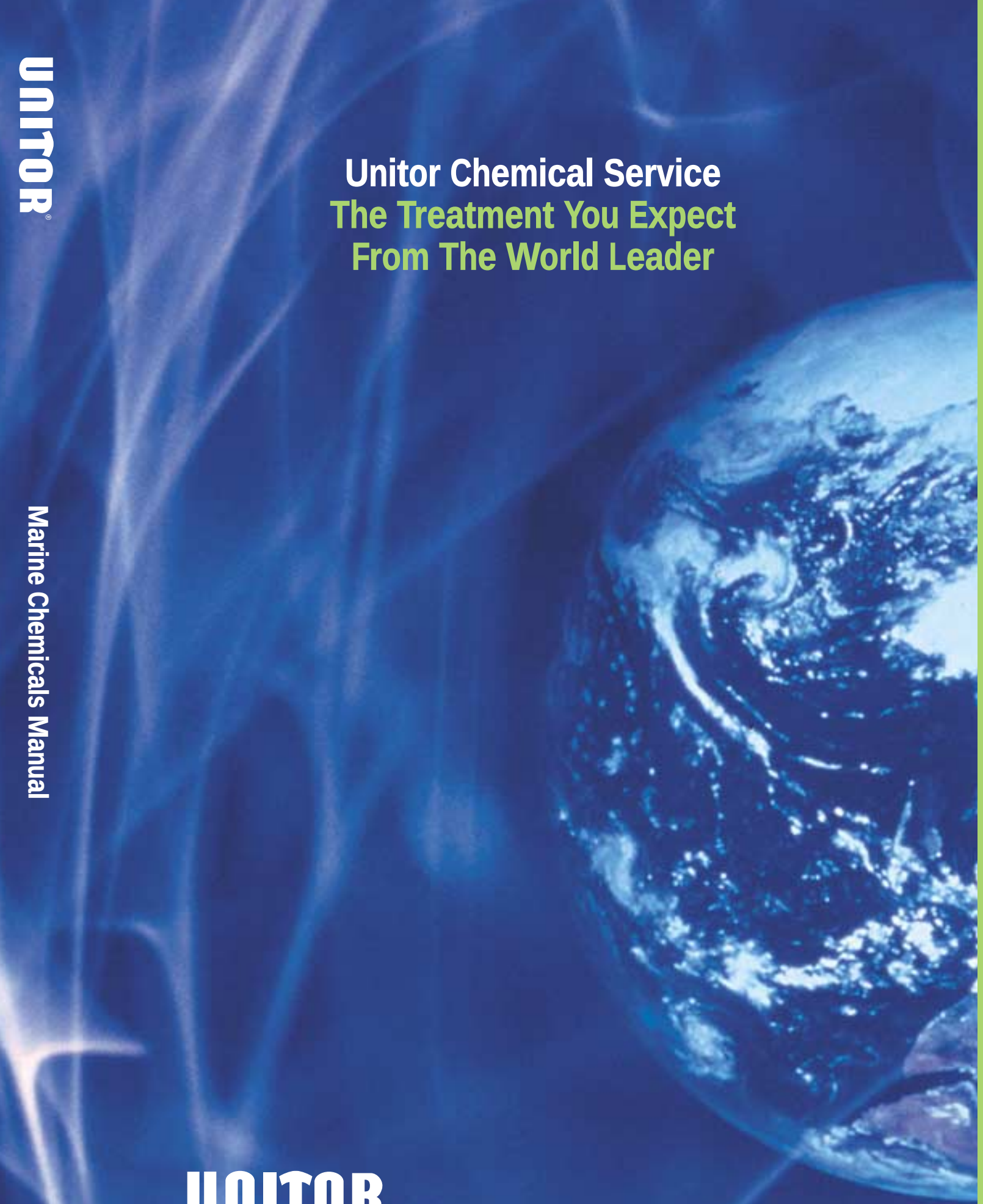
UNITOR®

Marine Chemicals Manual

Unitor Chemical Service
The Treatment You Expect From The World Leader



UNITOR
CHEMICAL SERVICE

Unitor Chemical Service
The Treatment You Expect From The World Leader

Fuel and Oil Treatment

Cleaning, Maintenance and Biochemicals

Water Treatment

Pool Water Treatment

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UNITOR
CHEMICAL SERVICE

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FUEL & OIL TREATMENT

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FUEL TREATMENT
PROBLEM & 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 $SO_2 -> SO_3$ conversion.	Dual Purpose Plus Burnaid Valvecare Dieselite
Ash deposits Carbon residuals from combustion processes bind ash particles together to form deposits.	Combustion catalyst increases $C -> CO_2$ conversion reducing free carbon.	Dual Purpose Plus Burnaid Dieselite
Smoke and Smut 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

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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 Unitor 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.

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.

FUELCARE

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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.

Product Properties

Appearance:	Pale yellow liquid
Density, g/cm^3 at 15°C:	0.9
Flash point (PMCC)°C:	Above 61°C
Compatibility:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

Packaging:	Product no.	Size (in litres)	Container
	650 571133	25	Steel
	650 571794	210	Steel

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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.

Features, Benefits and Applications

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

GAMABREAK

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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.

Product Properties

Appearance:	Yellow liquid
Density, g/cm^3 at 1 5°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 571158	25	Steel

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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 dispersant 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 in the yellow tab section.

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

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BIOCONTROL MAR-71

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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.

Product Properties

Appearance:	Pale yellow liquid
Density, g/cm^3 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

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DUAL PURPOSE PLUS

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 Unitor's Fuel Oil Treatment Dosing Unit, product #597187, or Fuel Oil Treatment Dosing Unit with Alarm product #597195.

Fuel Combustion Catalyst

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

DUAL PURPOSE PLUS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Dark brown liquid		
Density, 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

UNITOR CHEMICAL SERVICE

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 Unitor's Fuel Oil Treatment Dosing Unit, product No#. 597187, or Fuel Oil Treatment Dosing Unit with Alarm, product No#. 597195.

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

BURNAID

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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.

Product Properties

Appearance:	Clear, pale yellow liquid		
Density, 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 604405	25	Steel
	650 604397	210	Steel

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DIESELITE

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 tarry 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.

Dieselite can be dosed using Unitor's Fuel Oil Treatment Dosing Unit, product No# 597187, or Fuel Oil Treatment Dosing Unit with Alarm, product No# 597195

COMBINATION COMBUSTION CATALYST/ ASH MODIFIER

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

DIESELITE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Dark brown liquid		
Density, 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 571224	25	Steel

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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 Unitor's Fuel Oil Treatment Dosing Unit, product No. 597187 or Fuel Oil Treatment Dosing Unit with Alarm, product No. 597195.

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

VALVECARE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Pale coloured liquid		
Density, 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 571190	25	Steel

UNITOR CHEMICAL SERVICE

SOOT 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.

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

Boilers

Steam Raised tons/hour	Fuel 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

SOOT DEPOSIT REMOVER

Features, Benefits and Applications

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

SOOT REMOVER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Blue green powder		
Density, 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.	Size (in kg)	Container
	650 571240	25	Steel

UNITOR CHEMICAL SERVICE

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 or 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:

Automatic Dosing Unit: 664-625 202
Manual Dosing Unit: 664-625 194

Boiler

Steam Raised tons/hour	Fuel tons/day	Dose rate ltrs/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 ltrs/day
10	1,5
20	3,0
30	3,5
40	4,0
50	4,5

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

Ideal for use on Cruise Ships

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SOOT REMOVER LIQUID

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear blue liquid		
pH:	3,0		
Solubility in water:	100%		
Density, g/cm^3 at 15°C:	1,12		
Flash point (PMCC)°C:	Not applicable		
Packaging:	Product no.	Size (in litres)	Container
	650-624627	25	Plastic drum/keg

CLEANING, MAINTENANCE AND BIOCHEMICALS

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CLEANING & MAINTENANCE
PROBLEM & SOLUTION SUMMARY

Problem	Solution	Product(s)
CARGO TANK/HOLD:		
Cargo tank cleaning after mineral oils	Solvent emulsion and/or water based cleaners	Tankleen Plus, Cleanbreak, Seaclean, Tankleen
Cargo tank cleaning after drying, semi-drying and non-drying natural oils and fats	Saponifying and detergents	Alkleen Liquid, Alkleen Safety Liquid, Aquatuff
Cargo tank cleaning after petrochemicals and light hydrocarbons	Detergents	Alkleen Safety Liquid, Aquatuff
Cargo tank cleaning after general chemical cargoes	Refer to UNITOR Tank Cleaning Manual	Product choice depends on type of cargo, please, consult UNITOR Tank Cleaning Manual
Fuel and lube oil tank cleaning	Heavy duty tank cleaners for Rock & Roll cleaning method	Tankleen Plus, Seaclean, Tankleen
Hydrocarbon gas-freeing	Following normal or specific cleaning, wash with water based cleaner solution	Enviroclean, Alkleen Safety Liquid, Alkleen Liquid
Cargo hold cleaning	Wash with water based cleaner solution with a foam additive	Aquatuff + Foam-Agent.
Cargo tank/hold sanitising and deodorising	Wash with water based cleaner solution	Alkleen Liquid, Alkleen Safety Liquid, Enviroclean
Oil spills on sea, in harbours, beaches and rocky shores	Low toxicity, biodegradable oil spill dispersants	Seacare OSD, Seacare Ecosperse
Removal of small oil spills on board	Detergents, dispersants and emulsifiers	Seacare OSD, Cleanbreak, Coldwash HD
Cleaning and upgrading of coatings	Special purpose organic liquid	Zinc Coat Conditioner
BALLAST TANK:		
Removal of sediments, silt and mud	Special purpose polymer	Mud & Silt Remover
ENGINE ROOM:		
Cleaning electrical apparatus	Special purpose volatile solvent	Electrosolv - E
Degreasing marine diesel engine cooling water systems	Heavy duty solution of solvent emulsion cleaners	Tankleen Plus.
Removal of grease and carbon based deposits from turbochargers	Special purpose solvents	ACC LT, Air Cooler Cleaner Carbonclean LT, Carbon Remover
Removal of grease and carbon based deposits from the air side of air coolers and other heat exchangers	Special purpose solvents	ACC LT, Air Cooler Cleaner, Carbonclean LT, Carbon Remover
Cleaning the oil side of the lube and fuel oil heat exchangers	Solvent emulsion cleaners or fuel oil treatment compound	Seaclean, Tankleen Plus, Fuel Care, Carbon Remover
Removal of water scale from heat exchangers	Inhibited acid cleaners	Descalex, Descaling Liquid
Removal of water scale from boilers	Inhibited acid cleaners	Descalex, Descaling Liquid
Cleaning of separator disc stacks	Clean with a solution of inorganic inhibited acid	Disclean
General removal of carbonaceous oil, varnish and grease residues	Special purpose solvents	ACC LT, Air Cooler Cleaner, Carbonclean LT, Carbon Remover
Removal and passivation of rust and oxidation from ferrous and non-ferrous metals	Special purpose inhibited acid cleaners	Metal Brite, Metal Brite HD.
Cleaning of new boilers and cooling systems	Special purpose water based cleaner	Commissioning Cleaner

UNITOR CHEMICAL SERVICE

CLEANING & MAINTENANCE
PROBLEM & SOLUTION SUMMARY

Problem	Solution	Product(s)
ULTRASONIC CLEANING:		
Cleaning machinery parts	Ultrasonic bath	Aquabreak PX, Enviroclean
DECK:		
Brightening up wooden decks	Special purpose powder based product	Teak Renewer
ACCOMMODATION:		
General shipboard cleaning	General purpose water based cleaners	Aquabreak PX, HP Wash, Enviroclean, Uniwash
General accommodation cleaner	Special purpose detergents	Uniwash, Fore & Aft, Enviroclean, Aquabreak PX
Cleaning of reefer rooms	Water based cleaner and disinfectant	Reefer Cleaner
GALLEY:		
Cleaning sinks, toilets, showers and sewage systems from grease, fat, starch, sewage and other organic compounds	Special purpose biochemicals	Gamazyme BTC, Gamazyme MSC, Gamazyme DPC, Gamazyme 700 FN
Descaling of toilet bowls, toilet systems, drain and pipes	Special acid and bacteria based powder product	Gamazyme Toilet Descaler
Removal of foam in a vacuum toilet system	Non-silicone defoamer	Defoamer Concentrate
Removal of odour from garbage and waste collection areas	Special purpose bacterial formulation	Gamazyme BOE
Cleaning of pulper and drain	Special synergetic blend of highly specialised bacteria	Gamazyme Digestor

UNITOR CHEMICAL SERVICE

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 to 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 neat Coldwash HD.

Features, Benefits and Applications

- This product has been reformulated. Additional property: 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.

COLDWASH HD

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear brown liquid
Density, 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
Synthetic rubber:	May swell

Packaging:	Product no	Size (in litres)	Container
	651 571430	25	Steel
	651 571455	210	Steel

UNITOR CHEMICAL SERVICE

TANKLEEN

TANK CLEANER

Product Description
Tankleen is a powerful tank cleaner based on petroleum solvents, emulsifying agents and surfactants.

