Properties

APPEARANCE: Tan powder

pH (0.3 wt%): 10

COMPATIBILITY:

Metal: Avoid aluminium, zinc, tin and their alloys

Rubber: No known effect

PACKAGING: Product No.	Size (Kg)	Container
655 571265	25	Steel

Features, Benefits and Applications

- Combined conditioning treatment for simplified dosing and handling
- Suitable for use with all auxiliary boilers; waste heat units; economisers; package boilers; smoke and water tube boilers, up to 16 bar pressure
- Boiler kept at peak level efficiency
- Heating surfaces maintained at optimum thermal conditions
- Dispersant action suspends sludge and sediment particles
- Approved by the Norwegian National Institute of the Public Health for the use in system where steam is used for drinking water production

Additional Information

- Wilhelmsen Ships Service strongly recommends the use of Condensate Control in conjunction with Combitreat. Condensate Control is a volatile amine that neutralizes carbonic acid in the condensate return
- To minimize oxygen corrosion, Wilhelmsen Ships Service recommends the use of an oxygen scavenger and to maintain the temperature of the hotwell at a minimum of 80°C

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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LIQUITREAT

Liquid Boiler Water Conditioner for Boilers up to 30 Bar Pressure

Product Description

Liquitreat is a liquid blend of alkaline compounds, scale and corrosion inhibitors, oxygen scavengers and sludge conditioners.

Directions for Use

The main attributes of Liquitreat fall into the following categories:

Control of alkalinity: The correct level of alkalinity ensures that optimum conditions exist for:

Precipitation of hardness salts in conjunction with phosphate.

Neutralisation of acid conditions. Avoidance of caustic corrosion. Control of magnesium and calcium salts. Control of hardness: Liquitreat provides a phosphate reserve to effectively react with and precipitate the hardness salts introduced with the feedwater.

Conditioning of sludge: Boiler sludge can only be removed by blowdown if it is free flowing. Liquitreat will ensure this by preventing the sludge from adhering to metal surfaces. The resulting sludge is composed of small particles flowing towards the bottom of the boiler.

Control of oxygen: Oxygen scavenging becomes more important with the increase in boiler pressure. The oxygen scavenger will effectively react with dissolved oxygen even at lower temperatures.

Dosing Methods

Liquitreat is best fed into the boiler feed line by means of by-pass pot feeder. The amount required for dosage can be obtained from the dosage chart. Consult your Wilhelmsen Ships Service representative for specific dosing instructions. Liquitreat can also be fed using Unitor's BWT dosing system.

Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. The sample should always be taken from the same point after blowdown, cooled and tested immediately. Follow the Spectrapak test kit instructions and log the results on the log sheets provided by Wilhelmsen Ships Service. These log sheets should be sent to Wilhelmsen Ships Service Rapid Response centre for review and comments. It is important that regular testing is carried out to ensure levels of treatment are correct.

Product Dosage and Control Limits

Initial dosage for an untreated system is 2.4 litres of Liquitreat/1000 litres of boiler capacity. This will bring the treatment up to a suitable level of 200 ppm p-Alkalinity. The dosage chart given below is for convenience in calculating the amount required to bring the level to the mid point between the minimum and maximum (mid point 200 ppm. p-Alkalinity.)

P-Alkalinity (as ppm CaCO ₃)	0	50	100	150	200	225	300	350	400
Dosage of Liquitreat ltrs/1000	2.4	1.8	1.2	0.6	0	0	0	0	Blowdown

Our recommended control limits are:

- p-Alkalinity: 100-300 ppm CaCO₃.
- Chlorides: 200 ppm Cl max.
- Condensate pH 8.3-9.0.

These are recommended values based on experience, and are in no way intended to replace the boiler manufacturers specifications, or company regulations. Excessive chlorides are removed by blowdown.

Product Properties

APPEARANCE: Colourless liquid

DENSITY, g/ml at 15°C: 1.1

pH: 13-14

COMPABILITY:

Metal: Avoid aluminium, zinc galvanised steel.

Rubber: No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	655 571273	25	Plastic

Features, Benefits and Applications

- Liquid conditioning treatment for simplified dosing and handling
- Suitable for use with auxiliary boilers; waste heat units
- Smoke or water tube boilers; up to 30 bar pressure
- Boiler kept at peak level efficiency
- Heating surfaces are maintained at optimum thermal conditions
- Dispersant action suspends sludge and sediment particles for efficient blowdown
- Oxygen scavenging for optimum protection
- Approved by the Norwegian National Institute of the Public Health for the use in system where steam is used for drinking water production

Additional Information

- Unitor strongly recommends the use of Condensate Control in conjunction with Liquitreat. Condensate Control is a volatile amine that neutralizes carbonic acid in the condensate return
- For optimum protection against oxygen corrosion, we recommend to maintain a minimum temperature of 80°C in the hotwell
- This product is formulated for use in conjunction with good quality feed water

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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AUTOTREAT

Boiler Water Conditioner for Boilers up to 30 Bar Pressure

Product Description

Autotreat is an advanced liquid boiler water treatment chemical, formulated with alkaline compounds, scale and corrosion inhibitors, volatile amines for protection of condensate system, and sludge conditioner.

The product combines well known phosphate treatment with new polymer technology. This ensures that precipitates are kept soft and nonadherent for easy removal by blowdown.

Dosing Method

The product should preferably be dosed continuously with a Unitor Boiler Water Treatment Dosing Unit. Alternatively the product can be fed into the feed line by means of a by-pass pot feeder.

Dosage

Initial dose for an untreated system is 2.4 litres of Autotreat per ton boiler capacity. This will bring the treatment up to a suitable level of about 200 ppm p-Alkalinity. The provided dosing chart is convenient for calculation of the amount of chemical required.

Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. The sample should always be taken from the same point after Blowdown, cooled and tested immediately.

Follow the Spectrapack test kit instructions and log the results on the log sheets provided by Wilhelmsen Ships Service. These sheets should be sent to Wilhelmsen Ships Service Rapid Response centre for review and comments. It is important that regular testing is carried out, to ensure correct level of treatment is maintained.

Product Dosage and Control Limits

Initial dosage for an untreated system is 2.4 litres of Autotreat/ton of boiler capacity. This will bring the treatment up to a suitable level of 200 ppm p-Alkalinity. The dosage chart given below is for convenience in calculating the amount required to bring the level to the mid point between the minimum and maximum (mid point 200 ppm. p-Alkalinity.)

P-Alkalinity (as ppm CaCO ₃)	0	50	100	150	200	225	300	350	400
Dosage of Autotreat ltrs/1000	2.4	1.8	1.2	0.6	0	0	0	0	Blowdown

Our recommended control limits are:

- p-Alkalinity: 100-300 ppm CaCO₃.
- Chlorides: 200 ppm Cl max.
- Condensate pH 8.3-9.0.

These are recommended values based on experience, and are in no way intended to replace the boiler manufacturers specifications, or company regulations. Excessive chlorides are removed by blowdown.

Product Properties

APPEARANCE: Light yellow liquid

DENSITY: 1.1

pH: 13-14

COMPABILITY:

Metal: Avoid aluminium, zinc and galvanised steel.

PACKAGING: Product No.	Size (in litres)	Container
655 698720	25	Plastic

Features, Benefits and Applications

- Liquid boiler water treatment chemical for simplified dosing and handling
- Suitable for all boilers, up to 30 Bar pressure
- Prevents scaling and corrosion, increasing system life and reliability
- Contains volatile amines to neutralise acids occurring in condensate system
- Dispersant action suspends sludge and sediment particles for efficient removal by blowdown
- Ideal for use with Unitor's Boiler Water Management System, suitable for dosing with Unitor Boiler Water Treatment Dosing Unit
- Keeps boiler tube surfaces clean, promoting the best heat transfer conditions
- Simple testing to determine treatment level

Additional Information

- The product should always be used in conjunction with an oxygen scavenger, Oxygen Scavenger Plus is recommended
- This product is formulated for use in conjunction with good quality feed water

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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CAT SULPHITE L (CSL)

Oxygen Scavenger

Product Description

CSL is a sodium sulphite based product in ready to use liquid form. The catalyst ensures rapid elimination of oxygen in the boiler system. CSL should be used in conjunction with other Unitor boiler water treatment products.

Oxygen is highly corrosive in the boiler system, even in small amounts. Elevated temperature operation of the hotwell is a good practice to remove gases like oxygen. Even so, the feed water contains oxygen which can create severe corrosion, shown as deep and local pitting. This will quickly cause failure of the boiler metal. CSL reacts with oxygen to form inert sodium sulphate, thus preventing oxygen attack.

Dosage

The quantity of CSL required depends on the operation of the boiler system. As a guide 10 ppm sulphite is required to react with 1 ppm oxygen.

A reserve of 20 to 50 ppm sulphite is to be maintained in the boiler water, determined by regular testing.

A normal dosage is approximately 1 ltr per day, depending on system layout.

Dosing Method

For optimal results CSL should be dosed continuously by means of a metering pump into the feed line, after the recirculation valve. CSL can be fed using Unitor's BWT dosing system. Slug dosing into the hotwell as well as low hotwell temperatures will strongly reduce the efficiency of this treatment.

Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. Samples should be taken after blowdown, cooled and tested immediately. Samples should always be taken from the same location. The results should be recorded on the log sheets provided by Wilhelmsen Ships Service. These logs should be sent to Wilhelmsen Ships Service Rapid Response center for review and comments. It is important that regular testing is carried out to ensure that treatment levels are maintained within correct chemical limits.

Sulphite Test Kit

Product no: **661 574913**

Range: 0 - 50 mg/l Na₂SO₃

Test Procedure

Take a sample of the water under test in the sample container, filling to the 50 ml mark. Add two Sulphite No. 1 tablets, stopper the container and swirl gently to disintegrate tablets.

Then add one Sulphite No. 2 tablet and swirl the container gently until the tablet disintegrates. Continue adding Sulphite No. 2 tablets in this manner one at a time until a blue colour appears.

Note the number of No. 2 tablets used. Multiply the number of No. 2 tablets used by 4 and subtract 2 from the result. This gives the Sulphite concentration in the water expressed as mg/l Na₂SO₃.

This calculation is represented by the formula below:

For a 50 ml sample

Sulphite (as Na₂SO₃) = (No. of No. 2 tablets x 4) - 2

Note that the Sulphite No.1 tablets are to condition the sample only. Do not include these tablets in the calculation of sulphite level.

Cleaning: Thoroughly rinse out sample container after use.

The test results indicate the level of treatment in the boiler. If levels are incorrect, the treatment will have to be adjusted accordingly, with more frequent testing until a steady state is reached. It is important that regular testing is carried out to ensure levels of treatment are correct.

Product Properties

APPEARANCE: Pale Pink Liquid

pH:(10 wt%) 4

SPECIFIC GRAVITY 1.3

COMPABILITY:

Metal: May corrode metal

Rubber: No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	655 575662	25	Plastic

Features, Benefits and Applications

- Concentrated liquid product
- Protects the boiler from oxygen corrosion
- Catalysed product for very rapid action
- Reacts at low temperature
- Will assist mechanical deaeration
- Simple control test
- Should be used in conjunction with other Unitor treatments
- CSL should be dosed separately from other boiler water treatments

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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OXYGEN SCAVENGER PLUS

Catalysed Deha Solution for Oxygen Scavenging in Boilers

Product Description

Oxygen Scavenger Plus is a catalysed liquid solution of di-ethylhydroxylamine (DEHA). Its volatile properties ensure distribution throughout the boiler and condensate system, and hence protects against oxygen corrosion in all parts of the system. The product also provides the required conditions for the establishment of a passivating layer of magnetite on all inner surfaces. Oxygen Scavenger Plus is a low toxicity product, suitable for high, medium and low pressure boiler systems.

Directions for Use

This product is formulated for use in conjunction with Wilhelmsen Ships Service co-ordinated or combined treatment programmet.

Oxygen Scavenger Plus can be used in any boiler system, and in conjunction with mechanical deaeration systems. Removal of dissolved oxygen is vital for prevention of corrosion and especially pitting corrosion in boilers. When dosed into a boiler system, Oxygen Scavenger Plus will react with dissolved oxygen and form non corrosive compounds. The product is volatile, and left over product from oxygen scavenging in the pre-boiler section will evaporate and assist protection of the steam and condensate system. No solid materials are produced when using Oxygen Scavenger Plus.

Dosage

Dosing should be controlled so that the DEHA residual in the condensate is between 0,08-0,30 ppm. The consumption will depend on feed water temperature and the amount of water fed into the boiler. For more information about initial dosage and dose rate please consult your nearest Customer Services.

Dosing Method

Wilhelmsen Ships Service recommends continuously into the boiler feed line using the Boiler Water Treatment Dosing Unit.

Oxygen Scavenger Plus Dosing Chart

DEHA test result in condensate, (ppm)									
0-0.14	0.04-0.08	0.08-0.12	0.12-0.16	0.16-0.20	0.20-0.25	0.25-0.30	0.30-0.35	0.35-0.40	0.40 +
Increase dose by 25 %		Satisfactory, maintain daily dose rate					Decrease dose by 25 %		

Sampling and Testing

A representative sample of Condensate should be drawn for analysis daily. The sample should always be taken from the same sampling point, cooled and tested immediately.

Follow the Spectrapack 313 test kit instructions and log the results on the logs provided by Wilhelmsen Ships Service. It is important that regular testing is carried out, to ensure the correct level of treatment is maintained.

Product Properties

APPEARANCE:	Light yellow Liquid	
pH:	10.5	
DENSITY:	1.0	
PACKAGING:	Product No.	Size (in litres)
	655 698712	25

Features, Benefits and Applications

- Fast acting, liquid oxygen scavenger
- Safe and easy to use, low toxicity
- Reduces corrosion of iron and copper, increasing system life and reliability
- Neutralises acids occurring in condensate system
- Volatile product, provides distribution and protection throughout the boiler system, economical in use
- Ideal for use with the Unitor Boiler Water Management System, suitable for use in conjunction with Wilhelmsen Ships Service combined and co-ordinated treatment programmes
- Organic product, no dissolved solids added
- Simple test to determine treatment level

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 CONTROL

Phosphate Treatment for Boiler Water

Product Description

Hardness Control is a highly soluble, dry powder product used for the reduction of hardness in boilers. It will precipitate calcium hardness as a non-adherent sludge.

Directions for Use

Hardness Control is part of the Wilhelmsen Ships Service co-ordinated treatment programme. It is formulated to form a precipitate with calcium ions which will not adhere to metal surfaces but are in a form suitable for blowdown.

Dosage

Hardness Control is used in controlled amounts so that a free phosphate level is maintained in the boiler. This level is determined by the boiler pressure (see table for normal levels). Initial dosage is dependent on the quality of feed water. To raise the phosphate level during normal operation, dose 23 grams per ton of distilled water to raise the phosphate level by 20 ppm PO₄.

Dosing Method

For optimum results dose Hardness Control direct to the boiler via the bypass pot-feeder. The dry powder should be dissolved in hot water (50°C) at a ratio of 1 part powder to twenty parts condensate (e.g. 500 grams/10 litres). Ensure that treatment is fully dissolved before dosing.

Product Properties

Appearance: White powder

pH, (1 wt %): Natural

COMPABILITY:

Metal: No known effect

Rubber: No known effect

PACKAGING: Product No.	Size (Kg)	Container
655 571299	25	Steel

Features, Benefits and Applications

- Highly active phosphate based compound Economical
- Easily dissolved in water for dosing
- Scale problems due to calcium are eliminated
- Maintains sludge in a non-adherent state for removal by blow down
- Simple test to determine level of treatment
- Can be used for boilers of all pressures
- Unitor Hardness Control does not influence the alkalinity in the system
- Approved by the Norwegian National Institute of the Public Health for the use in system where steam is used for drinking water production

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 Control – Dosage - Grams/ton

Pressure Range	Phosphate test result in p.p.m PO ₄						Standard Range	Initial dose gram/tonne
	0-10	10-20	20-30	30-40	40-50	50+		
0-40 Bar	23	11.5	Satisfactory	Satisfactory	Satisfactory	Blowdown	20-50	23
0-588 Psi	23	11.5	Satisfactory	Satisfactory	Satisfactory	Blowdown	20-50	23
41-60 Bar	17	5.5	Satisfactory	Blowdown	Blowdown	Blowdown	15-30	17
603-880 Psi	17	5.5	Satisfactory	Blowdown	Blowdown	Blowdown	15-30	17
> 60 Bar		Satisfactory	Satisfactory	Blowdown	Blowdown	Blowdown	10-25	17
> 880 Psi		Satisfactory	Satisfactory	Blowdown	Blowdown	Blowdown	10-25	17

These are recommended values based on experience and are in no way intended to replace the boiler manufacturer's specifications or company regulations.