Applications
This product is excellent as a tank cleaner for mineral oils and petroleum based residues.

Directions for Use and Dose Rates
This tank cleaner can be applied neat with a brush, by hand sprayer, immersion, soaking etc.. The contact or soaking time should be between 15 minutes to 2 hours before rinsing off with hot or cold water. Hot water will improve the result of the cleaning.

Spot cleaning
Tankleen 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 to 80°C. Slops should be constantly stripped from the tank and transferred to a holding tank or pumped ashore to slop tanks.

Spray method
Spray Tankleen neat onto soiled surfaces. The contact time should be between 15–30 minutes, and then rinse off with water. Hot water will improve the result of the cleaning.

Cargo tank cleaning after mineral oils

Direct injection method – for tank cleaning machines:
The dose rate should be between 0,1 and 2% i.e. 1 to 20 litres per ton wash water. Best results are obtained when water is heated to a temperature between 65 to 80 degrees Celsius.

Slops should be constantly stripped from the tank and transferred to a holding tank or pumped ashore to slop tanks.

Recirculation method – for tank cleaning machines.
It is recommended to use a solution of 0,5 to 3% (5 to 30 litres per ton wash water) mixed in the tank to be cleaned. The washing solution is usually 5–10% of the tank capacity. The best result is achieved when water is heated to between 65 to 80°C.

The dose rates and results of the cleaning may vary depending on amount of contamination and number of tanks to be cleaned with this solution.

After cleaning, slop water should be pumped ashore or to ship´s slop tanks.

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

Features, Benefits and Applications

- Powerful tank cleaner with a 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.
- Wide application within tank cleaning.
- Effective on mineral oils and petroleum based residues.
- Safe to use on most metal surfaces, painted surfaces and tank coatings.
- Economical, very low dosage rates.
- Easy rinse off, leaving, clean and oil-free surfaces.

TANKLEEN

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear light brown liquid		
Density, 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		
Synthetic rubber:	May swell		
Packaging:	Product no	Size (in litres)	Container
	652 571463	25	Steel
	652 571489	210	Steel

UNITOR CHEMICAL SERVICE

SEACLEAN

Product Description

Seaclean is a highly concentrated tank 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

Rock and Roll method

Cleaning of double bottom tanks during voyages.

1) Heat the remaining fuel in tank, trimming the vessel as required to assist in stripping tank.
2) Flush tank with sea water, stripping constantly.
3) After flushing, ensure all suction and discharge valves in the engine room are closed.
4) Dose the tank with Seaclean through sounding pipe or manhole, between 0,5–1 litre per 1000 litres of water, for 75 to 80% of capacity of tank to be cleaned.
5) Fill tank to 25% capacity with sea water, raise the temperature up to 60°C maximum, and maintain this temperature for 24 hours.
6) Top up tank to 75 to 80% capacity with sea water, continue to heat for 48 to 72 hours.
7) Discharge and strip tank. Fill to 50 to 60% capacity with sea water and allow 2 hours rinsing time.
8) 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:
9) Add second dose of Seaclean, fill tank with sea water to 75 to 80% capacity and raise the temperature to 60°C maximum. Maintain this for 48 to 72 hours. In calm seas leave solution in tank for as long as possible and recirculate.
10) Discharge and strip tank, flush with sea water, stripping continuously for 2 hours.
11) 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 1st Stage	SEACLEAN per ton of water 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	–

CLEANER FOR CARGO AND DOUBLE BOTTOM TANKS

Features, Benefits and Applications

- Highly concentrated tank 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 cleaning and gas-freeing of double bottom, deep and other 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 general removal of oil and grease from soiled surfaces.
- Economical – very low dosage rates.

SEACLEAN

UNITOR CHEMICAL SERVICE

Recirculation method – for tank cleaning machines
It is recommended to use a solution of 0,5 to 3% i.e. 5 to 30 litres per ton wash water mixed in the tank to be cleaned. The washing solution is usually 5 to 10% of the tank capacity. The best result is achieved when the washing solution is heated to between 65 to 80°C.

The dose rates and results of the cleaning may vary depending on amount of contamination and number of tanks to be cleaned with this solution.

After cleaning, slop water should be pumped ashore or to ship's slop tanks.

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

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 UNITOR Chemical Cleaning Unit – Order 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 to 75°C. Maintain the temperature throughout the cleaning operation. Cleaning without heating will extend the cleaning operation.
4) Circulate the solution for 12 to 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.

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.

Product Properties

Appearance:	Light brown liquid		
Density, 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		
Synthetic rubber:	May swell		
Packaging:	Product no	Size (in litres)	Container
	652 571406	25	Steel
	652 571422	210	Steel

UNITOR CHEMICAL SERVICE

TANKLEEN PLUS

TANK CLEANER AND DEGREASER

Product Description

Tankleen Plus is a 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 to 2% i.e. 1 to 20 litres per ton wash water.

Recirculation method – for tank cleaning machines

It is advised to use a solution of 0,5 to 3% i.e. 5 to 30 litres per ton wash water mixed in the tank to be cleaned. The washing solution is usually 5 to 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 to 80°C.

Spot cleaning

Tankleen 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 to 80 degrees Celsius. Slops should be constantly stripped from the tank and transferred to a holding tank or pumped ashore to slop tanks.

Rock and Roll method

Cleaning of double bottom tanks during voyages.

1) Heat the remaining fuel in the tank, trimming the vessel as required to assist in stripping tank.
2) Flush tank with sea water, stripping constantly.
3) After flushing, ensure all suction and discharge valves in the engine room are closed.
4) Dose tank with Tankleen 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.
5) Fill tank to 25% capacity with sea water, raise the temperature up to 60°C and maintain this for 24 hours.
6) Top up tank to 75–80% capacity with sea water and continue to heat for 48 to 72 hours.
7) Discharge and strip tank. Fill to 50–60% capacity with sea water and allow 2 hours rinsing time.
8) 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:
9) Add second dose of Tankleen Plus, fill tank to 75–80% capacity with sea water and raise the temperature to 60°C maximum. Maintain this for 48 to 72 hours. In calm seas recirculate the solution in tank as long as possible.
10) Discharge and strip tank, flush with sea water, stripping continuously for 2 hours.
11) To gas-free, fill tank with sea water to overflow through vents and sounding pipes, discharge and strip completely.

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.
- IMO-approved.
- 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 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.

TANKLEEN PLUS

UNITOR CHEMICAL SERVICE

ROCK AND ROLL CLEANING DOSAGE CHART

	Fuel Oil Viscosity Centistokes at 50°C 1st Stage	TANKLEEN PLUS per ton of water 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 UNITOR 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 Tankleen 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 Unitor Dieselguard NB or Unitor Rocor NB Liquid.

Tankleen 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 to 30 minutes before rinsing off with water.

Soak method
Immerse heavily soiled parts into bath of undiluted Tankleen 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.

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

Approvals

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Tankleen Plus was evaluated through IMO's BLG Inter-sessional Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet the Guidelines, as stated in MEPC/Circ. 305.

UNITOR CHEMICAL SERVICE

TANKLEEN PLUS

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.

Product Properties

Appearance:	Clear pale yellow 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:	No known effect.
Synthetic rubber:	No known effect

Packaging:	Product no	Size (in litres)	Container
	652 607782	25	Steel
	652 607783	210	Steel

UNITOR CHEMICAL SERVICE

CLEANBREAK

Product Description

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

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 to 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.

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Cleanbreak was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards

SELF-SPLITTING CLEANER FOR ENGINE ROOMS AND BILGES

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.

CLEANBREAK

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear brown liquid
Density, in g/cm^3 at 15°C:	0,8
Flash Point, (PMCC) in°C:	Above 61
pH, in conc. at 20°C:	N/A
Compatibility:	
Metal:	No known effects
Rubber:	Do not use with natural rubber compounds
Synthetic rubber:	May swell

Packaging:	Product no	Size (in litres)	Container
	651 571497	25	Steel
	651 571505	210	Steel

UNITOR CHEMICAL SERVICE

ENVIROCLEAN

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. Tank cleaning

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

Enviroclean 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.

3. Spot cleaning

Enviroclean 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.

4. 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.

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Enviroclean was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards.

WATER BASED CLEANER AND DEGREASER

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.
- USDA approved.

ENVIROCLEAN

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Orange liquid		
Density, in g/cm^3 at 15°C:	1,0		
Flash Point, (PMCC) in°C:	N/A		
pH, in conc. at 20°C:	7,5		
Compatibility:			
Metal:	No known effect.		
Rubber:	May soften some rubber.		
Synthetic rubber:	May soften some rubber.		
Packaging:	Product no	Size (in litres)	Container
	651 571380	25	Steel
	651 571398	210	Steel

UNITOR CHEMICAL SERVICE

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 U.K. Ministry of Agriculture, Fisheries and Food (MAFF). Se definition below.

MAFF-approval Reference No. MAFF/FEPA 90/98.

SOAEFD-approval Reference No. FEP/DISP/98/1.

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

1 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;

Features, Benefits and Applications

- Approved Type I dispersant according to the LR448 specifications of Warren Springs Laboratory, 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

SEACARE O.S.D.

UNITOR CHEMICAL SERVICE

- 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).

2 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 the Warren Spring Laboratory of the Department of Trade and Industry and similarly found to be satisfactory.

3 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 the approval, may be in breach of the terms of the Food and Environment Protection Act, 1985.

4 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.

5 Copies of the current Continental Shelf Operations Notice (CSON 7) are obtainable from the Department of Energy, Petroleum Engineering Division, Thames House South, Millbank, London SW1P 4QJ.

6 It is advisable that the information given in notes 1–5 above, are included in the manufacturer's instructions to users.

7 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).

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.

Product Properties

Appearance:	Amber liquid
Density, in g/cm^3 at 15°C:	0,8
Flash Point, (PMCC) in°C:	Above 61
pH, in 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
	651 571562	25	Steel
	651 571570	210	Steel

UNITOR CHEMICAL SERVICE

SEACARE ECOSPERSE

OIL SPILL DISPERSANT

Product Description

Seacare Ecosperse concentrated oil spill dispersant is highly efficient for use on a wide range of oils. It converts hydrocarbons into fine emulsions that are easily biodegradable. This product can be used as a concentrate or diluted for many types of oil clean up e.g. at sea, on rocky shoreline and beaches. It can be applied by boat or aerial spraying.

Approved as a Type II and Type III dispersant according to LR448 specifications by the UK Ministry of Agriculture, Fisheries and Food (MAFF). See definitions below.

MAFF-approval Reference No. MAFF/FEPA 71/96.

SOAEFD-approval Reference No. FEP/DISP/96/18.

Directions for Use and Dose Rates:

Oil Spills at Sea

Seacare Ecosperse 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 as a Type III dispersant, (neat), 1 litre of Seacare Ecosperse will disperse between 20 and 30 m^2 of oil depending on the thickness and age of oil being treated.

Used as a Type II dispersant Seacare Ecosperse 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 minimise the damage to the environment, it is important that a dispersant is used at an early stage of the clean up operation, before weathering takes place.

The Type II/III dispersant gives greater flexibility in use with more cost effectiveness.

Aerial Spraying

Aircraft using the appropriate form of spraying equipment which has been tested and found satisfactory by Warren Springs Laboratory, may spray Seacare Ecosperse over the sea. Seacare Ecosperse has passed tests in accordance with the specification of the UK Ministry of Defence.

Oil on beaches and shore line

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

Definition:

Quote: 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.

WSL – Warren Springs Laboratory

Features, Benefits and Applications

- Approved Type II/III dispersant according to the LR448. Specifications of Warren Springs Laboratory covering both efficiency and toxicity for use in dispersion of oil on sea, beaches and rocks.
- Rapid efficient dispersal of wide range of oils.
- Less agitation required to disperse oil compared to conventional products.
- Used neat as a Type III dispersant on heavy oil slicks.
- Used diluted as a Type II on light oil slicks.
- Suitable for aerial spraying as Type II and Type III
- Suitable for uses on the sea, beaches and rocks.
- Low stocks required compared to Type I and III products.
- High standards in operator safety in handling and uses, due to low toxicity.
- Cleaning up after spills that may occur during loading of bunkers where allowed.
- For cleaning of spills on deck, ships side, piers, wharfs, etc., where allowed

SEACARE ECOSPERSE

UNITOR CHEMICAL SERVICE

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

1. Article 30 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 deposit is 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).
2. 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 the Warren Spring Laboratory of the Department of Trade and Industry and similarly found to be satisfactory.
3. 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.
4. 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.
5. Copies of the current Continental Shelf Operations Notice (CSON 7) are obtainable from the Department of Energy, Petroleum Engineering Division, Thames House South, Millbank, London SW1P 4QJ.
6. It is advisable that the information given in notes 1–5 above, are included in the manufacturer's instructions to users.
7. 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).

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.

Product Properties

Appearance:	Amber liquid
Density, in g/cm^3 at 15°C:	0.9
Flash Point, (PMCC) in°C:	Above 61
pH, in conc. at 20°C:	N/A
Compatibility:	
Metal:	No known effect
Rubber:	May swell
Synthetic rubber:	May swell

Packaging:	Product no.	Size (in litres)	Containers
	652 575647	25	Steel
	652 575654	210	Steel

UNITOR CHEMICAL SERVICE

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.

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Alkleen Safety Liquid was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards.

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	100%	3–5%	2–4%	180–300
Fish oils	100%	3–5%	2–4%	180–300
Drying & semidrying vegetable oils	50–100%	2–4%	1–3%	120–240
Non-drying vegetable oils	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.

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

ALKLEEN SAFETY LIQUID

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

ALKLEEN LIQUID

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

Alkleeen 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.

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Alkleen Liquid was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards

HEAVY DUTY ALKALINE TANK CLEANER

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.

ALKLEEN LIQUID

UNITOR CHEMICAL SERVICE

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.

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
	651 575539	25	Plastic
	651 575547	210	Steel

UNITOR CHEMICAL SERVICE

FORE & AFT

Product Description

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

Applications

Fore & Aft is a cleaner for the accommodation and galley areas.

Directions for Use and Dose Rates

Depending on the applications, Fore & Aft can be diluted with water in concentrations from 1 to 50% or used neat.

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

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

MULTI PURPOSE BIODEGRADABLE CLEANER

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

FORE & AFT

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Blue liquid
Density, in g/cm^3 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

UNITOR CHEMICAL SERVICE

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 KEW 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 to 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 to 20% in water depending on the soiling. Allow 5 minutes for penetration, then rinse off with water.

H.P. Wash was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards.

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.

H.P. WASH

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	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:	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

UNITOR CHEMICAL SERVICE

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.

Applications

Uni-Wash is an accommodation cleaner.

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 to 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.

Uni-Wash was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards.

Features, Benefits and Applications

- Biodegradable detergent.
- Non-flammable.
- Pleasant odour.
- 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.

UNI-WASH

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

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 from 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 neat 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.

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.

As of the 1st July 1996, chemical tankers were only be permitted to use tank cleaning agents which are evaluated and approved by the International Maritime Organisation (IMO).

Aquabreak PX was evaluated through IMO's BCH Working Group on the Evaluation of Safety and Pollution Hazards of Chemicals and found to meet their requirements of paragraph 1.8.2 of the P&A Standards.

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..
- Cleans effectively fiberglass boats
- Approved by United States Department of Agriculture (USDA).

AQUABREAK PX

UNITOR CHEMICAL SERVICE

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.

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:	May attack aluminium and zinc at concentrated solution		
Rubber:	No known effect.		
Packaging:	Product no	Size (in litres)	Container
	651 575613	25	Plastic
	651 575605	210	Steel

UNITOR CHEMICAL SERVICE

AQUATUFF

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.

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 KEW High Pressure Cleaning Machine and use 1:6 with water. However, if used with a hand sprayer, apply the product neat on the surfaces, allowing 1 litre per 12 m^2.
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.

Cargotank and cargo hold cleaning

Aquatuff can be used for tank cleaning after animal, vegetable and fish oil, petroleum waxes, and for cargo hold cleaning after soot, coal 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. For problem deposits, please consult the UNITOR Tank Cleaning Manual.

GENERAL STRONG ALKALINE CLEANER

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 removal of grease, vegetable and animal oil, soot and general dirt and grime.
- Effective and economical in use.

AQUATUFF

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

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 of 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.

Features, Benefits and Applications

- Biodegradable.
- 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.

FOAM-AGENT

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Light yellow liquid
Density, in g/cm^3 at 15°C:	1,05–1,06
Flash Point, (PMCC) in°C:	N/A
pH, in conc. at 20°C:	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

UNITOR CHEMICAL SERVICE

ACC LT

Product Description

ACC LT is a powerful cleaning agent for cleaning of diesel engine air coolers, scavenging air systems and the compressor side of turbochargers. ACC LT has a low toxicity to the environment and the persons handling it, as it contains no chlorinated solvents.

Directions for Use

Recirculation method in-situ: For this cleaning procedure the engine needs to be stopped and secured and it involves the use of permanently installed spray nozzles in combination with a cleaning solution tank and pump, such as the Unitor CHEMICAL CLEANING UNIT. It is advisory to blind off the cooler outlet. Properly mix water and 10–30% ACC LT, 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 it 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 (10–40%) ACC LT and 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 (10–40%) ACC LT and 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 LT 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 LT 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 LT
6,000 to 12,000	3 litre mix
12,000 to 24,000	4.5 litre mix
24,000 or more	6 litre mix

LOW TOXIC CLEANER FOR AIR COOLERS AND TURBOCHARGERS

Features, Benefits and Applications

- Reformulated with improved cleaning properties.
- Does not contain nonyl phenol ethoxylates or other estrogenic compounds.
- Formulated to remove oil, grease and carbon deposits from air coolers and scavenging systems.
- Efficient and economical.
- May be used for in-service cleaning and reduces down-time.
- 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.
- Can be used for handspray cleaning while Diesel engine is stationary.
- Can be used in soak bath or cleaning tanks

ACC LT

UNITOR CHEMICAL SERVICE

For in-service cleaning of air cooler and air-side of turbocharger a solution of 25% ACC LT 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 LT recommend injection 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 if approved by the engine manufacturer.

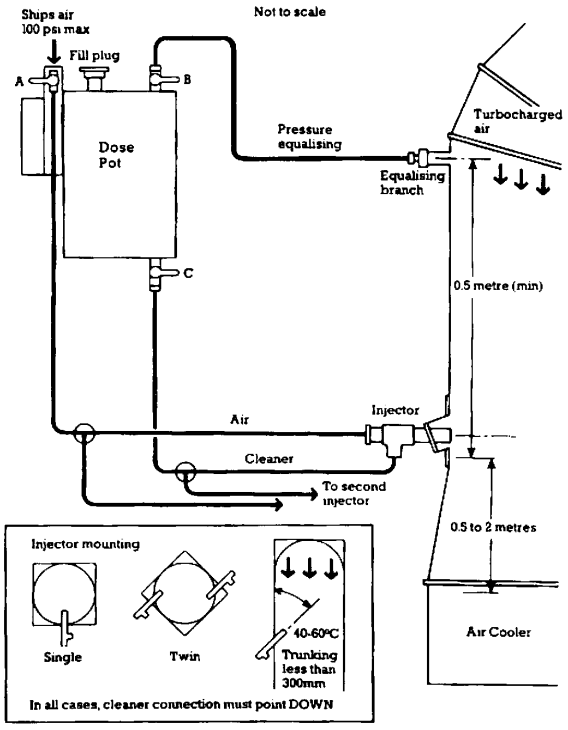
UNITOR AIR COOLER CLEANER
Injection System

Tests show that vessels using this type of injection equipment with chemical cleaners such as ACC LT correctly, 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.

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



Dosing Procedure

1) Check that all valves are closed A, B & C.
2) Thoroughly mix up a 25% solution of ACC LT and fresh water and pour this into the dosing pot through the filling opening, and close the plug 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. Cleaning 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 aircoolers.

UNITOR CHEMICAL SERVICE

ACC LT

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.

Product Properties

Appearance:	Pale yellow liquid
Density In g/cm^3 at 15°C:	1,0
Flash Point, (PMCC)°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 575670	25	Plastic

UNITOR CHEMICAL SERVICE

CARBONCLEAN LT

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 method 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 UNITOR Chemical Cleaning Unit – Product no. 613 807 – 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 Unitor Chemical Cleaning unit can also be used for cleaning by soaking or circulation. Results can be achieved with maximum efficiency and with the minimum use of Carbonclean LT.

LOW TOXIC SOLVENT CLEANER FOR REMOVAL OF STUBBORN CARBON DEPOSITS

Features, Benefits and Applications

- Reformulated with improved cleaning properties.
- 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.
- Can be used for cleaning engine parts like:
  - Pistons.
  - Piston rings.
  - Valves.
  - Valve cages

CARBONCLEAN LT

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Pale yellow liquid
Density In g/cm^3 at 15°C:	1,0
Flash Point, (PMCC)°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

UNITOR CHEMICAL SERVICE

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 general principle 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, 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% 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 freshwater is recommended.

The appropriate dose of cleaner is then put in the dosing pot and injected up-stream of the air cooler in 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 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 only recommended if approved by engine manufacturers.

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.

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.

AIR COOLER CLEANER

UNITOR CHEMICAL SERVICE

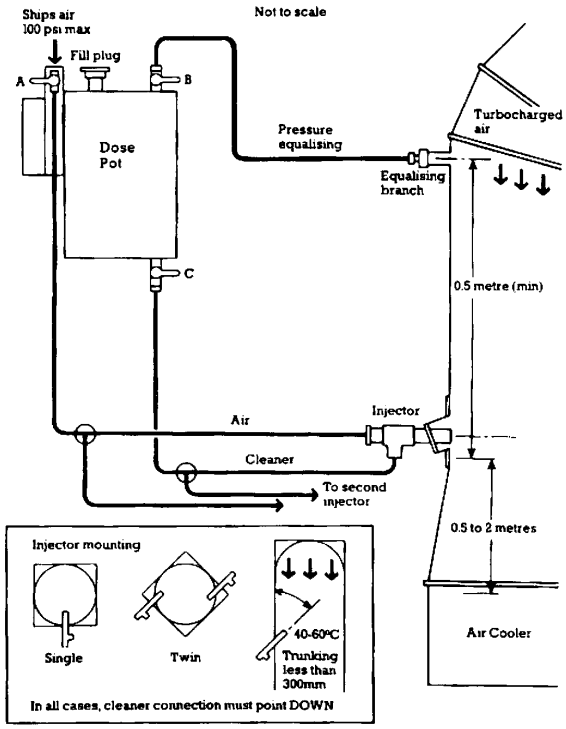
Unitor Air Cooler Cleaner Injection System

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.

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 after.
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.



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.

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 effects
Rubber:	May swell slightly
Synthetic rubber:	May swell

Packaging:	Product no.	Size (in litres)	Container
	651 571588	25	Steel

UNITOR CHEMICAL SERVICE

CARBON REMOVER

Product Description

A powerful non corrosive solvent to break down carbon deposits

Directions for Use and Dose Rates

Soak Method

This method 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 UNITOR Chemical Cleaning Unit – Product no. 613807 – 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 the 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

HEAVY DUTY SOLVENT CLEANER FOR REMOVAL OF STUBBORN CARBON DEPOSITS

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

CARBON REMOVER

UNITOR CHEMICAL SERVICE

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.

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 effects		
Rubber:	Avoid natural and synthetic rubber		
Packaging:	Product no	Size (in litres)	Container
	651 571604	25	Steel

UNITOR CHEMICAL SERVICE

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.

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 of an external circulation pump.

Directions of Use and Dose Rates

Use the dosage 5–10% solution depending on the grade of contamination. At the end of the cleaning process it is recommended to dose 0,5 litres of Mar-71 Biocide to prevent future bacteria contamination.

Degreasing and descaling of boiler and cooling water systems

The UNITOR Chemical Cleaning Unit – Product no. 613807 – 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. Refill 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 complete and flush thoroughly the entire system and all compounds 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.

Features, Benefits and Applications

- Water based multifunctional cleaner.
- Biodegradable.
- Cleaning of new systems for mill scale, rust, oil etc.
- Cleans water systems with light scale and a thin oil film.

COMMISSIONING CLEANER

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

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 neat 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. 613807) 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.

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.

DISCLEAN

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

DESCALEX

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, then pre-cleaning with Tankleen 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 disappear 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 Unitor's Practical Application Manual or Unitor's Water Treatment Handbook.

The strength of the acid can be enhanced by adding 1 part sodium chloride (common salt) to 20 parts of Descalex. If salt is not available, an acceptable alternative is to dissolve Descalex in sea water. This enhancement of the cleaning solution, however, should not be used when descaling diesel engine cooling water systems.

After use of Descalex a 0,5% solution of Alkalinity Control in fresh water should be used for neutralisation.

POWDER ACID FOR REMOVAL OF SCALE AND RUST

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.

DESCALEX

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Reddish powder		
Density, in g/cm^3 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 known effect.		
Packaging:	Product no	Size (in litres)	Container
	651 571646	25	Steel

UNITOR CHEMICAL SERVICE

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 Tankleen 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.

Chemical Cleaning Unit: Product no. 613807

Unitor has developed a 210 litres capacity cleaning unit designed among other for use with chemical acid solutions for cleaning boilers, calorifiers, heat exchangers and other types of equipment where rust and scale form. See yellow tab Equipment.

Descaling Boilers, Condensers, Evaporators, Calorifiers and Heat exchangers:
See UNITOR Practical Application Manual or UNITOR Water Treatment Handbook.

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.

DESCALING LIQUID

UNITOR CHEMICAL SERVICE

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.

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:	Contains corrosion inhibitors.		
Rubber:	No known effect.		
Synthetic rubber:	May swell.		
Packaging:	Product no	Size (in litres)	Container
	651 571653	25	Plastic

UNITOR CHEMICAL SERVICE

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.

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.

METAL BRITE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Light yellow liquid
Density, in g/cm^3 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

UNITOR CHEMICAL SERVICE

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 after 15–40 minutes with water.