ALKALINITY CONTROL

Concentrated Liquid Alkalinity Boiler Water Treatment

Product Description

Concentrated liquid alkaline product for corrosion and scale control in boilers.

Directions for Use

This treatment is part of Wilhelmsen Ships Service Co-ordinated Treatment Programme. Alkalinity Control provides the alkaline conditions for Hardness Control to function correctly.

Without the correct precipitation and subsequent blowdown of hardness salts, scale will form. This will result in restriction in water flow, ineffective heat transfer and local corrosion. The end effect would be an inefficient boiler and ultimately component failure.

Alkalinity Control also provides the alkaline conditions required for corrosion control, by neutralisation of acidic gases.

Dosage

A proper level of treatment is maintained by testing for p-Alkalinity. The level is determined by the pressure and type of boiler. Refer to the dosage tables overleaf for correct dose rates. The normal method of raising the alkalinity level is by adding the required quantity of Alkalinity Control after testing for p-Alkalinity. 225 ml/ton will raise the p-Alkalinity by 100 ppm.

Dosing Method

For optimum results dose Alkalinity Control direct to the boiler with a Boiler Water Treatment Dosing Unit, or via a bypass pot-feeder installed in the boiler feed line.

Product Properties

Appearance: Colourless liquid

Density, g/cm³ at 15°C: 1.3

pH (1 Vol %): 13

COMPATIBILITY:

Metal: Corrosive to aluminium, magnesium, zinc and tin.

Rubber: No known effect.

PACKAGING:	Product No.	Size (in litres)	Container
	655 571307	25	Plastic

Alkalinity Control - Dosage - ml/ton

Pressure Range	p-Alkalinity test result ppm CaCO ₃							Standard Range p.Alkalinity	Initial Dose millilitres/Tonne
	0-60	60-90	90-100	100-110	110-120	120-150	150 +		
0-30 Bar 0-441 Psi	225	110	70	Satisfactory No Dose	Satisfactory No Dose	Satisfactory No Dose	Blow Down	100-150	280
31-40 Bar 456-588 Psi	190	80	60	Satisfactory No Dose	Satisfactory No Dose	Blow Down	Blow Down	100-130	260
41-60 Bar 603-882 Psi	170	80	60	Satisfactory No Dose	Satisfactory No Dose	Blow Down	Blow Down	100-120	235

225 ml Alkalinity Control per ton will raise the p.Alkalinity by 100 ppm. Proper treatment should normally give a pH between 9.5 and 11. These are recommended values based on experience and are in no way intended to replace the boiler manufacturer's specifications or company regulations.

Features, Benefits and Applications

- Convenient liquid treatment which provides the basic alkalinity on which successful water treatment depends
- Maintains alkalinity within optimum limits
- Provides optimum conditions for hardness control to function
- Assists in precipitation and blowdown of magnesium and calcium salts
- Neutralises acid conditions
- Allows efficiency to be maintained, and reduces maintenance.
- Can be used with most treatment chemicals, in conjunction with a coordinated treatment programme
- Will assist in keeping silica in suspension
- Simple test to determine level of treatment
- Can be used in boilers of all pressures
- Can be used as a neutraliser after acid cleaning operations in different systems
- Approved by the Norwegian National Institute of the Public Health for the use as neutraliser after acid cleaning operations in fresh water generators

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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Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. The sample should always be taken from the same point after blowdown, cooled and tested immediately. Follow the Spectrapak Test Kit instructions and log the results on the log sheets provided by Wilhelmsen Ships Service. These log sheets should be sent to Wilhelmsen Ships Service Rapid Response center for review and comments. It is important that regular testing is carried out to ensure levels of treatment are correct.

USING THE TABLE: Select the section corresponding to the pressure of the boiler to be treated and read across the table to obtain the level of treatment required.

OXYGEN CONTROL

Hydrazine Solution for Oxygen Scavenging in Boilers

Product Description

Oxygen Control is a catalysed liquid hydrazine oxygen scavenger for boiler and steam line corrosion protection. As an additional benefit it will assist to neutralise dissolved carbon dioxide. It provides the required conditions for the establishment of a passivating layer (magnetite) in the boiler and condensate system.

Directions for Use

This product is used in conjunction with Wilhelmsen Ships Service co-ordinated treatment programme and Wilhelmsen Ships Service combined treatment programmes.

Oxygen Control can be used in all boiler systems, from low to high pressures and in conjunction with mechanical deaeration systems.

The treatment combines with dissolved oxygen to form water and inert nitrogen gas, thus effectively removing O_2 from the water. No solid materials are produced, so there is no contribution to the increase in total dissolved solids - a critical factor in high pressure boilers. The removal of dissolved oxygen is vital for preventing oxygen pitting and corrosion in boilers. Oxygen Control reacts with ferrous and non-ferrous oxides to prevent general corrosion. Ferric oxide (red rust, Fe_2O_3) is converted to magnetite (black iron oxide, Fe_3O_4), which is a tough corrosion resistant oxide which seals the metal surface. The term for this is 'passivating' the surfaces, so that they are protected from further corrosion.

Dosage

The objective is to maintain a hydrazine residual between 0.05-0.2 ppm depending on operating pressure and boiler design. Actual consumption is determined under operating conditions. A normal dosage is approximately 1 ltr. per day, depending of system layout.

Dosing Method

For optimum protection, Oxygen Control should be fed continuously into the boiler feed line, after the feed pump recirculating valve, using Unitor's BWT dosing systems.

For steam turbine systems, Oxygen Control can be dosed into the cross over between the H.P. and L.P. turbines or the storage section of the deaerator for full protection.

Oxygen Control dosage parameters for distilled water

Pressure Range	Hydrazine test result in p.p.m					Standard PPM Hydrazine
	0-0.05	0.05-0.10	0.10-0.15	0.15-0.2	0.2 +	
0-40 bar 0-588 Psi	Increase Dosage by 25%	Increase Dosage by 25%	Satisfactory Maintain Daily Dose Rate		Decrease Dosage by 25%	0.1-0.2
41-60 bar 603-882 Psi	Increase Dosage by 25%	Increase Dosage by 25%	Satisfactory Maintain Daily Dose Rate	Decrease Dosage by 25%	Decrease Dosage by 25%	0.1-0.15
> 60 bar < 897 Psi	Increase Dosage	Satisfactory Maintain Daily by 25%	Decrease Dosage Dose Rate	Decrease Dosage by 25%	Decrease Dosage by 25%	0.05-0.10

These are recommended valves based on experience and are in no way intended to replace the boiler manufacturer's specifications or company regulations. When wet lay-up of the boiler is required then a minimum dosage of 1.25 litres/tonne is required. Refer to Unitor's Water Treatment Handbook or contact Unitor for details.

Product Properties

Appearance: Colourless liquid

Density, g/cm³ at 15°C: 1.0

pH, (1 vol%): 9

COMPABILITY:

Metal: Avoid copper, brass, aluminium

Rubber: No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	655 571315	25	Plastic

Sampling and Testing

A representative sample of boiler water should be drawn for analysis daily. The sample should always be taken from the same point after blowdown, cooled and tested immediately. Follow the Spectrapak Test Kit instructions and log the results on the log sheets provided by Wilhelmsen Ships Service. These log sheets should be sent to Wilhelmsen Ships Service Rapid Response center for review and comments. It is important that regular testing is carried out to ensure levels of treatment are correct.

Features, Benefits and Applications

- Oxygen Control is a liquid product, easy to feed
- Does not contribute to conductivity
- Protects boiler, steam lines, condensate lines and feed water lines from corrosion
- Fast action due to catalyst
- Assists mechanical deaeration
- Simple test to determine level of treatment
- Oxygen control can be used to condition the water used for laying up the boiler in a wet condition. Refer to Unitor's Water Treatment Handbook or contact Wilhelmsen Ships Service for details

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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CONDENSATE CONTROL

Liquid Condensate Corrosion Control for Boiler Systems

Product Description

Concentrated liquid neutralising agent for corrosion control in condensate and feed water systems.

Directions for Use

Condensate Control is a blend of volatile liquid amines with differing liquid/steam distributions ratios that neutralise the acid contaminants in condensate and feed water thus providing protection against acid corrosion in the complete system.

This product is used in conjunction with Wilhelmsen Ships Service co-ordinated treatment programme and Wilhelmsen Ships Service combined treatment programs. The most common cause of acid corrosion in condensate and feed water systems is dissolved carbon dioxide. Condensate Control neutralises this acid and maintains the condensate and feedwater in an alkaline condition

Dosage and Control

The condensate is tested for pH to determine the dosage level. The pH limits are 8.3-9.0.

For an average system e.g. 10 m³, the dosage is approximately 0.65 ltr/day

Dosing Method

Condensate Control is best dosed continuously using a Unitor Boiler Water Treatment Dosing Unit. The treatment can be dosed together with Oxygen Control.

Suitable dosage points are:

- Boiler feed line after recirculating valve
- Condensate pump discharge

Condensate Control can be fed using Unitor's BWT dosing systems. Consult your Unitor representative for specific dosing instructions.

Sampling and Testing

A representative sample of condensate should be drawn for analysis daily. The sample should always be taken from the same point, cooled and tested immediately.

Condensate Control dosage parameters

	Condensate pH from testing			Standard pH Range
	Less than 8.3	Standard 8.3-9.0 range	Over 9.0 0.10-0.15	
All Boiler groups	Increase Dosage By 25% for 72 hours and Retest	Satisfactory Maintain Dosage	Decrease Dosage By 25% for 72 hours and Retest	8.3-9.0

These are recommended values based on experience and are in no way intended to replace the boiler manufacturer's specifications or company regulations.

Follow the Spectrapak test kit instructions and log the results on the log sheets provided by Wilhelmsen Ships Service. These log sheets should be sent to Wilhelmsen Ships Service Rapid Response center for review and comments. It is important that regular testing is carried out to ensure levels of treatment are correct. Use dosage chart to maintain condensate pH between 8.3-9.0.

Product Properties

Appearance: Colorless liquid

Density, g/cm³ at 15°C: 1.0

pH (1 Vol%): 10

COMPABILITY:

Metal: Avoid copper, brass, aluminium

Rubber: No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	655 571323	25	Plastic

Features, Benefits and Applications

- Easy to use liquid treatment
- Neutralises the acids occurring in the condensate system
- Less maintenance required. Lower operating costs and increased reliability
- Volatilizes and carries over with the steam and so is recycled. Dosage is economical and efficient
- Simple test to determine level of treatment
- Used for protection of condensate and feed water systems in boiler systems of all pressures.

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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BOILER COAGULANT

Boiler Water Sludge Conditioner

Product Description

Liquid sludge conditioner designed to prevent deposits.

Directions for Use

Boiler Coagulant prevents the formation of deposits on boiler internal surfaces. Sludge is kept dispersed in small particles and conditioned to be removed by normal blowdown. In this way tube overheating due to deposits is avoided.

The treatment is primarily used in conjunction with Hardness Control, but also with other Unitor chemical treatments.

Boiler Coagulant can also be used where minor oil contamination has been experienced, the oil being required to be coagulated for removal by blowdown. However, it must be noted that if oil contamination is continuous and excessive, off-line cleaning will be required. The source of oil contamination must be stopped immediately.

Dosage

The initial dosage is 20 ml of treatment daily for every ton of boiler capacity. Daily bottom blowdown is required when using Boiler Coagulant.

Dosing Method

For optimum results dose Boiler Coagulant directly to the boiler via the bypass pot-feeder. Boiler Coagulant is compatible with any Boiler Water Treatment and dosing can be combined.

Product Properties

Appearance: Amber liquid

Density, g/cm³ at 15°C: 1.2

pH (neat) 9

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

PACKAGING: Product No.	Size (Kg)	Container
655 571331	25	Plastic

Features, Benefits and Applications

- Liquid product, easy to feed
- Prevents the formation of adherent deposits and sludges in boilers
- Keeps sludge dispersed for efficient removal by blowdown
- Keeps boilers clean and extends boiler operational time between cleaning
- Used in conjunction with Wilhelmsen Ships Service Chemical service standard range of boiler water treatments
- Used to coagulate small amounts of oil which have contaminated the boiler water

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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POTABLE WATER STABILISER

Treatment of Potable Water Systems

Product Description

Potable Water Stabiliser is a concentrated, highly soluble polyphosphate in powder form.

Directions for Use and Dose Rates

Potable Water Stabiliser effectively and economically provides scale and corrosion control in potable water systems and other shipboard once-through water systems.

Dosage varies between 4-8 mg/ltr for ordinary water treatment. For drinking water, dosage should always be kept at or below 9 mg/l (9 g/ton).

The powder product should not be dosed directly into the water system. A water solution should be made prior to dosing.

Make a 5% solution in fresh water by adding the powder slowly to the water while stirring. The solution should preferably be portioned to maintain the desired dosage, either by means of a simple bypass feeder, or with Unitor Dosing System for Water Treatment.

The product can be injected into the discharge lines of the fresh water generator or directly into the fresh water pumps' suction manifold. If a high percentage of shore water is used the solution must be "slug" dosed into the tanks prior to taking water.

Inject the 5% solution at a rate of 0.12 litres per m³ of water to obtain a 6 mg/L concentration.

Examples

For 20 m³ per day: Dose 0.1 litres/hour =
2.4 litres/day of the solution.

For 100 m³ per day: Dose 0.5 litres/hour =
12 litres/day of the solution

For larger systems, stronger solutions up to 20% can be made. The dosage rate may then be reduced proportionally, which will extend the time period between each filling of the dosing tank. However, production of stronger solutions may require improved stirring equipment.

Product Properties

APPEARANCE: White powder

pH in 10% solution: Neutral

COMPATIBILITY:

Metal: No known effect

Rubber: No known effect

Synthetic rubber: No known effect

PACKAGING: Product No.	Size (Kg)	Container
659 624916	25	Steel

Features, Benefits and Applications

- Prevents "Red Water" in potable water systems
- Provides scale and corrosion control in hot water heaters, coolers and water tanks
- Controls corrosion in pipelines and other equipment handling softened or evaporated water
- Effective at temperatures up to 60°C (140°F)
- Increases system life and reduces maintenance costs
- Approved by Norwegian National Institute of Public Health as an additive to drinking water. Approved by NSF according to Standard 60
- No restrictions on use of the treated water as feed water to boilers or engine cooling systems

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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DIESELGUARD NB

Cooling Water Corrosion Inhibitor

Product Description

A dry powder, nitrite/borate based compound with organic corrosion inhibitors for use in cooling water systems.

Directions for Use

Dieselguard NB is a highly effective corrosion inhibitor for the common ferrous and non-ferrous metals in cooling water systems.

The stable oxide film that results from treatment prevents corrosion caused by electrolytic action between dissimilar metals used in the system.

Dieselguard NB has been field tested and found to have no detrimental effects on non metallic substances such as seals, glands, packing, hoses, gaskets etc., normally used in these systems.

The compound is alkaline and so will suppress acid corrosion, which would otherwise result in corrosion damage such as pitting. However, the alkalinity control is such, that, even if the product is accidentally overdosed the pH of the water will remain within limits. The metals which would be affected by extremes of alkalinity or acidity are protected.

In cases where systems are contaminated with oil and/or scale they should be cleaned before starting to apply Dieselguard NB. There are suitable Unitor products to carry out the cleaning. Degreasing should be carried out using Seaclean Plus and descaling by using Descalex.

The use of antifreeze is sometimes required if the vessel is to be laid up in cold areas, Dieselguard NB can be used in conjunction with antifreeze products.

If the system contains galvanized parts, it is advisory to clean the system with Descalex or Descaling Liquid prior to commencing the treatment.