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 15–20 minutes after application.

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. Further for discoloration of stainless steel and epoxy coated tanks use the same method.

For removal of white residues from epoxy-coatings that sometimes remains after carriage of Stearin, Olein, Palm fatty acid etc., recirculate a solution of 5–10% Metal Brite H.D. When injected, use a 5% solution. Recirculate or inject until residue is removed.

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.

METAL BRITE H.D.

UNITOR CHEMICAL SERVICE

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.

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:	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

UNITOR CHEMICAL SERVICE

TEAK RENEWER

Product Description

Teak Renewer is a dry acid product formulated for cleaning and brightening wooden decks.

Applications

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

Directions for Use and Dose Rates

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

WOODEN DECK CLEANER

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

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

TEAK RENEWER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	White crystalline powder		
Density, in g/cm^3 at 15°C:	1,6		
pH, in 10% solution:	1		
Compatibility:			
Metal:	Long term exposure will cause corrosion		
Rubber:	No known effect		
Syntethic rubber:	No known effect		
Packaging:	Product no	Size (in litres)	Container
	651 623991	25	Steel

UNITOR CHEMICAL SERVICE

ELECTROSOLV-E

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 neat.

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

NOTE: Never use open light 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 helped to evaporate by using clean compressed air of low pressure and high volume.

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 is possible 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.

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

G.P. CLEANER AND DEGREASER FOR ALL ELECTRICAL PARTS

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 breakthrough 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.

ELECTROSOLV-E

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear, colourless liquid		
Density, in g/cm^3 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

UNITOR CHEMICAL SERVICE

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 in handling.

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.

Features, Benefits and Applications

- Water-based.
- Low-toxic.
- Biodegradable.
- Non-flammable.
- Free from 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
- Is a non-stock standard product and availability is limited to designated ports as requested by customers

UNITOR USC ULTRASONIC CLEANER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Green.
Density, in g/cm^3 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

UNITOR CHEMICAL SERVICE

NATURAL HAND CLEANER

SKIN CLEANER

Product Description

Unitor 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. It 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.

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.

NATURAL HAND CLEANER

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

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 subsequently biodegraded by the bacteria strains.

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

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 l ‘bag in a box’ & easy to use ltr. bottles

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

GAMAZYME BOE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Amber liquid
Bacterial Pathways:	Aerobic an facultative anaerobic
Density, in g/cm^3 at 15°C:	1,0 – 1,05
SHELF LIFE:	2 years
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

UNITOR CHEMICAL SERVICE

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 which 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 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.

Features, Benefits and Applications

- Unique liquid biological formulation for easy 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.

GAMAZYME BTC

UNITOR CHEMICAL SERVICE

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.

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 bottles	Plastic

UNITOR CHEMICAL SERVICE

GAMAZYME TOILET DESCALER

DESCALING OF TOILET SYSTEMS

Product Description

Gamazyme Toilet Descaler is a powder product 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.

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

Immediate action 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. Dissolve 5% Gamazyme Toilet Descaler in water.
2. Pour the solution in the pipes, drains or directly into the toilets when dealing with sanitary systems.

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

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

GAMAZYME TOILET DESCALER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Light grey powder		
Bacterial Pathways:	Aerobic an facultative anaerobic		
Density, in g/cm^3 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 624304	5 (100 sachets of 50 grams)	Carton

UNITOR CHEMICAL SERVICE

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 in time.

Three ways 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

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:

a) Accommodation and general cleaning:
Use from 50 ml up to 500 ml to half a bucket of hand hot water, depending on the surface to clean and the deposition, for cleaning decks, showers, floors, sinks, tiled areas, etc..

b) 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 hand hot water. Wait as long as possible and rinse.

c) 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.

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.

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

GAMAZYME MSC

UNITOR CHEMICAL SERVICE

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.

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	Plastic

UNITOR CHEMICAL SERVICE

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: Severely scaled systems should be acid cleaned.

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.

GAMAZYME DPC

UNITOR CHEMICAL SERVICE

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.

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 containers. Approx. 4 kg in sealed 0,23 kg solupacs.	Plastic

UNITOR CHEMICAL SERVICE

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 to 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 neat in the economiser tank by using a dosing pump. Use a dosage rate of approximately 2 litre per m^3 water.

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
- Water based – 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
- Approved by United States Department of Agriculture (USDA).

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

GAMAZYME DIGESTOR

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Green liquid
Bacterial Pathways:	Aerobic and facultative anaerobic
ODOUR:	Herbal/Lemon
Density in g/cm^3 at 15°C(59°F):	1.0
ACTIVE TEMP. RANGE:	10 to 60°C (50 to 140°F)
SHELF LIFE:	2 Years
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)

UNITOR CHEMICAL SERVICE

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 gram per m^3 of the volume of the sewage tank. Then a weekly dosage of 10 gram per m^3 of the volume of the sewage tank.

An example of a cruise vessel with a sewage tank on 100 m^3 and 2500 people and on a two weeks cruise. What is the consumption of Gamazyme 700FN?

Initial dosage: (50 g/m^3 x 100 m^3):1000 = 5 kg

Weekly dosage: (10 g/m^3 x 100 m^3):1000 x 2 weeks = 2 kg

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

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.

GAMAZYME 700FN

UNITOR CHEMICAL SERVICE

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 and 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 to 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.

NOTE: Severely scaled systems should be acid cleaned.

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.

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	Container
	656 571711	Non-returnable containers containing 12 kg	Plastic

UNITOR CHEMICAL SERVICE

DEFOAMER CONCENTRATE

ANTIFOAM

Product Description

Defoamer Concentrate is a non-silicone based water dispersible, liquid emulsion 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 to 30 ml/tonne, but proper dosage rate to be found out on 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 ½ hour before top load.

Features, Benefits and Applications

- Non-silicone defoamer
- Stable in alkaline conditions
- Can be used i sewage and waste water systems
- Outstanding for all atmospheric, pressurised and continuous waste equipment
- Excellent to control foaming and remove foam when necessary

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

DEFOAMER CONCENTRATE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	White emulsion
Odour:	Slight odour
Density in g/cm^3 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
	651 624314	20	Bag in a box (Cruise)
	651 661843	25	Steel

UNITOR CHEMICAL SERVICE

REEFER CLEANER

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 Unitor Foam-Agent (Product no. 651-614537) for increased resident time.

CLEANING OF REFRIGERATED ROOMS

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 bacterias, fungi, mould, algae and mildew
- Safe to use on all types of surfaces including aluminium and plastic
- Approved by The Norwegian Directorate for Fisheries

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

REEFER CLEANER

UNITOR CHEMICAL SERVICE

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.

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 litres)	Container
	651-623983	20	Bag in a box (Cruise)
	651-661827	25	Plastic

UNITOR CHEMICAL SERVICE

PENETRON PLUS

HIGH SPEED PENETRATING OIL

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 rustscale 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 neat.

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.

PENETRON PLUS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear red liquid		
Density, g/cm^3 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
	651 661819	25	Pail

UNITOR CHEMICAL SERVICE

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 will clean and upgrade coated cargo tanks after leaded gasoline, carbon tetrachloride, methylene chloride and virgin naphtha.

It will in a cost effective way 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 m^2 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 to max 45°C.
3. Using tank cleaning machine the solution should be recirculated for up to 45 minutes.
4. Rinse with fresh water and check the result.
5. Repeat cleaning procedure if necessary.

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.

ZINC COAT CONDITIONER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clean liquid		
Density, g/cm^3 at 15°C:	1,0		
Flash Point, (PMCC) in °C:	N/A		
pH, conc. at 20°C:	5,5		
Shelf life:	12 months from production		
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

WATER TREATMENT

UNITOR
CHEMICAL SERVICE

UNITOR CHEMICAL SERVICE

WATER TREATMENT
PROBLEM & 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
Corrosion in low pressure boilers as a result of high boiler water acid levels (low alkalinity).	Increase alkalinity to neutralise acids, precipitate salts and control corrosion.	Combitreat Liquitreat
Scale deposit 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)
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 temporary measure, increase alkalinity).	Boiler Coagulant
COOLING WATER TREATMENT		
Corrosion in closed circuit cooling or heating systems – e.g. diesel engines.	Passivate metal surface and maintain stable pH to prevent damage to the system	Dieselguard NB Rocor NB Liquid
Bacterial contamination in cooling water system	Kill bacteria	Mar-71
SEA WATER TREATMENT		
Sea water intakes and seawater systems blocked by mussels and barnacles	Inject dispersant into the seachest to deter biological contamination.	Bioguard
Corrosion in seawater lines, bilges and ballast tanks.	Condition metal surface 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
POTABLE WATER TREATMENT		
Corrosion in potable water system, “Red water”.	Corrosion prevention.	Potable Water Stabiliser

UNITOR CHEMICAL SERVICE

COMBITREAT

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 $CaCO_3$ 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.

BOILER WATER CONDITIONER FOR LOW PRESSURE BOILERS (UP TO 16 BAR)

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

- Unitor 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, Unitor recommends the use of an oxygen scavenger and to maintain the temperature of the hotwell at a minimum of 80°C

COMBITREAT

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

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 Unitor 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 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 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	blowdown	

[Continued on next page]

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.

LIQUITREAT

UNITOR CHEMICAL SERVICE

Our recommended control limits are:

- p-Alkalinity: 100–300 ppm $CaCO_3$.
- 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.

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.

Product Properties

Appearance:	Colourless liquid		
DENSITY, g/ml at 15°C:	1.1		
pH:	13–14		
Compatibility:			
	Metal: Avoid aluminium, zinc galvanised steel.		
	Rubber: No known effect		
Packaging:	Product no.	Size (Kg)	Container
	655 571273	25	Plastic

UNITOR CHEMICAL SERVICE

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 the other Unitor boiler water treatment products.

Oxygen is highly corrosive in the boiler system, even in small amounts. Elevated temperature of the hotwell is a good practice to remove gases like oxygen. Even though, 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. CAT Sulphite L 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 of system layout.

Dosing Method

For optional result 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 Unitor. These logs 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 maintained within correct chemical limits.

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.

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 Unitor boiler water treatments

CAT SULPHITE L (CSL)

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Pale pink liquid
pH (10 wt %):	4
Specific gravity:	1.3
Compatibility:	
Metal:	May corrode metal
Rubber:	No known effect

Packaging:	Product no:	Size (Kg)	Container
	655 575662	25	Plastic

UNITOR CHEMICAL SERVICE

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 Unitor co-ordinated treatment programme. Hardness Control 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 P04.

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.

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 levels of treatment are correct.

USING THE TABLE (SEE NEXT PAGE): 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.

Features, Benefits and Applications

- Highly active phosphate based compound, economical in use.
- Easily dissolved in water for dosing.
- Scale problems due to calcium are eliminated.
- Maintains sludge in a non-adherent state for ease of 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.

HARDNESS CONTROL

UNITOR CHEMICAL SERVICE

Hardness Control – Dosage – Grams/ton

Pressure Range	Phosphate test result in p.p.m PO_4					Standard	Initial Range	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.

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.

Product Properties

Appearance:	White powder		
pH, (1 wt %):	Natural		
Compatibility:			
Metal:	No known effect		
Rubber:	No known effect		
Packaging:	Product no:	Size (Kg)	Container
	655 571299	25	Steel

UNITOR CHEMICAL SERVICE

ALKALINITY CONTROL

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

Directions for Use
This treatment is part of Unitor's 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 would form. This would 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 via the bypass pot-feeder installed in 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 levels of treatment are correct.

USING THE TABLE (SEE NEXT PAGE): 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.

CONCENTRATED LIQUID ALKALINITY BOILER WATER TREATMENT

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.

ALKALINITY CONTROL

UNITOR CHEMICAL SERVICE

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.

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.

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 (Kg)	Container
	655 571307	25	Plastic

UNITOR CHEMICAL SERVICE

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 Unitor's co-ordinated treatment programme and Unitor's 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 O2 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 and 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.

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 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. Ref. Water Treatment Handbook or contact Unitor for details.

OXYGEN CONTROL

UNITOR CHEMICAL SERVICE

Oxygen Control dosage parameters for distilled water

Pressure Range	Hydrazine test result in p.p.m 0–0.05	0.05–0.10	0.10–0.15	0.15–0.2	0.2 +	Standard PPM Hydrazine
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	Decrease Dosage by 25%	Decrease Dosage by 25%	0.1–0.15
> 60 bar < 897 Psi	Increase Dosage by 25%	Satisfactory Maintain Daily DoseRate	Decrease Dosage by 25%	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. Ref. Water Treatment Handbook or contact Unitor 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.

Product Properties

Appearance:	Colourless liquid
Density, g/cm^3 at 15°C:	1.0
pH (1 Vol%)	9
Compatibility:	
Metal:	Avoid aluminium, brass and copper
Rubber:	No known effect

Packaging:	Product no:	Size (Kg)	Container
	655 571315	25	Plastic

UNITOR CHEMICAL SERVICE

CONDENSATE CONTROL

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

Directions for Use
Condensate Control is a volatile liquid amine which neutralises the acid contaminants in condensate and feed water thus preventing acid corrosion. This product is used in conjunction with Unitor's co-ordinated treatment programme and Unitor's 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 m^3, the dosage is approximately 0,75 ltr/day.

Dosing Method
Condensate Control is best dosed continuously using a metering pump. 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.

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 levels of treatment are correct.

Use dosage chart (see next page) to maintain condensate pH between 8.3–9.0.

LIQUID CONDENSATE CORROSION CONTROL FOR BOILER SYSTEMS

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.

CONDENSATE CONTROL

UNITOR CHEMICAL SERVICE

Condensate Control dosage parameters

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

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.

Product Properties

Appearance:	Colorless liquid		
Density, g/cm^3 at 15°C:	1.0		
Flash point (PMCC)°:	None		
pH (1 Vol%)	10		
Compatibility:			
Metal:	Avoid copper, brass, aluminium		
Rubber:	No known effect		
Packaging:	Product no:	Size (Kg)	Container
	655 571323	25	Plastic

UNITOR CHEMICAL SERVICE

BOILER COAGULANT

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, then 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. Bottom blowdown is required daily 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 Unitor Boiler Water Treatment and dosing can be combined.

BOILER WATER
SLUDGE CONDITIONER

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 Unitor Marine Chemicals standard range of boiler water treatments.
- Used to coagulate small amounts of oil which have contaminated the boiler water

BOILER COAGULANT

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Amber liquid		
Density, g/cm^3 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

UNITOR CHEMICAL SERVICE

POTABLE WATER STABILISER

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-trough 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 0,17 litres per m^3 of water.

Examples:

For 20 m^3 per day: Dose 0,14 litres/hour = 3,4 litres/day of the solution.

For 100 m^3 per day: Dose 0,70 litres/hour = 17 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.

TREATMENT OF POTABLE WATER SYSTEMS

Features, Benefits and Applications

- Prevent «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. Meets the requirements of ANSI/NSF Standard 60.
- No restrictions on use of the treated water as feed water to boilers or engine cooling systems.

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

POTABLE WATER STABILISER

UNITOR CHEMICAL SERVICE

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.

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

UNITOR CHEMICAL SERVICE

DIESELGUARD NB

Product Description

Dieselguard NB is a dry powder, nitrite/borate based compound with organic corrosion inhibitors for use in closed 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 Tankleen Plus and descaling by using Descalex. Ref. Unitor Water Treatment handbook.

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 prior to commencing the treatment.

Note: The product should not be used in systems containing aluminium!

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 Unitor 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 Unitor. These log sheets should be returned to the Unitor Rapid Response Centre 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.

[Continued on next page]

COOLING WATER CORROSION INHIBITOR

Features, Benefits and Applications

- By forming 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 all major engine manufacturers.
- Compatible with glycol based types of antifreeze.
- 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.

DIESELGUARD NB

UNITOR CHEMICAL SERVICE

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 Kg/1000L	2.88	2.52	2.16	1.80	1.44	1.08	0.72	0.36	0	0

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, Unitor recommends to use distilled water as make-up.

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

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

UNITOR CHEMICAL SERVICE

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 Tankleen Plus and descaling by using Descalex. Ref. Unitor 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.

Note: The product should not be used in systems containing aluminium!

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 Unitor 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 Unitor. These log sheets should be returned to the Unitor Rapid Response Centre 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.

[Continued on next page]

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 glycose based antifreeze.
- 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.

ROCOR NB LIQUID

UNITOR CHEMICAL SERVICE

Normal nitrite limits: 1000–2400 ppm nitrite (NO_2)

Nitrite (as PPM NO_2)	0	180	360	540	720	900	1080	1260	1400–2400
Rocor NB Kg/1000L	13	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, Unitor recommends the use of distilled water as make-up.

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.

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

UNITOR CHEMICAL SERVICE

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 combine 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.

Dosing Method

Dosage

The standard dosage, applicable to the majority of systems, is 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 x 30 ml = 750 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 Litres/24 x 60 = 35 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.

[Continued on next page]

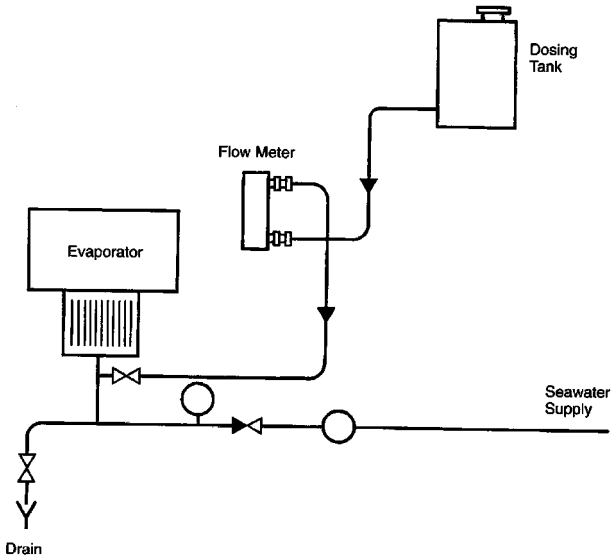
Features, Benefits and Applications

- 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.

VAPTREAT

UNITOR CHEMICAL SERVICE

Recommended installation layout evaporator treatment



- 60 litre polyethythene 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.

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.

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

UNITOR CHEMICAL SERVICE

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.

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, 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.

N.B. Bioguard should only be diluted with fresh water prior to dosing if necessary.

[Continued on next page]

Features, Benefits and Applications

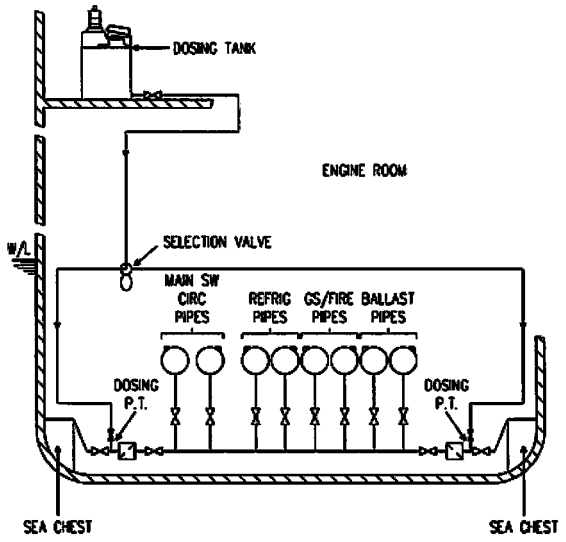
- Liquid treatment which is easy to use.
- Extremely effective in the control of sea water fouling organisms.
- Many applications covered by one product.
- Maintains heat transfer in systems and extends the periods between cleaning.
- Reduces maintenance and down time.
- Economic in use.
- Approved by 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

  NOT suitable for drinking water.

BIOGUARD

UNITOR CHEMICAL SERVICE

Typical installation layout dispersant treatment



Dosing Method

The diagram (left) 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.

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.

Product Properties

Appearance:	Pale yellow liquid		
Density, g/cm^3 at 1 5°C:	1,0		
Flash point:	Above 80°C		
Compatibility:			
Metal:	No known effect		
Rubber:	No known effect		
Packaging:	Product no:	Size (Kg)	Container
	653 597252	25	Plastic

UNITOR CHEMICAL SERVICE

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

Note: 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 0.05 and 0.1 % 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 micro-organisms. 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 0.03–0.05 % 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.

[Continued on next page]

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 micro-organisms.
- No cases have been reported where bacteria have become immune to MAR-71.
- Biodegradable, does not accumulate in the environment.

MAR-71

UNITOR CHEMICAL SERVICE

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 0.05–0.1 % MAR-71 is added. This procedure and the addition of 0.01–0.05% MAR-71 to the new oil will prevent re-infection of the lubricating oil.

Product Availability

Please contact your local Unitor office for availability.

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.

Product Properties

Appearance:	Liquid, colourless to yellow
Odour:	Amine-like
Spec. Density , g/cm^3:	1,06
pH, (0,15%):	~10
Flash Point, °C (CC):	>100
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 613809	3 x 5 ltr	Plastic

UNITOR CHEMICAL SERVICE

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.

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 regularly dosed each time tanks are ballasted, a maintenance dosage of 2,5 litres/100 tons of ballast water is recommended.

To clean heavy accumulation, a dose rate of 10 litres Mud & Silt Remover per 100 tons 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 – 12 MONTHS FROM PRODUCTION

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.

MUD & SILT REMOVER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Water 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:	12 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

POOL WATER TREATMENT

UNITOR
CHEMICAL SERVICE

UNITOR CHEMICAL SERVICE

POOL CHEMICALS
PROBLEM & SOLUTION SUMMARY

Guardex POOL & SPA PRODUCTS

SPA Essentials

PROBLEM	SOLUTION	APPLICATION	SIZE & PRODUCT NUMBER††
pH too low	Guardex pH Increaser	A convenient, safe, granular product for raising the pH of pool water with minimal effect on overall alkalinity. Prevents low pH, corrosion of equipment, etching of plaster, skin and eye irritation.	4 x 2.72 kg 657-624833 **2 x 5 kg 657-625657**
pH too high	Guardex Dry Acid **(pH Decreaser)**	A granular product for slowly lowering the pH of pool water. Safer to handle, use and store than liquid acids. Prevents scale build-up on equipment, piping and pool surfaces. Lowers total alkalinity and prevents skin and eye irritation.	4 x 4.08 kg 657-624841 **2 x 7 kg 627-625640**
Algae prevention	Guardex Algae Control Concentrate **(No Green)**	A long lasting formula for preventing and controlling the growth of all types of algae. By concentrating on pool surfaces where algae starts growing, it also helps chlorine work more effectively.	12 x 0.94 ltr 657-624817 **12 x 1 ltr 657-625731**
Algae growth	Guardex Algaecide 60 **(True Blue)**	This non-foaming, non-metallic, copper free algaecide is ideal for use in pools with attached spas or water features. Used to control and prevent all types of algae, it is especially recommended for outbreaks of green, blue-green and mustard algae.	12 x 0.94 ltr 657-624825 **12 x 1 ltr 657-625707**
Cloudy water	Guardex Pool Water Clarifier **(Super Clarity)**	Restores sparkling clear water by combining small particles into larger ones that the filter can remove. This product works while the filter is in operation, requires no premixing, contains no aluminium and does not affect the pH.	12 x 0.94 ltr 657-624809 **12 x 1 ltr 657-625699**
Staining and water discolouration	Guardex Stain & Scale Control **(Stain & Scale Away)**	Inhibits and prevents scale formation from excessive calcium and staining from iron, copper, and manganese. Prevents scale formation on spa surfaces, heaters, piping and equipment.	12 x 0.47 ltr 657-625368 **12 x 1 ltr 657-625681**
Scum lines elimination of oils and greases	Guardex Pool Surface Cleaner	A quick acting high performance surface cleaner that will not affect pH level. It is designed to clean both pool and equipment surfaces of unsightly greases and oils.	12 x 0.94 ltr 657-625376 **12 x 1 ltr 657-625665**
Chlorine maintenance	Guardex Chlorinating Tablets **(Advantage Tablets)**	These multifunctional blended tablets are for use in skimmers, floaters or chlorinators. They are designed to control bacteria and algae in swimming pool water as well as sanitising and are up to 20% more effective than traditional Trichlor tablets.	22.6 kg 657-624775 **25 kg 657-625715**
Cloudy, dirty water	Guardex Calcium Hypochlorite **(Breakpoint Shock)**	A “shock” treatment that destroys swimmer wastes and odours such as sweat, urine and suntan oils. Keeps water crystal clear and comfortable for swimmers.	11 kg 657-624791 40 kg 657-624783 **2 x 5 kg 657-625723**

UNITOR CHEMICAL SERVICE

POOL CHEMICALS
PROBLEM & SOLUTION SUMMARY

Guardex POOL & SPA PRODUCTS

SPA Essentials

PROBLEM	SOLUTION	APPLICATION	SIZE & PRODUCT NUMBER††
Alternatives to Chlorine Sanitisers	Guardex Brominating Tablets **(Hydrobrome Tablets)**	Slow dissolving, suitable for use in a brominator, ideal for continuous dosage programmes. These are one of the most reliable forms of pool and spa water sanitation available. Using a bromine based disinfectant, less product is required to achieve the same results.	22.7 kg 657-624858 **1 x 5 kg 657-625632**
Quick water testing	Guardex Test Strips	Testing is necessary to detect changes in water and prevent problems from developing. Test strips are a new technology quick dip method based on an advanced form of test paper. They are quick, easy to use and reliable.	12 x 50 strips 657-624874
Total water testing	Guardex 4 in 1 plus – DPD test kit	A compact, reliable test kit to perform basic water tests – total chlorine, free chlorine, total bromine, pH, acid demand and total alkalinity.	6 x 1 PCs 657-624866 657-624940(DPD#1) 657-624957(Sol#2) 657-624965(Sol#3) 657-624973(Sol#4)
Foam in spas and pools	Spa Essentials Defoamer **(Spa Nofoam)**	Eliminates unsightly foam from spa water, hot tubs and other water features caused by soaps, suntan lotion and detergents.	12 x 0.47 ltr 657-624882 **6 x 1 ltr 657-625673**
Algae in spas and hot tubs	Spa Essentials Sanitiser **(Spa Bromine Tablets)**	An easy to use sanitiser for spas and hot tubs, provides effective bromine disinfection without cloudy or insoluble residue in the water. Can be used to treat visible algae in spas and hot tubs or may be used as a super oxidation treatment to rid of organic wastes.	12 x 0.90 kg 657-624890 **6 x 0.5 kg 657-625624**
Low calcium hardness levels	Spa Essentials Balancer **(Higher Cal)**	Low calcium hardness could cause the spa water to be corrosive. This product raises calcium hardness of pool and spa water to assist in the prevention of corrosion.	12 x 0.45 kg 657-624908 **2 x 5 kg 657-625616**

UNITOR CRUISE SERVICE

Ideal for use on cruise ships

*Products in bold indicate European supplies

†† Sizes and numbers in bold indicate European supplies

UNITOR CHEMICAL SERVICE

SANITISER

DISINFECTANT AND SANITISER

Product Description

Concentrated bromine based sanitiser for spas and hot tubs.