Caution: This product should not be used in systems containing aluminium parts in cooling water spaces!

Dosing Method

Dieselguard NB should be dosed into a suitable point in the cooling water system, after it has been thoroughly mixed with water.

If the expansion tank is used then adequate circulation must be assured.

Sampling and Testing

The Spectrapak Test Kit provides the necessary equipment to carry out the control tests.

Obtain a representative sample of the cooling water. Carry out the tests immediately after sampling (following the instructions given in the Test Kit) and log the results on the log sheets provided by Wilhelmsen Ships Service. These log sheets should be returned to the Wilhelmsen Ships Service Rapid Response Center for review.

Use the dosage chart overleaf to adjust treatment to obtain the optimum level. It is important that testing is carried out at least once per week, to ensure levels of treatment are correct.

Dosing and Control

Initial dosage for an untreated system is 2 kg/1000 litres of untreated distilled water. This will bring the treatment up to the minimum level of 1000 ppm.

The dosage chart given below is for convenience in calculating the amount of Dieselguard required to bring the treatment level to the suitable point between the minimum and maximum - this being 1440 ppm nitrite.

Normal nitrite limits: 1000-2400 ppm nitrite (NO₂)

After a short period of use the operator will be able to easily determine the dosage required to maintain a proper treatment level.

Nitrite (as PPM NO ₂)	0	180	360	540	720	900	1080	1260	1440	1620	2400
Dieselguard NB	2.88	2.52	2.16	1.80	1.44	1.08	0.72	0.36	0	0	0
Kg/1000L											

N.B. Buffering agents in Dieselguard NB maintain pH values within suitable limits when the product is dosed as recommended.

The pH should be maintained between 8.3 and 10.0 by the treatment.

The engine manufacturer's recommendations for water quality should always be complied with. Chloride levels should be as low as possible. Most engine manufacturers recommend a maximum of 50 ppm chlorides.

For this reason, Wilhelmsen Ships Service recommends to use distilled water as make-up.

Dieselguard NB is very water soluble. One kilogram of Dieselguard NB should be dissolved in 10 litres of hot water before adding it to the system.

Product Properties

APPEARANCE: Off white powder

pH (0.2 WT%) 9

COMPATIBILITY:

Metal: Zinc and aluminium reacts with solutions of Dieselguard NB

Rubber: No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	653 571349	25	Steel

Features, Benefits and Applications

- By creating an oxide film on the metal surfaces, electrolytic corrosion is prevented
- Effective against cavitation and erosion
- Compatible with non-metals such as hoses, gaskets and seals
- Approved by numerous engine manufacturers
- Compatible with glycol used for frost protection
- Simple control tests
- The product can be used for corrosion inhibition in many types of closed recirculation systems such as:
 - Diesel engine cooling water systems.
 - Compressor cooling water systems.
 - Centralised cooling systems.
 - Hot water heating systems.
 - Auxiliary machinery cooling systems.
- Approved by the Norwegian National Institute of Public Health for the use in systems where cooling water is used for heating purpose in evaporators

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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ROCOR NB LIQUID

Liquid Cooling Water Corrosion Inhibitor

Product Description

Rocor NB Liquid is a liquid, nitrite/borate based compound with organic corrosion inhibitors for use in closed cooling water systems.

Directions for Use and Dose Rates

Rocor NB Liquid is a highly effective corrosion inhibitor for the common ferrous and non-ferrous metals in cooling water systems.

The stable oxide film that is formed prevents corrosion caused by electrolytic action between dissimilar metals used in the system.

Rocor NB Liquid has been field tested and found to have no detrimental effects on non metallic substances such as seals, glands, packing, hoses, gaskets etc., normally used in these systems.

The compound is alkaline and so will suppress acid corrosion, which would otherwise result in corrosion damage such as pitting. However, the alkalinity control is such that even if the product is accidentally overdosed, the pH of the water will remain within limits. The metals which would be affected by extremes of alkalinity or acidity are protected.

In cases where systems are contaminated with oil and/or scale they should be cleaned before starting to apply Rocor NB Liquid. There are suitable Unitor products to carry out the cleaning. Degreasing should be carried out using Seaclean Plus and descaling by using Descalex. Refer to Water Treatment handbook.

The use of antifreeze is sometimes required if the vessel is to be laid up in cold areas and so Rocor NB Liquid can be used in conjunction with antifreeze products.

If the system contains galvanized parts, it is advisory to clean the system with Descalex prior to commencing the treatment.

Caution: This product should not be used in systems containing aluminium parts in cooling water spaces!

Dosing Method

Rocor NB Liquid should be dosed to a suitable point in the system. If the expansion tank is used then adequate circulation must be assured.

Sampling and Testing

The Spectrapak Test Kit provides the necessary equipment to carry out the control tests.

Obtain a representative sample of the cooling water. Carry out the tests immediately after sampling (following the instructions given in the Test Kit) and log the results on the log sheets provided by Wilhelmsen Ships Service. These log-sheets should be returned to the Rapid Response Center for review.

Use the dosage chart overleaf to adjust the treatment to obtain the optimum level. It is important that at least weekly testing is carried out to ensure levels of treatment are correct.

For Further Dosage and Control Limits See Overleaf.

Dosing and Control

Initial dosage for an untreated system is 9 litres of Rocor NB Liquid/1000 litres of untreated distilled water. This will bring the treatment up to the minimum level of 1000 ppm nitrite.

The dosage chart given below is for convenience in calculating the amount of Rocor NB Liquid required to bring the treatment level to the suitable point between the minimum and maximum - this being 1440 ppm nitrite.

Normal nitrite limits: 1000-2400 ppm nitrite (NO₂)

Nitrite (as PPM NO ₂)	0	180	360	540	720	900	1080	1260	1440	2400
Rocor NB L/1000L	13.0	11.3	9.7	8.1	6.5	4.9	3.3	1.7		0

N.B. Buffering agents in Rocor NB Liquid maintain pH values within suitable limits when the product is dosed as recommended. Normal pH should be maintained between 8.3 and 10 by the treatment.

The engine manufacturer's recommendations for water quality should always be complied with. Chloride levels should always be as low as possible. Most engine manufacturers recommend a maximum of 50 ppm chlorides.

For this reason, Wilhelmsen Ships Service recommends the use of distilled water as make-up.

Product Properties

Appearance: Red liquid

Density, g/cm³ at 15°C: 1.1

pH (1 Vol%) 9

Compatibility:

Metal: Avoid contact with zinc and aluminium

Rubber: No known effect

PACKAGING:	Product No.	Size (in litres)	Container
	653 571356	25	Plastic

Features, Benefits and Applications

- Liquid product, easy to use
- By forming an oxide film on the metal surfaces electrolytic corrosion is prevented
- Effective against cavitation and erosion
- Compatible with hoses, gaskets and seals
- Compatible with glycol used for frost protection
- Simple control tests
- The product can be used for corrosion inhibition in many types of closed recirculation system such as: - Diesel engine cooling water systems. - Compressor cooling water systems. - Centralised cooling systems. - Hot water heating systems. - Auxiliary machinery cooling systems.
- Approved by all major engine manufacturers
- Approved by the Norwegian National Institute of Public Health for the use in systems where cooling water is used for heating purpose in evaporators

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

Wilhelmsen Ships Service or any associated or subsidiary company's warranties of fitness and merchantability, if any, as well as any expressed warranties regarding this product shall not be effective or actionable unless the goods are used as directed herein and in no other manner due to potential hazards from improper use of the goods described herein.

COOLTREAT AL

Advanced liquid cooling water corrosion inhibitor

Product Description

Cooltreat AL is an organic liquid corrosion inhibitor with extended life for use in closed cooling water systems. This product offers protection for all commonly used materials in engine cooling water systems, including aluminium. Unlike other coolants, Cooltreat AL does not contain components subject to rapid depletion i.e. Nitrite and Silicate. Based on aliphatic acid technology Cooltreat AL is stable and hence the test frequency can be reduced. Cooltreat AL is fully organic and biodegradable.

Directions for Use

Cooltreat AL is a highly effective corrosion inhibitor for all common metals in cooling water systems.

Testing has shown no detrimental effects on non metallic substances such as seals, glands, packing, hoses, gaskets etc., normally used in these systems.

Where most traditional inhibitors react with the metal surface and form oxides that prevent further corrosion, Cooltreat AL applies a thin and durable layer of protective molecules to the metal surfaces. This technology prevents the continuous build-up of insulating layers on heat transfer surfaces.

For new builds, Wilhelmsen Ships Service recommends cleaning of the water system before commencing service. The system will always contain small amounts of oil and iron oxides, and this can be removed in one operation with Unitor Commissioning Cleaner. If the system is corroded or is more heavily contaminated, degreasing with i.e. Unitor Seaclean Plus followed by acid cleaning, with i.e. Unitor Descalex for removal of metal oxides or scale is recommended.

For systems previously treated with other products, Wilhelmsen Ships Service recommend to drain and flush the system before refilling with distilled water and Cooltreat AL. The system should be clean and free from scale and corrosion products when starting the treatment.

The use of antifreeze is sometimes required if the vessel is to be laid up in cold areas, Cooltreat AL can be used in conjunction with glycols for frost protection. If used in conjunction with glycols, It is recommended to increase the product concentration to 8%.*

Dosing Method

Cooltreat AL should be dosed to a suitable point in the system. If the expansion tank is used, adequate circulation must be assured.

Dosing and Control

Initial dosage for an untreated system is 60 litres of Cooltreat AL/ton of untreated distilled water (6%). This will provide sufficient protection of the system for a period of two to five years under normal conditions.

6% Cooltreat AL should also be dosed in all make up water added to the system to compensate for lost coolant.

The engine manufacturer's recommendations for water quality should always be complied with. Chloride levels should always be as low as possible. Most engine manufacturers recommend a maximum of 50 ppm chlorides.

For this reason, Wilhelmsen Ships Service recommends the use of distilled water as make-up.

Product Properties

APPEARANCE: Colourless liquid
Density, g/cm³ at 20°C: 1.055
pH: 8.2

COMPATIBILITY:

Metal: All commonly used
Rubber: No known effect

PACKAGING: Product No.	Size (in litres)	Container
653 680843	25	Plastic

Features, Benefits and Applications

- Liquid product, easy to use
- Environmentally friendly, fully organic product, low toxicity
- Effective against cavitation and erosion. Superior heat transfer properties
- Compatible with hoses, gaskets and seals
- Compatible with glycols for frost protection
- Stable product-non depleting
- The product can be used for corrosion inhibition in many types of closed re-circulation system such as:
 - Diesel engine cooling water systems – Compressor cooling water systems – Centralised cooling systems
 - Hot water heating systems – Auxiliary machinery cooling systems
- Approved by major engine manufacturers

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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* 80 litres (8%) when used in conjunction with glycol for frost protection.

VAPTREAT

Liquid Evaporator Treatment

Product Description

A concentrated liquid blend of polymer and antifoam agents for controlling scale and foam in evaporators.

Directions for Use and Dose Rates

The specially selected polymers in Vaptreat combined with the potential scale forming salts in the brine to prevent them from adhering to heat transfer surfaces. These solids are held in suspension and removed with the evaporator brine.

The operating efficiency of the plant is maintained for maximum water production. The intervals between cleaning are greatly increased.

The product to use for acid cleaning is Descalex, which will remove old scale prior to treatment with Vaptreat.

Evaporators have a tendency to produce foam while operating - the defoaming properties of Vaptreat will stop this foaming and carry-over will be eliminated. Distilled water quality is maintained.

Dosage

The standard dosage, applicable to the majority of systems, is 15-30 ml of Vaptreat per ton of distillate produced. This is based on the rated production capacity of the evaporator.

Example: In a 25 ton/day evaporator.

Treatment used = $25 \times 30 \text{ ml} = 750 \text{ ml}$ of Vaptreat per day.

Setting the Flow Rate

The treatment is added to the dosage tank and mixed with water. Example: With the 0.75 litres of Vaptreat add sufficient water to make up 50 litres of liquid.

The standard flow meter is adjustable between 0 and 100 ml/minute.

Flow rate calculation:

Flowrate = $50 \text{ Litres} / 24 \times 60 = 35 \text{ ml/min}$ setting

This will last 24 hours.

A metering pump can also be supplied for use with Vaptreat if required.

N.B. The brine density should not exceed 1.038 g/cm^3 . The scaling potential increases rapidly over this level. An increase in the amount of Vaptreat used will assist in retaining potential scale forming salts in suspension. For example: If the density rises to 1.050 g/cm^3 the dosage should be 60 ml/ton of rated capacity.

Product Properties

Appearance: Pale yellow liquid

Density, g/cm^3 at 15°C : 1.1

pH (1 Vol%) 9

Compatibility:

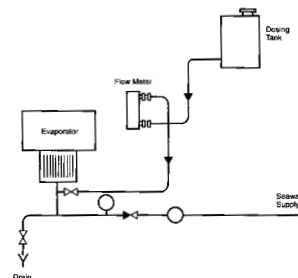
Metal: No known effect

Rubber: No known effect

PACKAGING:	Product No.	Size (kg)	Container
	654 571364	25	Plastic

Dosing Method

RECOMMENDED INSTALLATION LAYOUT EVAPORATOR TREATMENT



- 60 litre polyethylene tank
- 5 m PVC tube 6 mm diameter
- Flowmeter - adjustable 0 to 100 mls/min

-The system shown is easily installed. A positive pressure is obtained by keeping the treatment tank higher than the inlet to the system.

- A metering pump can also be supplied for use if required.

Using the method shown in the diagram, the treatment is drawn into the vacuum side of the evaporator, through the adjustable flowmeter.

The recommended dosing method for Vaptreat is continuous dosing into the sea water feed line to the evaporator. The diagram shown gives an indication of the simple dosing system required.

The required daily amount should be mixed with fresh water in the polyethylene tank and dosed via the adjustable flow meter into the sea water supply to the evaporator.

Features, Benefits and Applications

- Ensures that the evaporator works at maximum efficiency by keeping heat transfer surfaces free of scale
- The antifoaming properties ensure that distillate quality is high as carry over is eliminated
- Will gradually remove existing scale when dosed at twice the normal rate
- Reduces downtime and maintenance
- Concentrated, safe liquid, easy and economical dosing
- For use in both high pressure and vacuum evaporators
- Approved by the Norwegian National Institute of Public Health for the use in systems where cooling water is used for heating purpose in evaporators

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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MULTIVAP

Product Description

MultiVap is a concentrated liquid blend of antiscalant and antifoam agents for controlling scale and foam in sea-water evaporators. MultiVap has been formulated for optimum efficiency when used in large evaporators with high distillate production.

Directions For Use

The specially selected polymers in MultiVap prevent scale formation by salts in the brine and will efficiently prevent buildup of deposit on heat transfer surfaces. The solids are held in suspension and removed with the brine outlet. MultiVap will maintain optimum operating efficiency of the plant and hence maximize water production at minimum energy consumption. The intervals between cleaning are significantly increased.

Use Unitor Descalex for acid cleaning to remove old scale prior to treatment with MultiVap.

Seawater evaporators have variable tendency to produce foam during operation. Foam formation may vary with operating conditions, i.e. seawater temperature. MultiVap is formulated with antifoam to prevent foaming problems and eliminate carry-over. If foaming should still occur, Unitor Evaporator Defoamer can be added in a premix with water and Multivap for additional foam prevention.

Dosing method

Multivap should always be dosed on continuous basis. This can be done with a dosing pump or by gravity based dosing unit controlling dosage with a flow meter. MultiVap may be diluted in water for easier controlling dosing and flow rate.

Dosage and control

Required dosage may vary slightly depending on type of evaporator in use; however 10-15 ml of MultiVap per ton of distillate produced is recommended as initial dosage. The dosage recommendation is based on the rated production capacity of the evaporator.

Example: In a 500 ton/day evaporator.

Treatment used = $500 \times 15 \text{ ml} = 7,5 \text{ l}$ of MultiVap per day.