How it Works

This product is a practical, easy to use sanitiser for spa and hot tub water. It rapidly and completely dissolves without cloudy or insoluble residue in water, providing effective bromine disinfection. Spa Essentials Sanitiser may also be used as a super oxidation treatment to remove organic wastes. This product may be used to treat visible algae in spas and hot tubs.

Directions for Use and Dosage Rates

Ensure that all spa and hot tub equipment is working properly. Backwash or clean the filter system following manufacturer's directions. Adjust pH to between 7.2–7.6. When using other treatments as outlined in the directions for this product, always follow directions on those products.

Spas should be drained and cleaned weekly or whenever water becomes difficult to manage or keep clear. Bath oils, salts and lotions should not be used unless specifically formulated for use in spas and hot tubs as they can lead to cloudy water.

Supplied in Europe as Sunspot Bromine Tablets.

SPA Essentials

Features, Benefits and Applications

- For Spas & Hot Tubs
- One step sanitiser and oxidiser
- Completely soluble
- Disinfects and protects

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

SANITISER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour:	Chlorine		
Colour:	White		
pH:	6 to 7 (1% solution @ 25°C)		
Solubility in Water:	25g / 100g water:		
Density:	56–60lb / cu ft		
Packaging:	Product no:	Size (in kg)	Container
	657 624890	12 x 0.90 kg	Bottles

UNITOR CHEMICAL SERVICE

pH INCREASER

Product Description

A convenient and safe granular product for raising pH of pool water with minimal effect on 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 to 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 (#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.

Supplied in USA/Asia as pH Increaser.

Guardex POOL & SPA PRODUCTS

RAISING pH
OF POOL WATER

Features, Benefits and Applications

- Convenient granular product
- Safe for all types of pools
- 100% active ingredient – Sodium Carbonate
- Protects pool surfaces and equipment from corrosion due to low pH
- Reduces maintenance costs
- Makes water more comfortable for bathers

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

pH INCREASER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour:	Odourless		
Appearance:	Powder		
Colour:	White		
Solubility in Water:	47g / 100g		
Relative Density:	1.05 gm/cm^3		
Packaging:	Product no	Size (in kg)	Container
	657-625657	2 x 5 kg	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

BALANCER

Product Description

Raises calcium hardness of spa water to assist in the prevention of corrosion, etched plaster and other problems resulting from low calcium levels.

How it Works

This material raises calcium hardness in spa water. The desired calcium hardness level in spa water is in the 100 to 200 ppm range. Low calcium hardness, below 100 ppm, could cause the spa water to be corrosive, resulting in damage to the spa surface and/or equipment.

Directions for Use and Dosage Rates

Determine the calcium harness level using the Unitor Test Kit

(# 624866) and adjust dosage accordingly.

Add this product directly to the spa water by scattering it over the water surface. Do not predissolve this treatment as heat is generated when this product contacts water. When measuring this product use level tablespoons (tbsp) or level teaspoons (tsp). Do not use anything other than a level tablespoon or level teaspoon as this would cause an inaccurate measurement and could result in a calcium hardness level other than that desired.

The addition of one level tablespoon per 100 gallons of water will raise the calcium hardness level by approximately 25 ppm. The addition of one level teaspoon per 100 gallons will raise the calcium hardness level approximately 8 ppm.

Retest the level and adjust dosage accordingly.

Supplied in USA/Asia as Higher Cal.

SPA Essentials

CALCIUM HARDNESS INCREASER

Features, Benefits and Applications

- For Spas & Hot Tubs
- Raises calcium hardness level
- Prevents corrosion of spa equipment and erosion of the pool surface

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

BALANCER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour:	None		
Colour:	White to off-white		
Appearance:	Flake		
VAPOUR PRESSURE:	1.0 mm Hg at 20°C (68°F)		
Solubility in Water:	Soluble		
Boiling Point:	175°C (347°F)		
Melting Point:	174°C (345°F)		
Specific Gravity:	1.85 g/cc		
Packaging:	Product no:	Size (in kg):	Container:
	657 624908	12 x 0.45 kg	Bottles

UNITOR CHEMICAL SERVICE

POOL SURFACE CLEANER

WATERLINE CLEANING

Product Description

For removal of scum (bath tub ring) along the water line. Quickly eliminates oils, greases, light scale and fresh stains.

How it Works

This product removes most stubborn scale, metal stains, 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, Guardex pool surface cleaner is completely compatible with swimming pool water. Do not use on copper, brass, marble or galvanised surfaces. Do not allow undiluted material to remain on porous surfaces such as masonry bricks for extended periods of time (30–60 minutes).

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. Only use a soft bristle brush or sponge on vinyl surfaces.

Supplied in USA/Asia as Pool Surface Cleaner.

Guardex POOL & SPA PRODUCTS

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

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

POOL SURFACE CLEANER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Translucent		
Physical State:	Liquid		
Odour:	Perfume aroma		
Colour:	Orange		
pH:	8.5 – 9.5		
Solubility in Water:	Miscible		
Specific Gravity:	1 gm/ml		
Packaging:	Product no	Size (in kg)	Container
	657 625665	12 x 1 Ltr	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

BREAKPOINT SHOCK

POOL WATER CLEANING

Product Description

Calcium Hypochlorite (min 65%) oxidises organic wastes and restores water sparkle. Pre-mix in a clean bucket prior to application. Test pool water and allow chlorine to reduce to below 3 ppm before swimming can begin.

How it Works

Breakpoint Shock restores water sparkle and comfort by destroying swimmer waste and unpleasant odours. As the pool is used, swimmer wastes such as sweat, urine and suntan oils can build up in the water. These wastes can create dull looking water, strong odours and and skin irritation. Regular use of Breakpoint Shock destroys these waste products and keeps water crystal clear and comfortable for swimmers.

Directions for Use and Dosage Rates

Once a fortnight, or more frequently in hot weather, the pool water should be treated by pre-dissolving 500 g of Breakpoint Shock per 45m^3 of pool water in a clean container with clean water. Pour this solution evenly around the pool perimeter to allow an even distribution. Keep pump moving to circulate the treated water.

Wash out container thoroughly after use. Do not leave any residue in container.

Supplied in USA/Asia as Calcium Hypochlorite.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Destroys swimmer waste and restores water sparkle
- 65% available chlorine improves cleaning efficiency
- Kills resistant algae
- Removes bad odour and taste

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

BREAKPOINT SHOCK

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid
Odour:	Chlorine
APPEARANCE	Granules
Colour:	White
pH:	10.5 – 11.5 (1% solution)
Solubility in Water:	18% @ 25°C
Specific Gravity:	0.8 gm/cm^3 (granules)

Packaging:	Product no	Size (in kg)	Container
	657 625723	5 kg	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

SUPER CLARITY

Product Description

Highly concentrated polymer based product providing a supremely effective clarifier. Tonically charged to tie up negative particles.

How it Works

This product is a highly concentrated water clarifier contains specially formulated polymers that quickly clears cloudy water by binding small particles into larger masses that can be easily removed by the filter.

Directions for Use and Dosage Rates

Before applying this product ensure that the filter is operating efficiently.

Apply Super Clarity weekly or whenever the pool water has lost sparkle.

Apply Super Clarity at the rate of 15ml per 10 m^3 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.

Supplied in USA/Asia as Pool Water Clarifier.

Guardex POOL & SPA PRODUCTS

CLEARS CLOUDY WATER

Features, Benefits and Applications

- Concentrated formula
- Clears cloudy water fast
- Does not affect pH
- Contains specially formulated polymers
- Can help reduce chlorine demand

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

SUPER CLARITY

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Liquid		
Odour:	Almonds		
Appearance:	Clear		
Colour:	Blue		
pH:	4 – 7		
Solubility in Water:	Miscible in water		
Specific Gravity:	1 gm/ml		
Packaging:	Product no	Size (in kg)	Container
	657 625699	12 x 1 Ltr	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

NO GREEN

ALGAE PREVENTION

Product Description

A highly concentrated Formula with active quat to prevent and kill algae. No Green concentrates on pool surfaces where algae may grow.

How it Works

When used as directed this product will help prevent and control algae in pool water.

Directions for Use and Dosage Rates

Initial dosage for pool water having no visible algae growth is 90ml of No Green per 10 m^3 of pool water.

A weekly maintenance dose of 15 ml per 10m^3 of pool water should then be applied.

If a pool has visible algae then it should be treated with Breakpoint Shock 24 hours prior to using No Green, then the maintenance dose should be applied.

Apply the product by pouring directly into the pool around the perimeter or over the water inlet.

Supplied in USA/Asia as Algae Control Concentrate.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- High active quat formula
- Improves chlorine efficiency
- Prevents growth of all algae types
- Concentrates on surfaces where algae may grow
- Effective over a wide pH range
- Concentrated formula
- Keeps pool water clear and algae free

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

NO GREEN

UNITOR CHEMICAL SERVICE

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.

Product Properties

Odour:	Almonds		
Appearance:	Blue liquid		
pH:	7.0 – 8.0		
Solubility in Water:	Completely miscible		
Specific Gravity:	0.92 gm/ml		
Packaging:	Product no	Size (in ltrs)	Container
	657 625731	12 x 1 Ltr	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

TRUE BLUE

ALGAE CONTROL AND TREATMENT

Product Description

A stain free complete copper formulation with clarifying properties for fast algae control.

How it Works

New generation algaecide – when used as directed True Blue will effectively kill and control algae in swimming pools & spas. Recommended for outbreaks of green, blue-green and mustard algae.

Directions for Use and Dosage Rates

To treat visible algae growth:

Vacuum all debris from the pool surfaces. Brush visible algae from all pool surfaces. Ensure pH is between 7.2 and 7.6 then treat the pool with Breakpoint Shock. Leave to circulate for one hour.

Apply True Blue at the rate of 100ml per 10m^3 of water by diluting the required amount in a clean container with clean water. Pour the solution over the inlet or in areas of maximum circulation. Allow sanitiser level to drop below 3mg / l before resuming swimming. Severe cases may need to repeat the above procedure after 2–4 days.

No visible algae growth:

Initial treatment is 50 ml of True Blue per 10 m^3 of pool water. This should be applied following the procedure above. A weekly application of 10 ml per 10 m^3 should be applied to maintain proper preventative levels.

Supplied in USA/Asia as Algaecide 60.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Non-staining formula
- Proven killer of all algae types
- Easy application
- Safe to use
- Patented formula contains unique clarifiers

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

TRUE BLUE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Odour:	Slight ammonia		
Appearance:	Clear		
Physical State:	Liquid		
pH:	2 – 3		
Colour:	Blue / Green		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.21 g/ml		
Packaging:	Product no:	Size (in ltrs):	Container:
	657 625707	12 x 1 Ltr	Bottles in outer box

UNITOR CHEMICAL SERVICE

pH DECREASER

Product Description

A safer alternative to liquid acid, this granular product is used for slowly lowering pH levels of pool water.

How it Works

Proper pH control of pool water is essential to eliminate problems caused by pH being too low or too high. If pH is high, water becomes uncomfortable to bathers, chemical sanitisers lose efficiency, scale forms more readily and water can become dull.

Directions for Use and Dosage Rates

Ideal bathing conditions exist at a slightly alkaline pH level of 7.2 to 7.6 with total alkalinity of 80/150 mg/l. This range will also allow most effective use of other swimming pool chemicals.

Determine the pH of your pool water using Unitor's test kit (product number 624866).

If the reading is above 7.6, then add pH Decreaser following the instructions below.

Use 500 g of pH Decreaser per 45 m^3 of pool water.

Apply the required amount of pH Decreaser by pre-dissolving the product in clean, warm water. Pour solution around the pool perimeter and keep the pool pump running to allow re-circulation. Wait 2–3 hours then recheck pH level, if it is still above 7.6 then repeat the above procedure.

Supplied in USA/Asia as Dry Acid.