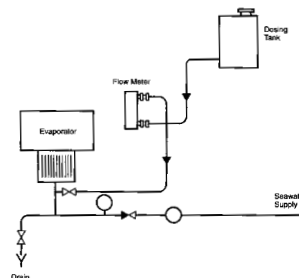
Product Properties

Appearance:	Amber liquid
Density, g/cm ³ at 15°C:	1.1
pH:	8
Compatibility:	
Metal:	No known effect
Rubber:	No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	653 759340	25	Plastic

Dosing Method

RECOMMENDED INSTALLATION LAYOUT EVAPORATOR TREATMENT



- 60 litre polyethylene tank
- 5 m PVC tube 6 mm diameter
- Flowmeter - adjustable 0 to 100 mls/min

-The system shown is easily installed. A positive pressure is obtained by keeping the treatment tank higher than the inlet to the system.

- A metering pump can also be supplied for use if required.

Using the method shown in the diagram, the treatment is drawn into the vacuum side of the evaporator, through the adjustable flowmeter.

The recommended dosing method for Vaptreat is continuous dosing into the sea water feed line to the evaporator. The diagram shown gives an indication of the simple dosing system required.

The required daily amount should be mixed with fresh water in the polyethylene tank and dosed via the adjustable flow meter into the sea water supply to the evaporator.

Features, Benefits and Applications

- Highly concentrated, economical and space saving for large evaporator units.
- Ensures optimum efficiency by keeping heat transfer surfaces clean and free of scale.
- Contains antifoam to give high quality distillate quality and prevent carry over.
- Reduces downtime and maintenance.

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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BIOGUARD

Fouling Control Agent for Sea Water Systems

Product Description

Bioguard is a very effective, amine based dispersant of marine growth such as algae, shellfish and micro-organisms to prevent fouling of sea water (cooling) systems. Because of its filming properties, the product also acts as a corrosion inhibitor.

Caution: Directions For Use

This bio-dispersant has been specially developed to prevent sea water (cooling) system from getting fouled by lower aquatic life forms like mussels, barnacles and algae. The dispersant in the product prevents bacteria to colonise the metal surface, making it unsuitable for settling of bacteria and therefore less favourable for larger fouling organisms. The filming characteristics will also provide anti corrosion properties.

Bioguard can be used in both static and flowing systems. Some application examples are: sea water systems, including seawater intakes; filter boxes and piping; static ballast tanks; stability trimming tanks and oil rig sea legs.

Dosage

For Sea Water Cooling Systems

Dose 0.6 litre of Bioguard for every 100 tons of sea water flowing through the system per hour. The system throughput is either to be determined from the rating of the pump(s) or from the system specifications. Treatment is necessary in coastal waters and should commence three days before entering these waters and continue for three days after leaving coastal waters. The calculated dose should be dosed over a one hour period and repeated every 48 hours.

For Static Ballast Tanks

Dose 1 litre of Bioguard per 10 tons of water prior to ballasting, followed by a monthly dose of 2 litres per 100 tons.

For Trim Tanks, Oil Rig Sea Legs and Similar Systems

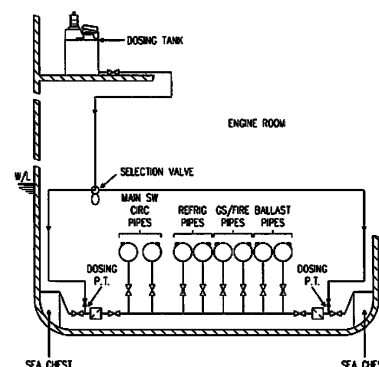
Dose 25 litres of Bioguard per 100 tons of water and add the same for make up water.

Product Properties

Appearance:	Pale yellow liquid
Density, g/cm ³ at 15°C:	1.0
Flash point:	Above 80°C
Compatibility:	
Metal:	No known effect
Rubber:	No known effect

PACKAGING:	Product No.	Size (Kg)	Container
	653 743880	25	Plastic

Typical installation layout dispersant treatment



Dosing Method The diagram above shows a typical dosage layout. This can be modified to suit a particular situation. A chemical dosing pump, with or without alarm to be used. Although the product will gradually clean fouled systems, treatment should preferably be started with a clean system. The product can be dosed neat or if necessary diluted into fresh water to accommodate the dosing equipment. When changing over from any other product to Bioguard, flush the entire dosing system thoroughly with fresh water.

Features, Benefits and Applications

- Liquid treatment which is easy to use
- Extremely effective in the control of sea water fouling organisms
- Many applications covered by one product
- Maintains heat transfer in systems and extends the periods between cleaning
- Reduces maintenance and down time
- Economic in use
- Approved by the U.K. Department of the Environment as a marine antifoulant in the inlet of evaporators producing potable water
- Biodegradable
- Suitable for all types of systems using sea water, both static and flowing

Caution: Bioguard can safely be dosed in sea water that is used in an evaporator, however Bioguard should never be dosed in Potable water

Read the Material Safety Data Sheet before using this product

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MAR-71

Bacteriological decontamination

Product Description

MAR-71 is a very effective biocide, used to prevent and combat microbiological growth in closed cooling water systems as well as in lubricating oil systems. Bacteria are the cause of many corrosion problems, as while they grow, they produce a variety of acids and in some cases slimy layers on metal surfaces which results in reduced heat transfer and corrosion in bearings. Nitrites, Phosphates and emulsifying oils are good nutrient media for bacteria. MAR-71 has proven to be a very effective disinfectant. Lower dosages of MAR-71 can also be used to prevent infection.

Directions for Use and Dose Rates

Closed cooling water circuits

Especially when berthing for a longer period in harbours in warmer climates, the risk of infection of the cooling water systems with micro-organisms is considerable. When this happens, acids are formed and at the same time, the corrosion inhibitors present in the system will be eaten away by the bacteria creating corrosive conditions. Regular testing for the presence of bacteria in the cooling water by the use of "dip slides" is therefore strongly recommended. Between 0.5 and 1.5 ltr./ton. MAR-71 should be added to contaminated systems. The system should be circulated for three days after which the complete contents of the cooling system is dumped. Before refilling the system with (distilled) water and the initial dosage of Dieselguard or Rocor NB Liquid, the system should be thoroughly flushed with fresh water. It is recommended to re-test for the presence of bacteria after the system has been in operation for 24 hours. The described procedure is to be repeated if necessary. For heavily contaminated systems and systems contaminated with scale/oil, it is recommended to acid clean and/or degrease the system prior to disinfecting.

Caution: During disinfecting, evaporators and other equipment which use cooling water and which are used in connection with the production of drinking water are not to be used.

Lubricating oils

The presence of water in lubricating oil, either caused by condensation or by leakage of cooling water, provides excellent growing conditions for micro-organisms in lube oil systems. The presence of bacteria will cause changes in lube oil characteristics, cause corrosion, water emulsion and clogging of filters. Regular control and necessary action to combat bacteriological contamination can avoid above mentioned problems. The recommended decontamination procedure is as follows:

1. Transfer 80-90% of the lubricating oil into a renovation tank and heat till 85-95% °C while separating for 12 hours. Continue heating for another 12 hours without separating.
2. To the remaining oil in the sump-tank, between 0.5 and 1 litres/ton MAR-71 is added. Circulate the contents of the sump-tank for 12-24 hours. Note that during circulation, filters may get clogged by dead microorganisms. Special observation of filters, and if necessary, cleaning of same, is therefore required.
3. Empty and clean the sump-tank.
4. Transfer the circulating oil from the renovation tank back into the sump-tank and fill with fresh oil.

As an alternative to the above procedure, increase of the bacteriological contamination can be stopped by adding 0.3-0.5 litres/ton MAR-71 to the lubrication oil. At a later stage, proper disinfecting must follow.

Note: Please check with the lubrication oil manufacturer regarding dosage rates for your brand of oil.

In case bacteriological contamination occurs and has already caused corrosion, the lubrication oil must be fully exchanged. Consult lubrication oil manufacturer. Before refilling the system, it is highly recommended to rinse the system for 24 hours with flushing oil to which 0.5-1 litres/ton MAR-71 is added. This procedure and the addition of 0.1-0.5 litres/ton MAR-71 to the new oil will prevent re-infection of the lubricating oil.

Product Availability

Please contact your local Wilhelmsen Ships Service office for availability.

Product Properties

Appearance:	Liquid, colourless to yellow
ODOUR:	Amine-like
SPEC. DENSITY, g/cm ³ :	1.06
pH, (0.15%):	~ 10
Compatibility:	Total soluble in water and oil.
Metal:	No known effect
Rubber:	No known effect
Synthetic rubber:	No known effect

PACKAGING:	Product No.	Size	Container
	653 735977	3 x 5 ltr	Plastic

Features, Benefits and Applications

- One product, two different applications
- Kills micro-organisms in closed cooling water systems and lubrication oil systems
- Prevents corrosion caused by microorganisms
- No cases have been reported where bacteria have become immune to MAR-71
- Biodegradable, does not accumulate in the environment
- HOCNF registered for use in the North Sea Offshore sector, yellow/gold classification

Read the Material Safety Data Sheet before using this product

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NOTES



Pool Water Treatment

POOL CHEMICALS**Problem and solution summary**Ideal for use on
Cruise Ships

Problem	Solution/Product	Application
pH to low	pH INCREASER (657 766537)	A convenient and safe granular product for raising the pH of the pool water with minimal effect on overall alkalinity.
Low calcium hardness levels	POOL AND SPA HARDNESS (657 766538)	A convenient and safe granular product for raises calcium hardness of pool and spa water to assist in the prevention of corrosion, etched plaster and other problems resulting from low calcium hardness.
Dirty pool surfaces	POOL SURFACE CLEANER (657 766436)	For removal of scum (bath tube ring) along the water line. Quickly eliminates oil, light scale and fresh stains.
Foaming in the spa	SPA DEFOAMER (657 766540)	Eliminates unsightly foam from spa water, hot tubs and other water features by soap, suntan lotion and detergents.
Cloudy water	POOL CLARIFIER (657 766539)	Highly concentrated product based on specially formulated polymers that quickly clears cloudy water. The product restores sparkling clear water by binding small particles into large masses that can be easily removed by the filter. This product works while the filter is in operation, requires no premixing, contains no alum and does not affect the pH.

pH INCREASER

Raising pH of Pool & Spa Water

Product Description

A convenient and safe granular product for raising the pH of pool water with minimal effect on overall alkalinity.

How it Works

This product is used to raise the pH of pool water. Proper pH control is essential to eliminate problems caused by pH being too low or too high. If pH is too low then corrosion and staining may occur.

Directions for Use and Dosage Rates

Ideal bathing conditions exist at a slightly alkaline pH level of 7.2–7.6, with alkalinity of 80/150 mg/l. This range will also allow the most effective use of other swimming pool chemicals.

Determine the pH of your pool water using Unitor Test Kit (Product no. 665 624866).

If the test reading is below 7.2 add pH Increaser by pre-dissolving the material in a clean container with clean, warm water. Pour solution around the pool perimeter and keep pump running to allow re-circulation. Wait 2–3 hours then recheck pH level. If it is still below 7.2 repeat the above procedure.

Product Properties

APPEARANCE:	White granules
DENSITY, in g/cm ³ at 20°C:	–
FLASH POINT, (PMCC) in °C:	N/A
pH, in 1% solution at 20°C:	11.6
SOLUBILITY IN WATER:	Soluble in water

PACKAGING:	Product No.	Size (in kg):	Container
	657 766537	25 kg	Steel

Features, Benefits and Applications

- Convenient granular product
- 100% active
- Safe for all types of pools
- Protects pool surfaces and equipment from corrosion due to low pH
- Reduces maintenance costs
- Quickly and easily raises pH
- Makes water more comfortable for bathers

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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POOL AND SPA HARDNESS

Calcium Hardness Increaser

Product Description

Raises calcium hardness of pool and spa water to assist in the prevention of corrosion, etched plaster and other problems resulting from low calcium levels.

How it Works

This product is used to raise the calcium hardness in pool and spa water. Low calcium hardness may cause pool and spa water to be corrosive which may result in staining, etching or distorting of all types of pool surfaces. Surface etching by low calcium hardness will become more abrasive and uncomfortable for bathers. Rough surfaces also increase problems with algae and makes cleaning more difficult.

Directions for Use and Dosage Rates

Ideal bathing conditions exist at a slightly alkaline pH level of 7.2–7.6, with alkalinity of 80/150 mg/l. This range will also allow the most effective use of other swimming pool chemicals.

Determine the calcium hardness of your pool water using Unitor Test Kit (Product no. 665 624866).

Use Spa Hardness Increaser at the rate of 100 g per 10m³ to raise calcium hardness by 10 mg/l. Dissolve the required amount of Spa Hardness Increaser in a clean container with clean water and pour slowly around the perimeter of your pool and spa. Ensure both the pump and filter are running to circulate the product effectively.

Product Properties

APPEARANCE:	White granules
DENSITY, in g/cm ³ at 20°C:	–
FLASH POINT, (PMCC) in °C:	N/A
pH, in 1% solution at 20°C:	–
SOLUBILITY IN WATER:	Soluble in water

PACKAGING: Product No.	Size (in kg):	Container
657 766538	18 kg	Steel

Features, Benefits and Applications

- For Pool, spas & Hot Tubs
- Raises calcium hardness level
- Helps prevent etching and staining
- 100% active

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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Ideal for use on
Cruise Ships

Ideal for use on
Cruise Ships

POOL SURFACE CLEANER

Waterline Cleaning

Product Description

For removal of scum (bath tube ring) along the water line. Quickly eliminates oils, greases, light scale and fresh stains.

How it Works

This product removes most stubborn scale, grease and common dirt. Clings to vertical surfaces for easy cleaning. May be used on plastic, vinyl, fibreglass, ceramic, stainless steel, aluminium and painted surfaces. Unlike many cleaners, Pool Surface Cleaner is completely compatible with swimming pool water.

Directions for Use and Dosage Rates

Apply to a damp sponge or brush and scrub the pool surface at water level. Rinse treated surfaces thoroughly. To remove heavy stains, allow cleaner to soak on stain for 5-10 minutes before scrubbing and rinsing. Use only a soft bristle brush or sponge on vinyl surfaces.

Product Properties

APPEARANCE:	Water-white, Yellowish liquid	
DENSITY, in g/cm ³ at 20°C:	1.04	
FLASH POINT, (PMCC) in °C:	N/A	
pH, in conc. at 20°C:	8.8-9.8	
SOLUBILITY IN WATER:	Miscible in water	
PACKAGING:	Product No.	Size (in litres): Container
	657 766436	Boxes of 12x1 Ltr bottles Plastic

Features, Benefits and Applications

- For Pools, Spas & Hot Tubs
- Prevents staining and controls scale build-up
- Removes oils, grease and other deposits from pool surfaces
- Cleans and maintains pool surfaces

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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SPA DEFOAMER

Foaming Prevention

Product Description

Eliminates unsightly foam from spa water, hot tubs and other water features by soaps, suntan lotion and detergents.

How it Works

Spa Defoamer quickly eliminates and prevents foaming in spas and tubes.

Directions for Use and Dosage Rates

Add directly to spa at the rate of 100 ml of Spa Defoamer per 1000 litres freshly filled spas. Ensure pump is running to allow re-circulation. To maintain a foam free spa – once a week add to the spa 50 ml Spa Defoamer per 1000 litres water.

Product Properties

APPEARANCE:	White emulsion
DENSITY, in g/cm ³ at 20°C:	1.0
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc. at 20°C:	6.0-8.0
SOLUBILITY IN WATER:	Emulsifiable

PACKAGING:	Product No.	Size (in litres):	Container
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657 766540	Boxes of 12x1 Ltr bottles	Plastic
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Features, Benefits and Applications

- Control and prevent foaming
- Quickly eliminates foam from spas, hot tubs and other water features
- Easy to 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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Ideal for use on
Cruise Ships

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POOL CLARIFIER

Clears Cloudy Water

Product Description

Highly concentrated product based on specially formulated polymers that quickly clears cloudy water.

How it Works

Pool Clarifier restores sparkling clear water by binding small particles into larger masses that can be easily removed by the filter. This product works while the filter is in operation, requires no premixing, contains no alum and does not affect the pH.

Directions for Use and Dosage Rates

Before applying this product ensure that the filter is operating efficiently.

Apply Pool Clarifier weekly or whenever the pool water has lost sparkle.

Apply Pool Clarifier at the rate of 15ml per 10m³ by pouring gently around the perimeter of the pool. Leave pump and filter running for 8 hours after application. If pool clarity has not been restored after 36 hours, repeat the treatment.

Product Properties

APPEARANCE:	Liquid
DENSITY, in g/cm ³ at 20°C:	1.04
FLASH POINT, (PMCC) in °C:	N/A
pH, in conc. at 20°C:	3-5
SOLUBILITY IN WATER:	Miscible in water

PACKAGING:	Product No.	Size (in litres):	Container
	657 766539	Boxes of 12x1 Ltr bottles	Plastic

Features, Benefits and Applications

- Concentrated formula
- Contains specially formulated polymers
- Easy to use - no premixing
- Clears cloudy water fast
- Does not affect pH
- Helps reduce chlorine usage
- Makes water sparkle

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

Wilhelmsen Ships Service or any associated or subsidiary company's warranties of fitness and merchantability, if any, as well as any expressed warranties regarding this product shall not be effective or actionable unless the goods are used as directed herein and in no other manner due to potential hazards from improper use of the goods described herein.



Equipment

FUEL/LUBE OIL TEST KITS

The Fuel Oil Test Cabinet

Viscometer

A new design, microprocessor controlled, easy to use, fast and accurate electronic instrument to determine the viscosity of lube oil at ambient temperature but corrected to 40°C, or heated to the standard temperature of 40°C. Also performs viscosity measurement of Intermediate Fuels heated to 50°C. Estimation of the combustion performance, Calculated Carbon Aromaticity Index (CCAI). Reports directly in cSt, repeat reading in one minute.

Range:

20-810 cSt at 50°C (ISO Fuel Grades RMA 10 RML 55)

20-810 cSt at 40°C (lube oils SAE 5 through SAE 50)

Density Meter

An easy to use, fast instrument to determine the density of a fuel. 850-1010 kg/m³ @ 15°C. Calculates the CCAI.

Compatibility Test

Compatibility and stability determination. Prediction of a fuel's sludging tendencies.

Water in Oil Test

To determine the water content 0-1%, 0-10% or 1-10000 ppm in lube and fuel oil.

TBN Test

For accurate testing of TBN (Total Base Number) in the range of 0-60.



Salt Water Determination Test

Insolubles Test

Comprehensive Training Manual included

Description	Product no.
Oil Test Cabinet	663 607820
Spare parts and Reagents	
Salt Water Determination Test	663 625756
Insolubles Test	663 625749
WIO Reagent Replacement Pack	663 602805
TBN Reagent Replacement Pack	663 632406
Hydrometer 850-950 kg/m ³	663 632513
Hydrometer 900-1010 kg/m ³	663 632521
Hydrometer 800-1010 kg/m ³	663 632554
Digital WIO and TBN Reaction Cell	663 632414

Compatibility Test Kit

- As per ASTM D 4740
- Small and compact
- Completely portable
- Power: 110-220 V
- Specifically designed for onboard use
- Complete with guide on methods to prevent sludging
- Results can be used to determine if precombustion additives are required and to assess dose rate
- Easy to use. Fast-less than five minutes operator time. No reagents. No glassware. Disposable sample containers. No cleaning

Description	Product no.
Compatibility Test Kit	663 555755
Spare Parts	
Sample Tubes, 50 pcs	663 555771
Compatibility Test Paper, 100 sheets	663 555789



FUEL/LUBE OIL TEST KITS

Water-In-Oil Test Kit

- Reliable test for water content: 0-1%, 0-10% or 0-10000ppm
- Short testing time: 2 min
- Good accuracy
- Reagent packs available worldwide
- Water in lube oil will rapidly cause severe damage to an engine, bearing or hydraulic system

Description	Product no.
Water-In-Oil Test Kit	663 632398
Spare parts and Reagents	
WiO Reagent Replacement Pack	663 602805
Digital WiO Reaction Cell	663 632380

**TBN Test Kit**

- TBN Test Kit
- Easy to use
- Reliable result in a few minutes
- One reagent only (patented by Unitor)
- Non-toxic and non-flammable
- After use, simply clean with water

The Unitor TBN (Total Base Number) Test Kit is a major advance in portable tests for oil alkalinity. The kit gives results for crankcase and other lubricants in a very short time, normally about 5 minutes. Designed for testing lubricants with TBN up to 60. The results may be used as an in-service check of depleting TBN to the equilibrium value.

Description	Product no.
TBN Test Kit	663 632448
Spare parts and Reagents	
TBN Reagent Replacement Pack	663 632406
Digital TBN Reaction Cell	663 632430

**Combined Oil Test Kit****Comprises**

- Water in oil test
- TBN test
- Insolubles test
- Salt water determination test
- Viscosity comparison test
- All necessary reagents and consumables
- Practical and clear instructions provide guidance and interpretations of test results for the complete range of tests

Description	Product no.
Combined Oil Test Kit	663 632422
Spare parts and Reagents	
WiO Reagent Replacement Pack	663 602805
TBN Reagent Replacement Pack	663 632406
Digital WiO and TBN Reaction Cell	663 632414



FUEL/LUBE OIL TEST KITS

Density Meter

A fast and reliable device to accurately determine the density of fuels from 800-1010 kg/m³ @ 15°C (ISO Fuel Grades DMA to RML 55). Allows rapid determination of exact bunker delivery quantities.

Calculation of density at 15°C in vacuo, centiPoise to centiStoke, and CCAI (Calculated Carbon Aromaticity Index). Clear instructions.

Description	Product no.
110-240 V AC	663 606251



Viscosity Meter

Small, fast and reliable. Measurements without heating (but corrected to 40°C) or heated to 40°C for lube oil viscosity and to 50°C for fuel oil viscosity.

Reports directly in cSt, repeat reading in one minute. Calculation of Calculated Carbon Aromaticity Index (CCAI) and density correction from 50°C to 15°C in vacuo. Clear and comprehensive user instructions.

Description	Product no.
110-240 V AC	663 606250



Bunker Sampler

Sizes from 3"-12" Product Nos. according to size 663 606252 - 663 606261

- Drip sampler
- Fully stainless steel
- Complies with ISO 3170, BS 31195, ASTM D 4057 and PSA recommendations
- Very easy to use
- Lloyd's type approval
- Comprehensive consumables
- Cubitainer and sample bottle kits ex. stock

Description	Product no.
Sampler valve cover (for PSA Regulations)	663 606262
5 litre Cubitainer pack	663 606265
Fuel Oil sample bottle pack	663 606263
Case of 92 sample bottles	663 606264



LUBE OIL TEST KIT

Oil Test Centre

The Oil Test Centre is a microprocessor technology based testing station providing laboratory grade results in the field for the following quality parameters:

Viscosity:	15-810 cSt @ 40°C	30 sec.
Insolubles Loading:	0-3.5% W/W	30 sec.
Total Base number:	0-50	120 sec.
Total Acid number:	0-6	120 sec. (optional)
Water Contamination:	0-2.5%	120 sec. (0-600ppm optional)
Power:	110-220 V AC.	

The Oil Test Centre is supplied with all necessary reagents and clear instructions.

The equipment is a key part of the lubrication oil control program many navies, have adopted. NATO Stock number 6630-99-215-5830.



Product no. **664 606249**

CLEANING AND DOSING EQUIPMENT

Injectors For Soot Remover

Equipment for blowing soot remover powder into boiler fire-side or into the gas side of exhaust gas boilers.

This simple, low cost injector ensures rapid and effective dosing of powder so that soot and firescale may be removed most efficiently.

Operation - Portable Injector

The nozzle of the injector is inserted into a suitable part of the boiler and an air supply is attached to the air hose connection. The valve is opened allowing air to be blown into the boiler while soot remover is being fed simultaneously into the funnel and is carried with the air into the combustion zone.

For further details of soot remover usage and consumption, refer to the soot remover data sheet.

Operation - Fixed Injector

- 1) Fill dosing pot with soot remover.
- 2) Open valves in sequence A.B.C.
- 3) Open vent lock until soot remover is injected.
- 4) Close valves in opposite sequence C.B.A.

Note

- A. Place outlet from injector in same direction as gas flow.
- B. Prevent bends in injection pipe, if not possible make bends of 45°, only last bend 90°.



Fixed injector

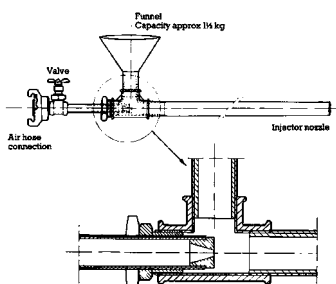
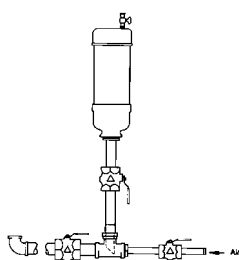
Product no. **664 572073**



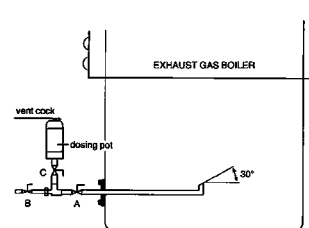
Portable injector

Product no. **664 572065**

Soot remover injector units



Installation layout



CLEANING AND DOSING EQUIPMENT

Manual Dosing Unit for Soot Remover Liquid

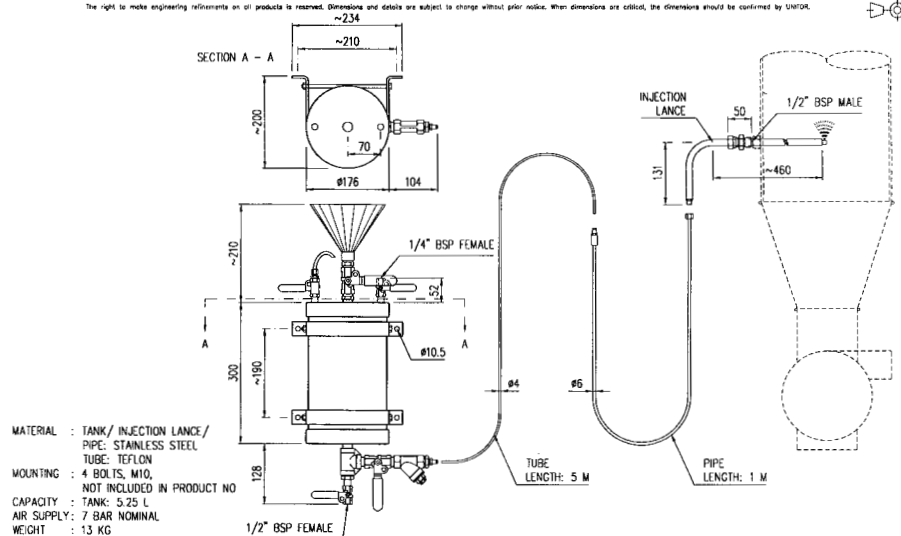
Equipment for the injection of Soot Remover Liquid into the exhaust ducting. The product is finely dispersed and prevents the build-up of soot and fire scale in the exhaust system and exhaust boiler.

The installation and operation is fully described in the installation instructions. For dosages of Soot Remover Liquid please refer to the Product Data Sheet no. 815838



Product	Product no.
Manual Dosing Unit for Soot Remover Liquid	664 625194

The right to make engineering refinements on all products is reserved. Dimensions and details are subject to change without prior notice. When dimensions are critical, the dimensions should be confirmed by UNITOR.

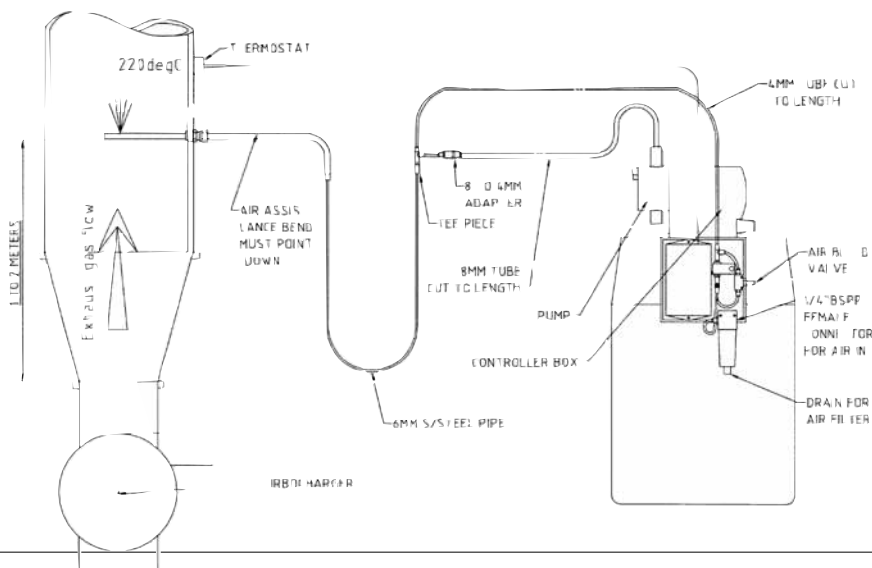


Automatic Dosing Unit for soot remover liquid

Soot and exhaust deposits greatly reduce efficiency and can ultimately lead to boiler failure. Effective control of those deposits will ensure reliable boiler operation.

The Automatic Dosing Unit gives you full control at the touch of a button.

Product	Product no.
Soot remover liquid Dosing Unit	664 711358



WATER TEST KIT SELECTOR

Application	Product	Rocor NB Liquid	Dieselguard NB	Combitreat	Liquitreat	Autotreat	Condensate Control	Oxygen Control	Oxygen Scavenger Plus	Cat. Sulphite	Alkalinity Control	Hardness Control
Engine cooling water	Rocor NB Liquid *	309										
Engine cooling water	Dieselguard NB *		309									
Combined boiler water treatments	Combitreat **			310			310	315/ 312	315/313	310/ sulphite		
Combined boiler water treatments	Liquitreat **				310		310					
Combined boiler water treatments	Autotreat **					310		315/ 312	315/313			
Single application boiler treatments	Condensate Control **			310	310						311	311
Single application boiler treatments	Oxygen Control **			315/312		315/312					311/312	311/312
Single application boiler treatments	Oxygen Scavenger Plus **			315/313		315/313					311/313	311/313
Single application boiler treatments	Cat. Sulphite **			310/ sulphite							311/ sulphite	311/ sulphite
Single application boiler treatments	Alkalinity Control **						311	311/ 312	311/313	311/ sulphite	311	
Single application boiler treatments	Hardness Control **						311	311/ 312	311/313	311/ sulphite	311	311

The numbers represent the appropriate Spectrapak test kit. In cells with two numbers, the number to the right is an extension kit. Sulphite represents the sulphite mini testkit.

More information about individual products and test kits is available in the Technical Product Data sheets.

- * Can be used alone.
- ** Should always be used in combination with other product(s).

SPEKTRAPAK 309

Unitor's Cooling Water Treatment Programme Water Test Kits

Product no: **661 739466**

The tests recommended to maintain cooling water within the prescribed limits when using Dieselguard NB/Rocor NB Liquid are as follows:

Nitrite - Recommended Limits 1000-2400 ppm as NO₂

The nitrite concentration should be maintained within the above recommended limits to effectively inhibit any corrosive or scaling action within a closed cooling system. Too high a concentration should be avoided to minimize the cost to maintain the system. Insufficient dosage can set up a condition where accelerated corrosion can occur in areas which become unprotected. Dieselguard NB/Rocor NB Liquid is dosed according to the nitrite level recommended.

pH - Recommended Limits 8.3-10

The effectiveness of a corrosion inhibitor is restricted to within a certain pH range. Treatment with Dieselguard NB/Rocor NB Liquid ensures that this pH range is observed when the nitrite level is sufficiently maintained to prevent corrosion. Under certain conditions, because of external contamination, the pH may not fall into the range usually found with the correct nitrite dosage. In such cases, Wilhelmsen Ships Service recommends dosing 50 ml of Unitor's Alkalinity Control per ton of cooling water to raise the pH value when the pH is below 8.3. Re-test pH after dosage to assure pH value is being maintained between 8.3-10.0.