Guardex POOL & SPA PRODUCTS

LOWERING PH
OF POOL WATER

Features, Benefits and Applications

- Safely lowers pH
- Convenient granular form
- Easy to use
- For all types of pools
- Safer than hydrochloric acid
- 100 % active ingredient

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

pH DECREASER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Powder		
Physical State:	Solid		
Odour:	Odourless		
Colour:	White		
pH:	1.8 @ 1.2% w/w solution		
Solubility in Water:	180 gm/l water @ 25°C		
Relative Density:	1.4/1.5 g/cm^3		
Packaging:	Product no	Size (in kg)	Container
	657 625640	2 x 7 kg	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

HYDROBROME TABLETS

SWIMMING POOL SANITISERS

Product Description

A highly compacted 100 gram bromine tablet suitable for use in a brominator. Slow dissolving and ideal for continuous dosage programmes.

How it Works

Hydrobrome Tablets are highly effective as a swimming pool sanitiser. Due to decreased surface area and high compaction, less bromine is released into pools at similar Brominator settings, assisting control. Hydrobrome tablets are used to maintain sanitation & hygiene, & to kill bacteria & algae.

Directions for Use and Dosage Rates

This product can be used in either an automatic feeder or a skimmer basket.

Automatic Feeder

Ensure tablets previously used in the feeder are of the same chemical as Hydrobrome Tablets. If in doubt, then wash out feeder thoroughly before adding the product.

Fill the feeder with Hydrobrome Tablets and adjust the flow rate according to the manufacturer's instructions to ensure a constant bromine residual is present in the pool.

Skimmer

This is an alternative method of using Hydrobrome Tablets in your pool. Apply at the rate of 25 g per $10m^3$ of pool water.

Check bromine and pH levels regularly with Unitor's Pool Water test kit (#624866) and maintain a bromine residual of 2–4 mg/l and a pH of 7.2 to 7.6 respectively.

It is good practice to shock dose the pool every week using Breakpoint Shock.

Supplied in USA/Asia as Brominating Tablets.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Slow dissolving tablet
- Bromine based disinfectant
- Significant decrease in surface area – less product required for same results
- Totally soluble
- Effective at wide range of temperatures
- Easy to apply

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

HYDROBROME TABLETS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour and Appearance:	Off-white tablets, faint halogen odour		
pH:	3 – 3.5 (1% solution @ 25°C)		
Solubility in Water:	0.15 @ 25°C		
Specific Gravity:	0.96 g/cm^3		
Packaging:	Product no	Size (in kg)	Container
	657 625632	1 x 5 kg	Plastic bucket

UNITOR CHEMICAL SERVICE

STAIN & SCALE AWAY

STAIN PREVENTION

Product Description

Inhibits and prevents scale formation from excessive calcium and staining from iron, copper and manganese.

How it Works

Stain & Scale Away can prevent metal stains from occurring. It also helps by stopping the build up of scale on pool surfaces.

Directions for Use and Dosage Rates

To treat for metals already present in pool water, first backwash the

filter and leave the pump running. Apply Stain & Scale Away at a rate of 200 ml per 100m^3 of pool water, directly into an area of the pool where circulation is good.

A weekly maintenance dose of 25 ml per 10m^3 of pool water is recommended.

When fresh stains are sighted turn the pump off for 8 hours and slowly add 200 ml per 10m^3 of pool water as close to the stain as possible. Do not swim or operate pump for 24 hours and then brush stains daily. Use a filter aid to help remove the re-dissolved metals.

Note:

Backwash the filter according to the manufacturers instructions. Do not apply within 24–48 hours of shocking the pool. Best results are obtained when the pool is treated after sunset and when the chlorine level is 1,100mg/l. Do not use shock treatments for seven days following use of Stain & Scale Away.

Never use more than 750 ml per 10m^3 of this product in one treatment.

Supplied in USA/Asia as Stain & Scale Control.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Helps prevent staining due to iron, copper and manganese
- Protects against scale build-up
- Concentrated liquid product
- Easy to use (no mixing)
- Suitable for all types of pools

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

STAIN & SCALE AWAY

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Liquid		
Odour:	Odourless		
Appearance:	Clear		
Colour:	Purple		
pH:	1.2 – 1.4		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.45 g/ml		
Packaging:	Product no:	Size (in kg):	Container:
	657 625681	12 x 1.0 Ltr	Plastic bucket in outer box

UNITOR CHEMICAL SERVICE

NOFOAM

FOAMING PREVENTION

Product Description

Eliminates unsightly foam from spa water, hot tubs and other water features caused by soaps, suntan lotion and detergents.

How it Works

Nofoam has been specially developed for spa pools to control and prevent foaming.

Directions for Use and Dosage Rates

Add an initial dose of 50 ml per 450 litres of spa water, adding up to half this dose again if foaming becomes a problem.

The introduction of plenty of fresh water on a daily basis, even to the extent of emptying the spa daily, and encouraging bathers to shower before they enter the spa on every occasion, will reduce likely foaming problems.

Supplied in USA/Asia as Spa Essentials Defoamer.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

SPA Essentials

Features, Benefits and Applications

- Control and prevent foaming
- Eliminates unsightly foam from spas, hot tubs and other water features
- Easy to use

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

NOFOAM

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	White emulsion		
Odour:	Slight		
pH:	3 – 5.5		
Boiling Point:	100°C		
Specific Gravity:	0.90 – 1.00		
Flash Point:	Non-flammable		
Solubility in Water:	Disperses only		
Packaging:	Product no:	Size (in ltr):	Container:
	657 625673	6 x 1 ltr	Bottles in outer box

UNITOR CHEMICAL SERVICE

4 IN 1 PLUS DPD

TEST KIT

Product Description

Performs basic water tests – total chlorine, free chlorine, total bromine, pH, acid demand and total alkalinity.

How it Works

Chlorine Residual – Free Available Chlorine (FAC)

Fill small vial to line. Add 1 DPD # 1 tablet. Cap the vial and shake vigorously to dissolve the tablet. Immediately compare colour in vial with chlorine standards to determine Free Available Chlorine (FAC). Chlorine Residual – Total Available Chlorine (TAC).

Add one DPD # 3 tablet to the water sample used in "A". Cap the vial and shake vigorously to dissolve tablet. Compare colour in vial with chlorine standards to determine Total Available Chlorine (TAC).

Total Active Bromine (TAB) Residual

Fill small vial to line. Add 1 DPD # 1 tablet. Cap the vial and shake vigorously to dissolve tablet. Compare colour in vial with bromine standards to determine Total Active Bromine.

Do not perform following tests if total available chlorine exceeds 3.0 PPM or if total active bromine exceeds 6.0 PPM.

pH Level

Fill large vial to top (solid) line. Add 1 drop of solution 4 (Neutraliser) and mix by swirling. Add 5 drops of solution 2 (pH indicator) and mix by swirling. Compare colour with pH colour standards.

Acid Demand

If pH is above 7.6 Use sample from pH test. Counting each drop, add solution 3 (acid demand) and swirl until colour matches approximately 7.4. Refer to Acid Demand Chart for proper amount of dry acid needed for your pool.

Total Alkalinity

Fill large vial to lower dash line. Add one drop of solution 4 (Neutraliser) and mix by swirling. Add 1 drop of solution 5 (alkalinity Increaser) and mix by swirling. Add solution 3 (Alkalinity Titrant) until colour changes to clear, light yellow or light green. While adding solution 3 count each drop and swirl. Multiply drops of solution 3 by 10 to determine total alkalinity in PPM.

Features, Benefits and Applications

- Performs basic water tests
- Electronic, easy to use colorimeter
- One kit for all your pool testing needs

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

4 IN 1 PLUS DPD

UNITOR CHEMICAL SERVICE

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.

Product Properties – DPD#1 Tablets

Appearance:	Small Tablet		
Physical State:	Solid		
Odour:	Odourless		
Colour:	White		
pH:	5 (1 Tablet in 10 ml water)		
Solubility in Water:	Soluble		
Packaging:	Product no	Size	Container
	657 624940	10 x 100 tablets	Box

Product Properties – Guardex Solution #2 – pH Indicator

Appearance:	Clear		
Physical State:	Liquid		
Odour:	Odourless		
Colour:	Red		
pH:	8		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.0 g/ml		
Packaging:	Product no:	Size:	Container:
	657 624957	24 bottles	Bottles

Product Properties – Guardex Solution #3 – Alkalinity Titrant

Appearance:	Clear		
Physical State:	Liquid		
Odour:	Slightly pungent		
Colour:	Colourless		
pH:	1 to 2		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.0 g/ml		
Packaging:	Product no:	Size:	Container:
	657 624965	24 bottles	Bottles

Product Properties – Guardex Solution #4 – Thiosulfate

Appearance:	Clear		
Physical State:	Liquid		
Odour:	Odourless		
Colour:	Colourless		
pH:	5 to 7		
Solubility in Water:	Completely miscible		
Specific Gravity:	1.0 g/ml		
Packaging:	Product no:	Size:	Container:
	657 624973	24 bottles	Bottles

Product Properties – Guardex Solution #5 – Alkalinity Indicator

Appearance:	Clear		
Physical State:	Liquid		
Odour:	Odourless		
Colour:	Colourless		
pH:	10.5		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.0 g/ml		
Packaging:	Product no:	Size:	Container:
	657 625350	24 bottles	Bottles
Tool kit	**657 624866**		

UNITOR CHEMICAL SERVICE

DRY ACID

Product Description

A granular product for slowly lowering the pH of pool water. Safer to handle, use and store than liquid acids.

How it Works

Dry Acid helps to maintain proper water balance by lowering high pH and high total alkalinity in spas, hot tubs and swimming pools.

Directions for Use and Dosage Rates

Ideal bathing conditions exist at a slightly alkaline pH level of 7.2 to 7.6 with total alkalinity of 80/150 mg/l. This range will also allow most effective use of other swimming pool chemicals.

Determine the pH of your pool water using Unitor's test kit (product number 624866).

If the reading is above 7.6, then add pH Decreaser following the instructions below.

Use 500 g of pH Decreaser per 45 m^3 of pool water.

Apply the required amount of pH Decreaser by pre-dissolving the product in clean, warm water. Pour solution around the pool perimeter and keep the pool pump running to allow re-circulation. Wait 2–3 hours then recheck pH level, if it is still above 7.6 then repeat the above procedure.

Supplied in Europe as pH Decreaser.

Guardex POOL & SPA PRODUCTS

LOWERING PH
OF POOL WATER

Features, Benefits and Applications

- Safely lowers pH
- Prevents scale build-up on equipment, piping and pool surfaces

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

DRY ACID

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Granules		
Physical State:	Solid		
Odour:	Sulphate		
Colour:	Off-white		
pH:	Not available		
PERCENT VOLATILE:	Non-volatile		
Melting Point:	(350°F)		
Solubility in Water:	100%		
Density:	83 lb. / cu ft		
Packaging:	Product no:	Size (in kg):	Container:
	657 624841	4 x 4,08 kg	Bottles

UNITOR CHEMICAL SERVICE

BROMINATING TABLETS

SWIMMING POOL SANITISER

Product Description

Brominating tablets offer you an alternative to chlorinating products. Available in easy-to-use 1" tablets, Guardex Brominating Tablets are one of the most reliable forms of pool or spa water sanitation.

How it Works

When used as directed, Brominating Tablets are effective as a swimming pool water sanitiser and disinfectant, maintaining hygiene and killing bacteria and algae.

Directions for Use and Dosage Rates

This product can be used in either an automatic feeder or a skimmer basket.

Automatic Feeder

Ensure tablets previously used in the feeder are of the same chemical as Hydrobrome Tablets. If in doubt, then wash out feeder thoroughly before adding the product.

Fill the feeder with Hydrobrome Tablets and adjust the flow rate according to the manufacturer's instructions to ensure a constant bromine residual is present in the pool.

Skimmer

This is an alternative method of using Hydrobrome Tablets in your pool. Apply at the rate of 25 g per 10m^3 of pool water.

Check bromine and pH levels regularly with Unitor's Pool Water test kit (# 624866) and maintain a bromine residual of 2–4 mg/l and a pH of 7.2 to 7.6 respectively.

It is good practice to shock dose the pool every week using Breakpoint Shock.

Supplied in Europe as Hydrobrome Tablets.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Swimming pool sanitiser
- Easy-to-use
- Ideal for irregular and continuous dosage

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

BROMINATING TABLETS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Tablets		
Physical State:	Solid		
Odour:	Faint Halogen odour		
Colour:	White		
pH:	3.5 (0.1% @ 20°C)		
Solubility in Water:	0.15g / 100g water		
Thermal Decomposition:	295°C		
Density:	1 kg/l		
Packaging:	Product no	Size (in kg)	Container
	657 624858	22.7 kg	Pail

UNITOR CHEMICAL SERVICE

HIGHER CAL

Product Description

Calcium Chlorite raises the hardness of pool water to assist in the prevention of corrosion, etched plaster and other problems.