Chlorides - Recommended limit max. 50 ppm

The chloride value of the cooling water should be kept as low as possible, any increase in value whether sudden or gradual, will be an indication of sea water contamination. Check with engine manufacturer for other specified limits. If the chloride level exceeds 50 ppm, the possibility of corrosion in the system increases because chlorides have a negative effect on the passivation film created by nitrites. Therefore, until corrective action has succeeded in bringing the chloride level back down below 50 ppm, the nitrite level should be kept close to the upper limit (2400 ppm).

Sampling of diesel engines

Accessible sampling cocks should exist on all cooling systems for each diesel engine. This including, but not limited to, main jacket water, piston cooling, fuel oil valve, auxiliary engines, low temperature systems, etc. A representative sample, must be taken from each cooling water system to be tested. To minimize the effort in obtaining cooling water samples, a sample cock located in a position to draw a sample/having access to draw the sample quickly and easily, will make the task of drawing samples simple. In each case of drawing a sample, the container should be filled with the water to be tested, sealed and labelled.



It is advisable to conduct the appropriate tests within 30 minutes of drawing the sample, although this time limit can be extended when the sample container is completely filled and sealed.

Test results - cooling water treatment

- A. Recording** - Always use Unitor Waterproof Software to record all readings and to keep track of all results.
Frequency - Samples should be drawn, tested and results logged for each system a minimum of once per week and if possible six times per month.
- B. Reporting** - The log file from Waterproof should be sent to Wilhelmsen Ships Service for evaluation a minimum of once per month.
- C. Evaluation**
 1. The log file with all the results will be reviewed at the Wilhelmsen Ships Service for adherence to recommended specifications.
 2. A report indicating the status of the ship's system, any problems and relevant recommendations will be issued to the desired e-mail addresses.

See also next page

SPECTRAPAK 309 Cooling Water Test Kit

Cooling Water Treatment NITRITE, CHLORIDE & pH

Product no: **661 739466****Nitrite test**

1. Take a 5 ml water sample with the syringe and put into the container provided.
2. Make the sample up to 50 ml using distilled water.
3. Add two nitrite No. 1 tablets and shake to disintegrate (or crush with the rod provided). Sample will be white.
4. Add one nitrite No. 2 tablet and shake to disintegrate.
5. Continue adding the nitrite No. 2 tablets, one at a time, until a pink colour persists for at least one minute.

Calculation

NITRITE (ppm) = number of No. 2 tablets x 180

For example:

If 9 tablets are used, nitrite = $9 \times 180 = 1620$ ppm.

6. Mark the result obtained on the log sheets provided, against the date on which the test was taken.

Chloride test

1. Take a 50ml water sample in the container provided.
2. Add one chloride tablet and shake to disintegrate, sample will turn yellow if chlorides are present.
3. Repeat tablet addition, one at a time until the yellow colour changes to orange/brown.

Calculation

Chloride ppm = (number of tablets used x 20) - 20

For example:

If 3 tablets are used then chloride

ppm = $(3 \times 20) - 20 = 40$ ppm.

4. Mark the result obtained on the log sheets provided, against the date on which the test was taken.

pH test

1. Dip one of the test strips into the water sample so that the colour zone is completely immersed.
2. Compare the colour obtained with the reference, and read off the printed pH value.
3. Mark the result obtained on the log sheet provided, against the date on which the test was taken.

Spares

Standard replacement reagents are available from your Wilhelmsen Ships Service Representative.

REAGENTS RE-ORDER	Product no:
Nitrite No. 1 tablets	661 555623
Nitrite No. 2 tablets	661 555631
Chloride tablets	661 739458
pH papers (6.5.10)	661 555698
EQUIPMENT	
Plastic sample container	661 555714

SPECTRAPAK 310**Unitor's Combined Boiler Water Treatment Programme Water Test Kits**Product no: **661 739474**

The tests recommended to maintain boiler water within the desired level of quality when treating with Unitor Liquitreat/Combitreat are as follows:

- A. p-Alkalinity - Recommended Limits: 100-300 ppm as CaCO_3
- B. Chlorides - 200 ppm maximum as Cl⁻.
- C. Condensate pH - 8.3-9.0
- D. Hotwell temperature - 70-90°C

Dosage level of Liquitreat/Combitreat is based on the p-Alkalinity value of the boiler water. However, chlorides and condensate pH must also be controlled and maintained as recommended. Knowledge of all relevant parameters is desirable to enable better interpretation and correct application of treatment. To increase the condensate pH, use Liquitreat/Combitreat in conjunction with your combined product boiler water treatment. It is recommended to dose Liquitreat/ Combitreat on a continuous basis, to maintain the condensate pH within the recommended range of 8.3-9.0 at all times.

**Controlling Alkalinity**

The alkalinity is a more accurate indicator of the boiler water condition than pH. The phenolphthalein (P) alkalinity is measured to determine whether the correct conditions of alkalinity exist in the boiler.

See also next page

Controlling Chlorides

The chloride value reveals any presence of dissolved salts in the boiler. An increase, gradual or sudden, in the level of chloride is an indication of contamination by sea water and the chloride level is often used as a reference point when controlling rate of blowdown.

pH BOILER

Recommended limits of 9.5-11.0. An additional test to determine the pH of the boiler water can be carried out to give a better overall understanding of the boiler water quality.

Condensate pH

To control corrosion in a boiler, condensate and feed water section, the condensate pH should be kept between 8.3-9.0. Monitoring the pH of this water is very important in maintaining a complete Boiler Water Treatment Management Programme.

Test results - Combined treatment

- A. Recording - Always use Unitor Waterproof Software to record all readings and to keep track of all results.
Frequency - Samples should be drawn, tested and results logged for each system minimum every three days.
- B. Reporting - The log file from Waterproof should be sent to Wilhelmsen Ships Service for evaluation a minimum of once per month.
- C. Evaluation
 1. The log file with all the results will be reviewed at the Wilhelmsen Ships Service for adherence to recommended specifications.
 2. A report indicating the status of the ship's system, any problems and relevant recommendations will be issued to the desired e-mail addresses.

SPECTRAPAK 310

Low Pressure Boiler Water Test Kit

Boiler Water Treatment Test Kit p-Alkalinity, Chloride & pH

Product no: **661 739474**

P ALKALINITY TEST

1. Take a 200 ml water sample in the stoppered bottle provided.
2. Add one P. Alkalinity tablet and shake to disintegrate. If P. Alkalinity is present the sample will turn blue.
3. Repeat tablet addition until the blue colour changes to permanent yellow.

Calculation

P. Alkalinity ppm (CaCO_3) = (Number of tablets used x 20) - 10.

For example:

If 8 tablets are used then P. Alkalinity = (8 x 20) - 10 = 150 ppm.

4. Mark this result on the log sheets provided, against the date on which the test was taken.

Chloride test

1. For boilers under 30 bar (KG/CM²) take a 50 ml sample in the stoppered bottle provided.
2. Add one chloride tablet and shake to disintegrate, sample will turn yellow if chlorides are present
3. Repeat tablet addition until the yellow colour changes to orange/brown.

Chloride (cont.) calculation (50 ml sample)

Chloride ppm = (number of tablets used x 20) - 20 For example: If 4 tablets are used then chloride ppm = (4 x 20) - 20 = 60 ppm.

4. Mark the result obtained on the log sheets provided, against the date on which the test was taken.

N.F. For higher expected chloride levels reduce the water sample size e.g. 25 ml sample will give steps of 40 ppm per tablet used. For lower expected chloride levels increase the water sample volume e.g. 100 ml sample will give steps of 10 ppm per tablet used.

pH test

7.5-14.0 For boiler water

6.5-10.0 For condensate water

1. Take a 50 ml sample of water to be tested in the plastic sample container provided.
2. Using the white 0.6 grm scoop provided, add one measure of the pH reagent to the water sample, allow to dissolve - stir if required.
3. Select the correct range of pH test strip and dip it into the water sample for approximately 10 seconds.
4. Withdraw the strip from the sample and compare the colour obtained with the colour scale on the pH indicator strips container.
5. Record the pH value obtained on the log sheet provided, against the date on which the test was taken.

Spares:

Standard replacement reagents are available from your Wilhelmsen Ships Service Representative.

REAGENTS RE ORDER	Product no:
P. Alkalinity tablets	661 555664
Chloride tablet	661 739458
pH paper replacement pack (7.5-14 & 5.5-10) and pH reagent)	661 555706
EQUIPMENT:	
250 ml sample bottles	661 555557

SPECTRAPAK 315

Boiler Water Treatment Programme Water Test Kits

Product no. **661 739490**

The tests recommended to maintain boiler water within the desired level of quality when treating with Autotreat or Combitreat in conjunction with Oxygen Scavenger Plus or Oxygen Control are as follows:

- A. P-alkalinity - Recommended Limits:
100-300 ppm as CaCO_3
- B. Chlorides - 200 ppm maximum as Cl^- .
- C. Condensate pH - 8.3-9.0
- D. Hotwell temperature - 70-90°C

Dosage level of Autotreat/Combitreat is based on the P-alkalinity value of the boiler water. However, chlorides and condensate pH must also be controlled and maintained as recommended. Knowledge of all relevant parameters is desirable to enable better interpretation and correct application of treatment. To increase the condensate pH, use Unitor's Condensate Control in conjunction with Combitreat. It is recommended to dose Condensate Control on a continuous basis, to maintain the condensate pH within the recommended range of 8.3-9.0 at all times.

Controlling Alkalinity

The alkalinity is a more accurate indicator of the boiler water condition than pH when water quality is monitored manually. The phenolphthalein (P) Alkalinity is measured to determine whether the correct conditions of alkalinity exist in the boiler.

Controlling Chlorides

The chloride value will reveal any presence of dissolved salts in the boiler. An increase, gradual or sudden, in the level of chloride is an indication of contamination by sea water and the chloride level is often used as a reference point when controlling rate of blowdown.

pH BOILER

Recommended limits of 9.5-11.0. An additional test to determine the pH of the boiler water can be carried out to give a better overall understanding of the boiler water quality.

pH-Condensate

To control corrosion in a boiler, condensate and feed water section, the condensate pH should be kept between 8.3-9.0. Monitoring the pH of this water is very important in maintaining a complete Boiler Water Treatment Programme.



TEST RESULTS - BOILER WATER TREATMENT

- A. Recording - Always use Unitor Waterproof Software to record all readings and to keep track of all results.
Frequency - Samples should be drawn, tested and results logged for each system minimum every three days.
- B. Reporting - The log file from Waterproof should be sent to Wilhelmsen Ships Service for evaluation a minimum of once per month.
- C. Evaluation
 - 1. The log file with all the results will be reviewed at the Wilhelmsen Ships Service for adherence to recommended specifications.
 - 2. A report indicating the status of the ship's system, any problems and relevant recommendations will be issued to the desired e-mail addresses.

See also next page

SPECTRAPAK 315

Low Pressure Boiler Water Test Kit

Boiler Water Treatment Test Kit P. ALKALINITY, CHLORIDE & pH

Product no.	661 739490
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P ALKALINITY TEST

1. Take a 200 ml water sample in the stoppered bottle provided.
2. Add one P. Alkalinity tablet and shake to disintegrate. If P. Alkalinity is present the sample will turn blue.
3. Repeat tablet addition until the blue colour changes to permanent yellow.

Calculation

P. Alkalinity ppm (CaCO_3) = (Number of tablets used x 20) -10.

For example:

If 8 tablets are used then P. Alkalinity = $(8 \times 20) - 10 = 150$ ppm.

4. Mark this result on the log sheets provided, against the date on which the test was taken.

Chloride test

1. For boilers under 30 bar (KG/CM²) take a 50 ml sample in the stoppered bottle provided.
2. Add one chloride tablet and shake to disintegrate, sample will turn yellow if chlorides are present
3. Repeat tablet addition until the yellow colour changes to orange/brown.

Chloride (cont.) calculation (50 ml sample)

Chloride ppm = (number of tablets used x 20)-20 For example: If 4 tablets are used then

chloride ppm = $(4 \times 20) - 20 = 60$ ppm.

4. Mark the result obtained on the log sheets provided, against the date on which the test was taken.

N.B. For higher expected chloride levels reduce the water sample size e.g. 25 ml sample will give steps of 40 ppm per tablet used. For lower expected chloride levels increase the water sample volume e.g. 100 ml sample will give steps of 10 ppm per tablet used.

pH test

7.5-14.0 For boiler water

6.5-10.0 For condensate water

1. Take a 50 ml sample of water to be tested in the plastic sample container provided.
2. Using the white 0.6 gm scoop provided, add one measure of the pH reagent to the water sample, allow to dissolve - stir if required.
3. Select the correct range of pH test strip and dip it into the water sample for approximately 10 seconds.
4. Withdraw the strip from the sample and compare the colour obtained with the colour scale on the pH indicator strips container.
5. Record the pH value obtained on the log sheet provided, against the date on which the test was taken.

SPARES:

Standard replacement reagents are available from your Wilhelmsen Ships Service Representative.

REAGENTS	Product no:
P. Alkalinity tablets	661 555664
Chloride tablets	661 739458
pH paper replacement pack (7.5-14 & 5.5-10) and pH reagent)	661 555706
EQUIPMENT	
250 ml sample bottles	661 555557
Lovibond 2000 comparator	661 555565
10 ml moulded cell	661 555599
Filter paper	661 555730
Plastic Funnel	661 573048
Beaker	661 568717
Stirring rods plastic	661 573055

SPECTRAPAK 311

Water Test Kits

Unitor's Coordinated Boiler Water Treatment Programme

Product no 311: **661 739482**

For medium and high pressure boilers, the use of combined product treatment is not recommended. This is because higher pressures and temperatures increase the tendency of scaling and corrosion, which makes it necessary to change the chemical conditions and test parameters individually.

Hardness Control

Hardness Control is a phosphate powder product used in boiler water treatment to precipitate dissolved calcium hardness salts and to convert these salts to non-adherent calcium phosphate sludge, which can be easily removed by blowdown. Hardness Control is highly effective in achieving this function requiring minimum dosages.

Alkalinity Control

Alkalinity Control is used to obtain the correct pH level necessary for the phosphate treatment to react with calcium salts.

Dissolved Oxygen

The Spectrapak 311 test kit can be extended for testing the presence of oxygen scavengers. Spectrapak 312 is used as extension to test for Hydrazine when Oxygen Control is in use. Spectrapak 313 is used as extension to test for DEHA when Oxygen Scavenger Plus is in use.

Catalysed Sodium Sulphite L (liquid)

Unitor's catalyzed sulphite product is used as scavengers in place of hydrazine where economy is of importance. It should not be used in boilers at pressures above 30 bars where the TDS level is critical.

Condensate Control

Condensate Control is a neutralizing volatile amine recommended to be used in all boiler systems for raising the pH of condensate and steam to a non-corrosive level (pH 8.3-9.0). The dosage is determined by the results of a daily condensate pH test. Condensate Control should be dosed using a continuous feed system daily.

SPECTRAPAK 311

Boiler Water Test Kit (Full Service)

Phosphate, P. & M. Alkalinity Chloride, pH

N.B. The oxygen scavenger test is optional (Spectrapack 312/313).

Product no **661 739482**



PHOSPHATE (ppm pO₄)

1. Take the comparator with the 10 ml cells provided.
2. Slide the phosphate disc into the comparator.
3. Filter the water sample into both cells up to the 10 ml mark.
4. Place one cell in the left hand compartment.
5. To the other cell add one phosphate tablet, crush and mix until completely dissolved.
6. After 10 minutes place this cell into the right hand compartment of the comparator.
7. Hold the comparator towards a light.
8. Rotate the disc until a colour match is obtained.
9. Record the result obtained on the log sheet provided, against the date on which the test was taken.

P. ALKALINITY (ppm CaCO₃)

1. Take a 200 ml water sample in the stoppered bottle.
2. Add one p. Alkalinity tablet and shake or crush to disintegrate.
3. If Alkalinity is present the sample will turn blue.
4. Repeat the tablet addition, one at a time (giving time for the tablet to dissolve), until the blue colour turns to permanent yellow.
5. Count the number of tablets used and carry out the following calculation: p. Alkalinity, ppm CaCO₃ = (Number of Tablets x 20) - 10 e.g. 12 Tablets = (12 x 20) - 10 = 230 ppm CaCO₃
6. Record the result obtained on the log sheet provided, against the date on which the test was taken.
7. Retain the sample for the M. Alkalinity test.

See also next page

M. alkalinity (ppm CaCO₃)

1. To the p. Alkalinity sample add one m. Alkalinity tablet and shake or crush to disintegrate.
2. Repeat tablet addition, one at a time (giving time for the tablet to dissolve), until the sample turns to permanent red/pink.
3. Count the number tablets used and carry out the following calculation: m. Alkalinity, ppm CaCO₃ = (Number of P&M tablets x 20) - 10 e.g. If 12 P. and 5M. Alkalinity Tablets are used M Alkalinity = [(12 + 5) x 20] - 10 = 330 ppm CaCO₃
4. Record the result obtained on the log sheet provided, against the date on which the test was taken.

Chloride (PPM Cl)

The range of chloride to be tested determines the size of water samples used. The higher the chloride level the smaller the size of water sample used - this saves tablets.e.g.

For low chloride levels use 100 ml water sample. For higher chloride levels use 50 ml water sample.

1. Take the water sample in the stoppered bottle provided.
2. Add one chloride tablet and shake to disintegrate. Sample will turn yellow if chlorides are present.
3. Repeat tablet addition, one at a time (giving time for the tablet to dissolve), until the yellow colour changes to permanent red/brown.
4. Count the number of tablets used and perform the following calculation:
For 100 ml water sample - Chloride ppm = (Number of tablets x 10) - 10 e.g. 4 Tablets = (4 x 10) - 10 = 30 ppm chloride
For 50ml water sample:
Chloride ppm = (Number of Tablets x 20) - 20
e.g. 4 Tablets = (4 x 20) - 20 = 60 ppm
For higher expected chloride levels reduce water sample volume, for lower chloride levels increase water sample volume.
5. Record the result obtained on the log sheet provided, against the date on which the test was taken.

pH TEST

7.5-14.0 For boiler water

6.5-10.0 For condensate water

1. Take a 50 ml sample of water to be tested in the plastic sample container provided.
2. Using the white 0.6 mm scoop provided, add one measure of the pH reagent to the water sample, allow to dissolve - stir if required
3. Select the correct range of pH test strip and dip it into the water sample for approximately 10 seconds.
4. Withdraw the strip from the sample and compare the colour obtained with the colour scale on the pH indicator strips container.
5. Record the pH value obtained on the log sheet provided, against the date on which the test was taken.

Spares

Standard spares packs for the Spectrapak Test Kit range are available from your local Wilhelmsen Ships Service Representative.

Spares for this Test Kit - Spectrapak 311

REAGENTS	Product no:
Phosphate tablets	661 555649
Chloride tablets	661 739458
P. Alkalinity tablets	661 555664
M. Alkalinity tablets	661 555672
pH paper replacement pack (7.5-14 & 5.5-10) and pH reagent	661 555706
Filter paper	661 555730
Hydrazine reagent	661 555680
EQUIPMENT	Product no:
250 ml samples bottles	661 555557
Lovibond 2000 comparator	661 555565
Phosphate disc 3/70	661 555573
10 ml moulded cells	661 555599
Hydrazine disc 3/126	661 555581

SPECTRAPAK 312

Product no 312: **661 555490**

**Boiler Water Treatment Programme
Water Test Kits**

The test recommended to ensure boiler water is free from dissolved oxygen when using Unitor's Oxygen Control (Hydrazine, N_2H_4).

Hydrazine is a colourless liquid at ambient temperatures, being completely mixable with water. It is used to efficiently scavenge and remove oxygen from condensate, feedwater, and boiler water. Hydrazine reacts with oxygen, acting as a scavenger. The reaction results in nitrogen and water, no solids being added to the boiler system. Some of the hydrazine will carry over with the steam, aiding in maintaining the condensate pH in an alkaline range, which thereby helps combat acid formation. Hydrazine will also form magnetite which will act as a protective layer against further corrosion.

SPECTRAPAK 312

Boiler Water Test Kit, Hydrazine

Product no. 555490

HYDRAZINE (PPM N_2H_4)

This is an option to the Spectrapak 311 and 315. This test must be performed below 21°C. A cooling coil should be fitted at the sampling point or the sample should be cooled immediately under cold running water. Cloudy samples should be filtered before testing.

1. Take the comparator with the 10 ml cells provided.
2. Slide the hydrazine disc into the comparator.
3. Add the water sample to both cells up to the 10ml mark.
4. Place one cell in the left hand compartment of the comparator.
5. To the other cell add one measure of hydrazine power (using the black 1 grm scoop provided) and mix until completely dissolved.
6. Wait 2 minutes and place the cell in the right hand compartment of the comparator.
7. Hold up to the light and rotate the disc until a colour match is obtained.
8. Record the reading shown as ppm hydrazine.



REAGENTS

Product no:

Hydrazine reagent

661 555680

EQUIPMENT

Hydrazine disc 3/126

661 555581

SPECTRAPAK 313

Product no 313: **661 698746**

Water Test Kits

Boiler Water Treatment Programme

The test recommended to ensure boiler water is free of dissolved oxygen when using Unitor's Oxygen Scavenger Plus.

Controlling dissolved oxygen in boiler feed water and boiler water is important to avoid pitting corrosion in boiler systems. Unitor's Oxygen Scavenger Plus contains DEHA, a low toxicity oxygen scavenger that is distributed throughout the boiler system.

Dosage level of Oxygen Scavenger Plus is based on the DEHA value of the condensate water. Note, a fresh sample of condensate should be drawn for this analysis. Great care should be taken in sampling to exclude reaction of the sample with atmospheric oxygen. For this purpose, use a 60 ml stoppered glass bottle. The sample point should be fitted with a sample cooler, capable of cooling the sample to below 30°C. DEHA - Recommended Limits in condensate: 0.08 - 0.30 PPM DEHA.

Test Results - Boiler Water Treatment

- A.** Recording - Always use Unitor Waterproof Software to record all readings and to keep track of all results.
Frequency - Samples should be drawn, tested and results logged for each system minimum every three days.
- B.** Reporting - The log file from Waterproof should be sent to Wilhelmsen Ships Service for evaluation a minimum of once per month.
- C.** Evaluation
 1. The log file with all the results will be reviewed at the Wilhelmsen Ships Service for adherence to recommended specifications.
 2. A report indicating the status of the ship's system, any problems and relevant recommendations will be issued to the desired e-mail addresses.

SPECTRAPAK 313

Boiler Water Test Kit

Boiler Water Treatment Test Kit DEHA,

Product no: **661 698746**

Spares:

Standard replacement reagents are available from your Wilhelmsen Ships Service Representative

REAGENTS	Product no:
DEHA test solution	661 698761
DEHA test tablets	661 698753

EQUIPMENT	Product no:
DEHA disc (3/170)	661 698928
30ml amber sample bottle	661 698936
60ml sample bottle	661 698944



DEHA Test

1. Fill the 60 ml bottle with sample direct from the sample cooler by immersing the outlet tube to the bottom of the bottle. Let the sample flow and fill the bottle and overflow for one minute.
2. Gently remove the bottle from the sample outlet tube so that the sample continues to overflow.
3. Gently place the stopper in the bottle so that a small amount of sample is expelled and that no air bubbles are trapped under the stopper.
4. Cool the outside of the bottle with cold running water if the sample feels warm. Remove the stopper.
5. Carefully pour the sample into a 10 ml moulded cell, filling to the 10 ml line.
6. Transfer this 10 ml into the amber glass bottle by pouring slowly down the side of the bottle.
7. Add 6 drops of DEHA test solution by holding the plastic bottle vertically and squeezing gently. Swirl to mix.
8. Now add one DEHA test tablet to the bottle. Crush and mix well to dissolve. Allow to stand for exactly 10 minutes.
9. Whilst waiting, decant another 10 ml of original sample into the 10 ml cell and add one DEHA test tablet.
10. Crush and mix well to dissolve then place the cell in the left hand compartment of the comparator. Slide the DEHA disc into the comparator.
11. After the 10 minute standing period is complete, pour the test solution from the amber glass bottle into a clean 10 ml cell and place in the right hand compartment of the comparator.
12. Immediately match the colour against the disc by holding the comparator facing a good source of daylight if possible.
13. Record the reading as ppm DEHA.

HIGH PRESSURE BOILER WATER TEST KIT

MultiDirect

Product number: Multidirect kit 661 729590

Accurate monitoring of boiler- feed- and condensate-water samples is of increasing importance with higher Boiler pressure and evaporation rate. The higher the operating pressure of the boiler, the narrower the specifications for the quality will be. Because the narrow range for the various parameters normally checked (like hydrazine, phosphate etc.), the accuracy of the test procedure used should also increase with the operating pressure of the boiler. Most treatment parameters are analysed by colorimetric methods, and to improve the accuracy of the test method, an advanced photometer is included in the Utor Multidirect kit. The photometer eliminates the reliance on correct colour perception by the human eye. Easy to use handheld conductivity and pH meters are also included in the kit.

System Specifications

The kit is designed as a portable kit with hardware and reagents in separate convenient cases. The photometer is supplied with re-chargeable batteries and mains cable for multi-voltage power supply.

The photometer is equipped with a foil keypad, scratch and acid/solvent resistant. The electronic components are sealed, making the instrument splash proof.

When operating the photometer, applicable water parameters are listed in a menu on the screen. The user selects the desired parameter method, and instructions for sample preparation, reagents, zero calibration and testing are provided on screen. When the test is complete the result is displayed.

The kit is supplied with 24mm and 16 mm vials for testing. Reagents for the most common parameters area also included. Reagents packs for all standard parameters are available in addition to a range of optional reagent packs. Certain parameters in addition to the ones mentioned in table below can be offered on special request. For queries about additional parameters, please contact Wilhelmsen Ships Service.

Operation

For accurate test results using the photometer it is important that the positioning mark on the cell is aligned with the positioning mark next to the cell compartment. It is also important to ensure that the test cell is clean when



performing a test with the photometer as i.e. finger marks on the test cell can affect the accuracy of the reading.

For each analysis, the instrument will perform a zero calibration. This calibration is typically performed with the applicable water sample prior to adding the reagent(s) and will help eliminate interference by i.e. slightly discoloured water samples.

The information in the display will guide the user through the steps of performing the each test. Detailed description of each test procedure is provided in the manual.

Parameters

Standard parameters (reagents included)

Refill product number:

P.Akalinity	661 729491
M.Akalinity	661 729509
Ammonia	661 729517
Chloride	661 729525
Hardness	661 729533
Hydrazine test powder	661 555680
Phosphate	661 729541
Silica	661 729558
pH Buffer tablets (7&10)	661 729632
pH reagent (conditioner)	661 568873

See also next page

Standard optional parameters

	Refill product number:
DEHA tablets*	661 698753
DEHA solution*	661 698753
Hydrazine Vials	661 729566
Dissolved Oxygen Vials	661 729574
Phosphate Vials	661 729582
Copper	661 729616
Iron LR	661 729624
Conductivity neutral soln.	661 568691
Standard solution cond.	661 568683

* Reagents for DEHA test are supplied individually; both reagents are necessary to perform the DEHA test. For other parameters all necessary reagents are supplied as one pack.

Handling of the Reagent Tablets

Tablet reagents represent an accurate and safe way of chemical testing. Our tablets are produced according to the most stringent quality requirements, for high precision in test results. For best accuracy, both the tablet and the foil packaging should be free from physical damage (scratches etc.). Damaged reagents should be disposed of. A tablet reagent in sealed foil packaging offers superior shelf life properties compared with i.e. liquid reagents.

When using tablet reagents, tare the foil next to the tablet, and let the tablet fall into the cell. Touching the tablet should be avoided for safe handling and to avoid possible contamination of the sample.

Countdown Function

In some methods, the photometer is programmed with a specified time after adding the reagent to testing the water sample. The time factor appears in the display after the test key is pressed. The time remaining after the key was pressed is continuously shown in the display. An audible signal sounds during the last ten seconds prior to expiry of the waiting time. The test result is then shown in the display. The countdown function can be disabled, however this will in most cases reduce the accuracy of the test.

Handheld meters

The Multidirect kit is equipped with handheld meters for checking conductivity and pH. As any electrode based meter, these instruments must be calibrated regularly to ensure accurate results.

The handheld meters can be re-ordered as individual products:

	Product number
pH meter	661 607800
Conductivity meter	661 607801

Technical data for handheld meters:

CHECKIT micro	pH	Conductivity
Range	0 to 14 pH	0 to 1990 μ S/cm
Resolution	0.1 pH	10 μ S/cm
Calibration	(4), 7, 10 pH	1400 μ S/cm
Operating Temperature Range	0° - 50°C	0° - 50°C

TEST KIT COOLTREAT AL WITH CL TEST

Product no: **666 758904**

Sampling and testing

Sampling of Diesel engines

Accessible sampling cocks should exist on all cooling systems for each diesel engine. This including, but not limited to, main jacket water, piston cooling, fuel oil valve, auxiliary engines, low temperature systems, etc. A representative sample must be taken from each cooling water system to be tested. To minimize the effort in obtaining cooling water samples, a sample cock located in a position to draw a sample/having access to draw the sample quickly and easily, will make the task of drawing samples simple. Before taking the sample the sampling line if present, should be thoroughly flushed with cooling water to ensure a representative sample is used for testing. In each case of drawing a sample, the container should be filled with the water to be tested, sealed and labelled. It is advisable to conduct the appropriate tests within 30 minutes of drawing the sample, although this time limit can be extended when the sample container is completely filled and sealed.

The tests recommended to maintain cooling water within prescribed limits when using Unitor Cooltreat AL are as follows:

pH: Recommended limits 7.0–9.5

The effectiveness of a corrosion inhibitor is restricted to within a certain pH range. Deviations from the recommended range may indicate of external contamination of the system. pH test:

1. Dip one of the test strips into the water sample so that the colour zone is completely immersed for minimum 10 seconds.
2. Compare the colour obtained with the reference, and read off the printed pH value.

Cooltreat AL concentration test: Recommended minimum level 5%.

The Cooltreat AL concentration should be maintained at a minimum of 5% in the engine cooling water. For systems where glycol is added for frost protection, a minimum concentration of 8% is recommended. At concentrations below the recommended minimum levels, the corrosion protection provided by the inhibitor product will not be as efficient.

Chloride test; recommended chloride level below 50 ppm.

1. Remove a titrator from bottle and replace cap immediately.
2. Insert lower end of titrator into solution. Do not allow solution to reach yellow completion band at top of titrator.



3. Allow solution to completely saturate wick of titrator. Reaction is complete when yellow band turns dark.
4. Note where the tip of the white chloride peak falls on the numbered Quantab® scale. This represents the Quantab® unit value.
5. Refer to the table to convert Quantab® units into salt concentration.

Cooltreat AL inhibitor concentration test procedure:

1. Rinse the shaker tube with clean water before use.
2. Fill the 1ml syringe to above the 1.0ml mark with Cooltreat reagent - ensure there are no air bubbles trapped. Set the plunger at the 1.0ml line.

NOTE: Check that no drops are on the syringe tip, and then eject the 1ml into the shaker tube – pushing the plunger fully down.

Touch the tip of the syringe against the side of the tube to collect the last drop.

3. Add 10 drops of Cooltreat indicator from the dropper bottle the solution will turn red.
4. Fill a disposable pipette with sample water. Add sample water a few drops at a time, swirling the tube with each addition. The colour will change to a cloudy purple, then a greyish colour. Add sample drop by drop at this point until a permanent green tint is produced.
5. Read the '% Cooltreat' in the sample from the liquid level in the tube

CONSUMABLES

Product no:

Cooltreat consumables rep pack, plastic components	666 735761
Cooltreat reagent rep pack, liquid reagents	666 735746
Chloride titrator reagent	666 758912

SPARES

Cooltreat test shaker tube	666 735738
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DOSING SYSTEM FOR WATER TREATMENT AND FUEL OIL TREATMENT

Cleaning and Dosing Equipment

Optional accessory

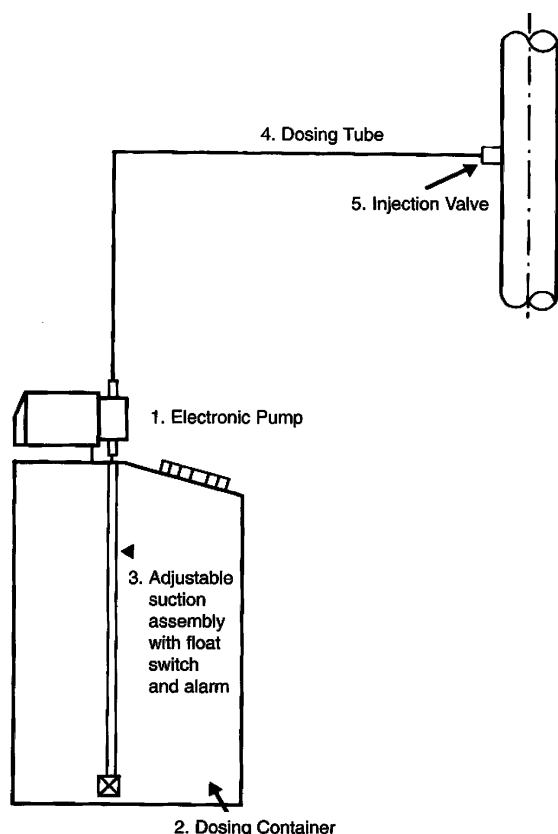
Alarm kit: **664 683771**

Consult your Wilhelmsen Ships Service service engineer for advice.

The standard dosing unit consists of:

1. Electronic metering pump
2. Dosing container
3. Adjustable suction assembly, with float switch
4. Dosing tube
5. Injection valve assembly for hot systems, complete with 1 metre stainless steel pipe

Recommended installation layout.



Information required when considering installation:

1. Treatment flow rate
2. Pressure of the system into which the treatment is being dosed
3. Available voltage 100–240 V



1. Boiler Water Treatment

Dosing valve into the boiler water feedline after the re-circulation line.

Product	Product no.
Boiler water treatment dosing unit	664 619312

Spares:

Spare BETA pump Boiler water treatment dosing unit	664 683730
Spare parts kit Boiler water treatment pump*	664 683706

2. Seawater Treatment

Dosing valve into any convenient place in the circulation system.

Product	Product no.
Seawater system dosing unit	664 619338
Additional dosing point option	664 619890

Spares:

Spare BETA pump Seawater water treatment dosing unit	664 683740
Spare parts kit Seawater treatment pump*	664 683714

3. Fuel Oil Treatment

Consult your Wilhelmsen Ships Service service engineer for advice regarding the dosing valve.

Product	Product no.
Fuel oil treatment dosing unit	664 619353

Spares:

Spare BETA pump Fuel oil treatment dosing unit	664 683698
Spare parts kit Fuel oil treatment pump*	664 683722

Spares kits for old dosing stations (gamma pumps):

Spare parts kit Boiler water treatment pump*	664 670141
Spare parts kit Seawater treatment pump*	664 670125
Spare parts kit Fuel oil treatment pump*	664 670133

* Spare parts kit contains: Diaphragm, Complete O-rings set, Pump inlet and outlet valves and pieces for tube connections.

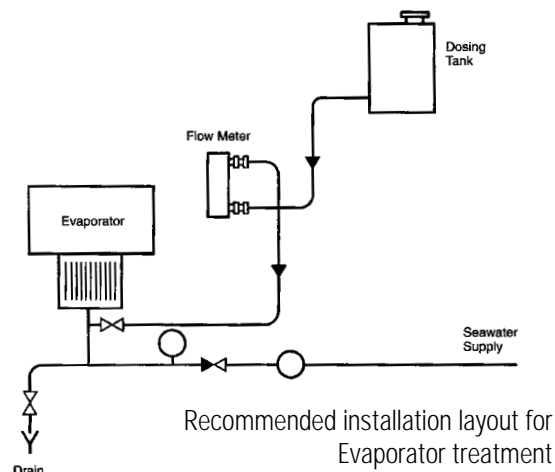
DOSING SYSTEM FOR EVAPORATOR TREATMENT

**Cleaning and Dosing Equipment**

This easily installed dosing equipment consists of:

- 60 litre Polyethylene tank.
- Adjustable flow meter.
- Pipework includes 5 m PVC coil, fittings and valves.

Consult your Unitor service engineer for advice.



N.B. An electronic metering pump for these applications can also be supplied – Use product no. 683730 as an electrical metering pump

Product no:

664 656207

Air Cooler Cleaner Injection System

Unitor air cooler cleaner Injection System Layout

Tests show that vessels using this type of injection equipment with chemical cleaners such as air cooler cleaner suffer no degradation of cylinder lubrication and liner wear rates are not increased.

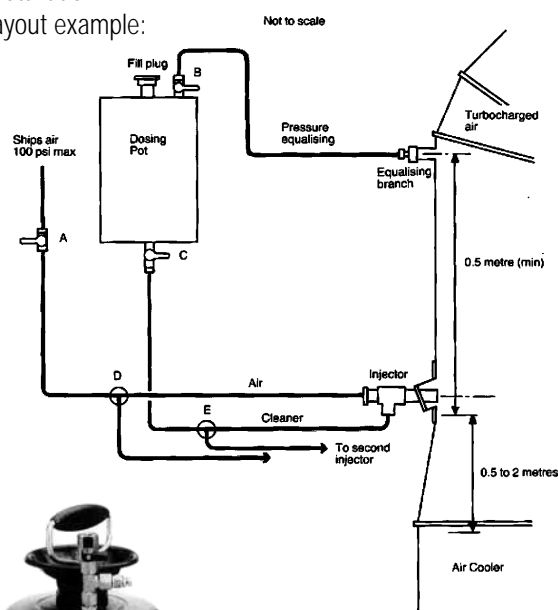
As the air cooler size and position, (baffle plates etc.) vary from engine to engine, Wilhelmsen Ships Service service engineers can help you find the optimum solution for placing the injectors.

Large engines will normally require two injectors per cooler, but one injector is usually sufficient for medium and small engines.

Dosing Procedure

1. Check that valves A, B & C are closed
2. Thoroughly mix up a 25% solution of air cooler cleaner and fresh water and pour this into the dosing pot.
3. Open valve 'A' allowing compressed air to the injector nozzle(s).
4. When two injectors are installed, the air cooler cleaner solution should be dosed separately to each injector. Turn the 'T' valves D and E to the correct line to supply the injector.
5. Open valves 'B' and 'C' to balance the pressure. The emulsion solution will now be drawn down into the injector and be atomised in the scavenge air trunking. It should take about 10 minutes to empty the dosing pot.
6. Close valves A, B & C.
7. After a residence time of 10 minutes repeat sequence of operation above using one full dosing pot fresh water.
8. Repeat this procedure every 24 to 48 hours, depending on the requirements of the type of engine and sizes of air coolers.

Installation layout example:



Consisting of:

1. Stainless steel 6 litre container
2. Injector

Product no:

664 567149

664 567156

CLEANING AND DOSING EQUIPMENT

Rechargeable sprayers

The sensible alternative to aerosols, using compressed air instead of CFC propellants.

The Atomizer Sprayer is easy to operate. Fill the sprayer unit until about two thirds full with your choice of cleaner, pressurize it with the on board available compressed air and the sprayer is ready to use.

Optimum working pressure is 6 to 8 bar, but efficient operation is possible at pressures from 4 to 13 bar.

Features, Benefits and Applications

- Environmentally safe
- Rechargeable
- Easy to maintain
- Versatile
- Economical

Suitable for Unitor products such as

- Enviroclean
- Fore and Aft
- Coldwash HD
- Uniwash
- Electrosolv-E
- Aquabreak PX

Extension piece and different nozzles available:

Pin stream

Solid pin stream pattern. For applications where "splash" coverage is preferred or deeper penetration is required (such as penetrating oil, lubricating oil, insecticide, etc. Ideal for distant or inaccessible areas. Effective range up to 20 feet.

Product no: **664 572206**

Fine mist

Solid cone pattern, fine density. For use with lighter liquids and applications that require extra uniformity such as mold release agents and dry cleaning fluids.

Product no: **664 572214**

Rigid 6-inch, extension piece

Product no: **664 572230**



Model A



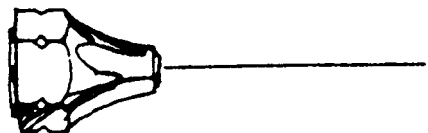
Model B

Model A: 0,5 litre stainless steel sprayer.

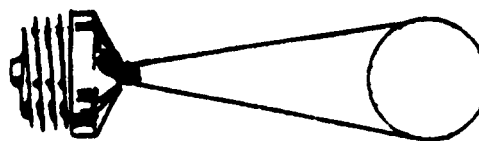
Product no: **664 572156**

Model B: 1 litre chrome plated brass sprayer with pressure guard.

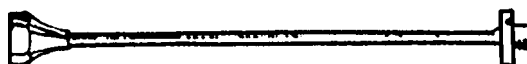
Product no: **664 572172**



Pin stream nozzle



Fine mist nozzle



Extension piece

CLEANING AND DOSING EQUIPMENT

Spraying Devices

Spray Gun, 1 Litre

DESCRIPTION

The Spray Gun has been designed for efficient spraying of Unitor's range of Electrosolvents and Solvent Degreasers. The adjustable nozzle allows for easy adjustment of the fluid discharge from a fine spray to a solid jet.

Application

1. Unscrew the container from the spray gun, fill it with the chemical and screw it on the spray gun again.
2. Alternatively put the end on an extended PVC hose directly into the drum of Unitor chemicals.
3. Pull trigger to spray.
4. Adjust nozzle for desired spray pattern.
5. If only an air stream is required without chemicals for drying, simply screw the nozzle all the way back.

Usage

Electrical equipment - such as control panels, motors, generators, etc. can be cleaned easily by spraying Unitor Electrosolv-E directly on the soiled areas.



Cleaning and Degreasing - of bulkheads, engine parts, winches, tanks, etc. can be accomplished by spraying on Coldwash HD, Seaclean Plus, Seaclean, Enviroclean or Aquabreak PX.

Oil Spills - can be dispersed quickly by spraying Seacare OSD or Seacare Ecosperse on spill and then washing away with water.

Painted Surfaces - can be cleaned rapidly by spraying on diluted Uni-Wash.

Product no:

664 592568

JET SPRAY UNIT

Description

The Jet Spray Unit is ideal for applying Unitor Electrosolvents, Degreasers, and cleaning chemicals.

The Jet Spray Unit is supplied complete with Instantaneous Control Lance, Cone Spray Nozzle, Charge Pump, Pressure Gauge and Relief Valve (set to operate at 6 bar).

To assemble

Fit lance tube to trigger control valve and connect hose to outlet of the container, ensuring that all washers are in place. Test machine with water to ensure that it is in correct working order.

To operate

Remove complete pump by pressing down on handle, engaging lugs and unscrewing. Pour in up to, but not more than, 9 litres of spray liquid.

Replace pump; screw home firmly onto rubber sealing ring. Charge with air until pointer of Pressure Gauge reaches the red line (5 bar). Lower pressures can be used if desired. The Sprayer is now ready for use.

Care must be taken when removing pump from container whilst under pressure. Gradually unscrew pump only a few threads - until the compressed air is heard to escape.

Maintenance

THIS UNIT MUST BE THOROUGHLY WASHED OUT IMMEDIATELY AFTER USE with water, shaking the unit well and spraying the water out. Remove nozzle to save time.

Product no:

10 ltr mild steel

664 572099

10 ltr stainless steel

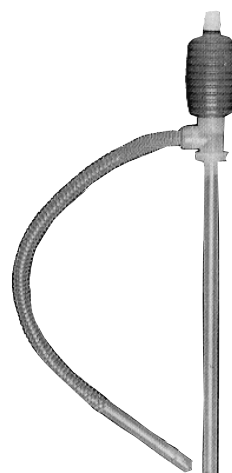
664 572123

SYPHON SQUEEZER FOR 25 LITRE CONTAINERS

The Syphon Squeezer has been developed to avoid spillages of cleaner. Put the suction end of the Syphon Squeezer into the container opening and the flexible end in a bucket. Squeeze the syphon bulb several times, until the required amount of cleaner has been transferred from the 25 litre container to the bucket.

Product no:

664 572024



CLEANING AND DOSING EQUIPMENT

Unitor Ultrasonic S-700/HM 230 V

General Description

The Unitor Ultrasonic S-700/HM is a portable ultrasonic cleaning unit with the following features: bottom drain, basket with long handles and a frame for secure fastening to the floor. This unit is designed for use with water-based as well as solvent based chemicals. Applications may include fuel and lube oil filters, injection nozzles, fuel and pump parts, inlet and exhaust valves etc.

Principle

Ultrasonics is the technology dealing with mechanical sound waves at frequencies above the audible range. Ultrasonic cleaning is based on the utilisation of these extremely high-frequency waves to "scrub off" surfaces immersed in a liquid medium, usually water. The scrubbing action is accomplished by a phenomenon known as cavitation.

Advantages of the Unitor ULTRASONIC S-700/HM

1. Thorough non-destructive cleaning by means of sound waves penetrating into crevices and cavities, facilitating cleaning of otherwise inaccessible areas. Allows use of chemicals with less environmental exposure.
2. Removes deposits, soil and fouling completely. Low, or hardly noticeable audible noise. Time saving.
3. Minimizes effluent disposal problems. Requires little manpower, set the time with the timer and it works by itself. Economical in use.

A specially developed cleaning agent for ultrasonic use, Unitor USC is recommended, but the Unit may also be used together with the following Unitor products: Metal Brite, Enviroclean, Coldwash HD and Aquabreak PX.

A range of Unitor Ultrasonic Cleaning Units specially designed for use in the ship's engine room.

Technical data

	Unitor Ultrasonic Cleaner S-1600 / HM 230V AC	Unitor Ultrasonic Cleaner S-2000 / HM 230V AC	Unitor Ultrasonic Cleaner S-3000 / HM 400V AC
External measurement L x W x D	740 x 730 x 830* mm	910 x 740 x 830* mm	1240 x 800 x 990* mm
Internal measurement L x W x D	650 x 500 x 520 mm	820 x 500 x 500 mm	1150 x 550 x 620 mm
Capacity	165 ltr.	208 ltr.	300 ltr.
Material	Stainless steel V2A	Stainless steel V2A	Stainless steel V2A
Heating	2200 W Adjustable 20–80 °C	2200 W Adjustable 20–80 °C	6000 W Adjustable 20–80 °C
Connected power	3050 W	3250 W	8050 W
HF-continuous output	800 W	1000 W	2000 W
Operating frequency	37 kHz	37 kHz	37 kHz
Drainage	Ball valve	Ball valve	Ball valve
Timer	0–120 min., Continuous operation	0–120 min., Continuous operation	0–120 min., Continuous operation
Stainless steel lid included	Yes	Yes	Yes
Basket included	Yes	Yes	Yes
Product No.	664 766907	664 766923	664 766949

Ultrasonic Cleaning Unit T-1300 / H with additional Ultrasonic generators in tank walls = Ultrasonic T-1330 H/2. Product No. 664 720920

Ultrasonic Cleaning Units T-1060 400V / 50 Hz and T-1100 440V / 60 Hz available on request.

Our range of MULTI-FREQUENCY GENERATORS and IMMERSIBLE TRANSDUCERS are designed for installation in new or existing steel tanks to improve the speed and effectiveness of the washing process. Available on request.



Specifications:

Capacity:	76 ltr. total.
Tank working volume:	51 ltr.
Material Tank:	Stainless Steel V2A
Material Casing:	Stainless Steel V2A
Weight:	55 kg.
External measurements:	640 mm (L), 540 mm (W), 830* mm (H)
Internal measurements:	550 mm (L), 300 mm (W), 470 mm (H)
Basket measurements:	500 mm (L), 225 mm (W), 240* mm (H)
Mesh size of basket:	12 x 1.5 mm
Mains voltage:	1 x 230 V/50 and 60 Hz
Mains Connection:	1 phase, 1N, 1PE
Max overall Power:	2750 W
Heating:	2200 W, temperature adjustable 20–80 °C
Effective Ultrasonic Power:	500 W
Max Ultrasonic Power:	1000 W
Protection Class:	IP 32

Product no:

Ultrasonic cleaning unit
S 700/HM 230 volt AC. **664 766881**

*including support structure

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