How it Works

This product is used to raise calcium hardness in pool water. Low calcium hardness may cause pool water to be corrosive which may result in staining, etching or distorting of all types of pool surfaces. Surfaces etched 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

Determine the calcium hardness of your pool water using Unitor's test kit (product number #624866). Use Higher Cal at the rate of 100g. per 10 m^3 to raise calcium hardness by 10 mg/l. Dissolve the required amount of Higher Cal in a clean container with clean water and pour slowly around the perimeter of your pool. Ensure both the pump and filter are running to circulate the product effectively.

Supplied in USA/Asia as Spa Essentials Balancer.

Guardex POOL & SPA PRODUCTS

CALCIUM HARDNESS INCREASER

Features, Benefits and Applications

- Raises calcium hardness in pools, spas, & jacuzzis
- Helps prevent etching and staining
- 100% active ingredient Calcium Chlorite

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

HIGHER CAL

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour:	None		
Appearance:	White to off-white		
Solubility in Water:	5 g/100g water		
Specific Gravity:	0.85 gm/cm^3		
Packaging:	Product no	Size (in kg)	Container
	657 625616	2 x 5 kg	Bottles in outer box

UNITOR CHEMICAL SERVICE

ALGAECIDE 60

Product Description

A non-foaming, non-metallic 60% polyquat effective in preventing green, black and mustard algae. Ideal for use in pools with attached water features or spas.

How it Works

Algaecide 60 is used to control and prevent the growth of algae in swimming pools & spas. This product may be used in systems sanitised with chlorine or bromine. This product will not foam and prevents all types of algae.

Directions for Use and Dosage Rates

To treat visible algae growth:

Vacuum all debris from the pool surfaces. Brush visible algae from all pool surfaces. Ensure pH is between 7.2 and 7.6 then treat the pool with Breakpoint Shock. Leave to circulate for one hour.

Apply Algaecide 60 at the rate of 100ml per 10m^3 of water by diluting the required amount in a clean container with clean water. Pour the solution over the inlet or in areas of maximum circulation. Allow sanitiser level to drop below 3mg/l before resuming swimming. Severe cases may need to repeat the above procedure after 2–4 days.

No visible algae growth:

Initial treatment is 50 ml of Algaecide 60 per 10 m^3 of pool water. This should be applied following the procedure above. A weekly application of 10ml per 10m^3 should be applied to maintain proper preventative levels.

Supplied in Europe as True Blue.

Guardex POOL & SPA PRODUCTS

ALGAE CONTROL AND TREATMENT

Features, Benefits and Applications

- Algae preventative
- Non-foaming
- Safe to use
- Easy application

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

ALGAECIDE 60

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical state:	Liquid		
Odour:	Mild		
Appearance:	Clear		
Colour:	Pale yellow		
pH:	6.0 to 8.0		
Boiling Point:	> 100°C (212°F)		
FREEZING POINT:	> 0°C		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.15 g/ml		
Packaging:	Product no	Size (in ltrs)	Container
	657 624825	12 x 0.94 ltr	Box

UNITOR CHEMICAL SERVICE

ALGAE CONTROL CONCENTRATE

ALGAE PREVENTION

Product Description

A broad range 40% strength algaecide for preventing the growth of all types of algae.

How it Works

When used as directed this product will help prevent and control algae in pool water.

Directions for Use and Dosage Rates

Initial dosage for pool water having no visible algae growth is 90ml of Algae Control Concentrate per 10 m^3 of pool water.

A weekly maintenance dose of 15 ml per 10m^3 of pool water should then be applied.

If a pool has visible algae then it should be treated with Breakpoint Shock 24 hours prior to using Algae Control Concentrate, then the maintenance dose should be applied.

Apply the product by pouring directly into the pool around the perimeter or over the water inlet.

Supplied in Europe as No Green.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- Preventing the growth of algae
- Economical, efficient and stable
- Improves chlorine efficiency
- Effective over a wide pH range
- Concentrated formula
- Keeps pool water clear

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

ALGAE CONTROL CONCENTRATE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical state:	Liquid		
Odour:	Almonds		
Colour:	Blue		
pH:	7.0 to 8.0		
Solubility in Water:	Completely miscible		
Specific Gravity:	0.92 g/ml		
Packaging:	Product no	Size (in ltrs)	Container
	657-624817	12 x 0,94 ltr	Box

UNITOR CHEMICAL SERVICE

POOL WATER CLARIFIER

Product Description
Clears cloudy water by collecting small unfilterable particles into larger filterable masses.

How it Works
Pool Water Clarifier restores sparkling clear water by combining small particles into larger ones that the filter can remove. 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 Water Clarifier weekly or whenever the pool water has lost sparkle.

Apply Pool Water Clarifier at the rate of 15ml per 10 m^3 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.

Supplied in Europe as Super Clarity.

Guardex POOL & SPA PRODUCTS

CLEARS CLOUDY WATER

Features, Benefits and Applications

- Helps clear cloudy water
- Easy to use – no premixing
- Makes water sparkle

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

POOL WATER CLARIFIER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical state:	Liquid		
Odour:	Almonds		
Appearance:	Clear		
Colour:	Blue		
pH:	6.0 to 8.0		
Boiling Point:	100°C (212°F)		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.0 g/ml		
Packaging:	Product no	Size (in ltrs)	Container
	657 624809	12 x 0.94 ltr	12 bottles in box

UNITOR CHEMICAL SERVICE

CALCIUMHYPOCHLORITE

Product Description

A 65% available chlorine that comes in a variety of convenient sizes.

How it Works

Chloryte is designed to dissolve quickly and provide a ready source of available chlorine in swimming pools. Used according to directions Chloryte kills algae and bacteria, and destroys organic contaminants. If any chlorine residual is present, adding 2 ozs. per 10.000 gallons will increase the residual by approximately 1 part per million (ppm). Follow the dosages and procedures recommended.

How it Works

Breakpoint Shock restores water sparkle and comfort by destroying swimmer waste and unpleasant odours. As the pool is used, swimmer wastes such as sweat, urine and suntan oils can build up in the water. These wastes can create dull looking water, strong odours and and skin irritation. Regular use of Breakpoint Shock destroys these waste products and keeps water crystal clear and comfortable for swimmers.

Directions for Use and Dosage Rates

Once a fortnight, or more frequently in hot weather, the pool water should be treated by pre-dissolving 500 g of Breakpoint Shock per 45m^3 of pool water in a clean container with clean water. Pour this solution evenly around the pool perimeter to allow an even distribution. Keep pump moving to circulate the treated water.

Wash out container thoroughly after use. Do not leave any residue in container.

Supplied in Europe as Breakpoint Shock.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

RESTORES
WATER SPARKLE

Features, Benefits and Applications

- Bactericide and algaecide for swimming pool.
- A granular chlorinator.

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

CALCIUM HYPOCHLORITE

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical state:	Solid		
Odour:	Chlorine		
Appearance:	Granules		
Colour:	White		
pH:	11.5 (5% solution)		
Thermal Decomposition:	> 100°C		
Solubility in Water:	18 g/100 g Water		
Specific Gravity:	2.35 (water = 1)		
Packaging:	Product no	Size (in kg)	Container
	657 624791	11	Pail
	657 624783	40	Drum

UNITOR CHEMICAL SERVICE

ADVANTAGE TABLETS

CONTROL BACTERIA AND ALGAE

Product Description

A specially formulated 200 gram multifunctional blended tablet for use in the skimmer, floater or chlorinator. Slow dissolving and ideal for less regular and continuous dosage methods. Up to 20% more effective than traditional Trichlor tablets. Contains stabilisers, clarifiers and buffers together in a minimum 67% available chlorine formulation.

How it Works

These specially formulated, stabilised chlorine tablets are designed to control bacteria and algae in swimming pool water. In addition to sanitising, Advantage Tablets can provide continuous clarification and a reduction in the amount of product required to treat pool water.

Directions for Use and Dosage Rates

Skimmer

Place one tablet per 50 m^3 of pool water into the skimmer basket. This should be applied every 2–4 days depending upon demand to ensure the correct residual is being maintained.

Floating dispenser

Fill the dispenser with Advantage Tablets and regulate the flow with the mechanism on the dispenser by placing fewer tablets in the device to maintain the chlorine residual required.

Automatic Feeder

Place Advantage Tablets in the feeder and follow the manufacturers instructions on regulating the flow to maintain the correct residual.

Supplied in USA/Asia as Chlorinating Tablets.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- 65,1 % available chlorine.
- Multi-Functional.
- Reduces chlorine demand
- Can be used in chlorinator, floater or skimmer
- Less cyanuric acid build-up

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

ADVANTAGE TABLETS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Solid		
Odour and Appearance:	Blue, tablet with slight chlorine odour		
pH:	3 – 3.5 (1% solution @ 25°C)		
Melting Point:	225°C		
Packaging:	Product no	Size (in kg)	Container
	657 625715	25 kg	Plastic bucket

UNITOR CHEMICAL SERVICE

CHLORINATING TABLETS

Product Description

These large, 3" tablets have the sanitizing power of 90% available chlorine and built-in chlorine stabilisers to maintain proper chlorine levels in sunlight. For use in chlorine feeders, floaters and skimmers.

How it Works

These specially formulated, stabilised chlorine tablets are designed to control bacteria and algae in swimming pool water. In addition to sanitising, Advantage Tablets can provide continuous clarification and a reduction in the amount of product required to treat pool water.

Directions for Use and Dosage Rates

Skimmer

Place one tablet per 50 m^3 of pool water into the skimmer basket. This should be applied every 2–4 days depending upon demand to ensure the correct residual is being maintained.

Floating dispenser

Fill the dispenser with Advantage Tablets and regulate the flow with the mechanism on the dispenser by placing fewer tablets in the device to maintain the chlorine residual required.

Automatic Feeder

Place Advantage Tablets in the feeder and follow the manufacturers instructions on regulating the flow to maintain the correct residual.

Supplied in Europe as Advantage Tablets.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

CONTROL BACTERIA AND ALGAE

Features, Benefits and Applications

- For use in chlorine feeders, floaters and skimmers
- An effective, stabilised chlorine disinfecting agent
- Reduces the growth of harmful algae and micro-organisms
- Swimming pool sanitiser

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

CHLORINATING TABLETS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Tablet		
Physical state:	Solid		
Odour:	Chlorine		
Colour:	White		
pH:	3 to 3.5 (1% solution @ 25°C)		
Thermal Decomposition:	225°C TO 230°C		
Solubility in Water:	1.2 g / 100 g Water		
Density:	55 – 60 lb. / cu ft		
Packaging:	Product no	Size (in kg)	Container
	657 624775	22.6	Pail

UNITOR CHEMICAL SERVICE

STAIN & SCALE CONTROL

STAIN PREVENTION

Product Description

Inhibits scale formation from excessive calcium and prevents staining from iron, copper and manganese.

How it Works

Stain & Scale Control helps prevent scale formation on spa surfaces, heaters, piping and equipment. Prevents stains caused by iron, copper and manganese.

Directions for Use and Dosage Rates

To treat for metals already present in pool water, first backwash the filter and leave the pump running. Apply Stain & Scale Away at a rate of 200 ml per 100m^3 of pool water, directly into an area of the pool where circulation is good.

A weekly maintenance dose of 25 ml per 10m^3 of pool water is recommended.

When fresh stains are sighted turn the pump off for 8 hours and slowly add 200 ml per 10m^3 of pool water as close to the stain as possible. Do not swim or operate pump for 24 hours and then brush stains daily. Use a filter aid to help remove the re-dissolved metals.

Note:

Backwash the filter according to the manufacturers instructions. Do not apply within 24–48 hours of shocking the pool. Best results are obtained when the pool is treated after sunset and when the chlorine level is 1,100mg/l. Do not use shock treatments for seven days following use of Stain & Scale Away.

Never use more than 750 ml per 10m^3 of this product in one treatment.

Supplied in Europe as Stain & Scale Away.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

Features, Benefits and Applications

- For Spas & Hot Tubs
- Prevents staining and controls scale build-up
- Prevents water discoloration
- Easy to use

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

STAIN & SCALE CONTROL

UNITOR CHEMICAL SERVICE

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.

Product Properties

Physical State:	Liquid		
Odour:	Odourless		
Colour:	Colourless		
pH:	< 3.5		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.17 g/ml		
Packaging:	Product no:	Size (in kg):	Container:
	657 625368	12 x 0.94 Ltr	Pints in case

UNITOR CHEMICAL SERVICE

DEFOAMER

FOAMING PREVENTION

Product Description

Eliminates unsightly foam from spa water, hot tubs and other water features caused by soaps, suntan lotion and detergents.

How it Works

Spa Essential Defoamer quickly eliminates and prevents foaming in spas and hot tubs.

Directions for Use and Dosage Rates

Add an initial dose of 50 ml per 450 litres of spa water, adding up to half this dose again if foaming becomes a problem.

The introduction of plenty of fresh water on a daily basis, even to the extent of emptying the spa daily, and encouraging bathers to shower before they enter the spa on every occasion, will reduce likely foaming problems.

Supplied in Europe as Sunspot Nofoam.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

SPA Essentials

Features, Benefits and Applications

- For spas and hot tubs
- Quickly eliminates foam
- Easy application

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

DEFOAMER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Milky
Odour:	Mild
Colour:	White
pH:	6.0 to 7.0
Boiling Point:	100°C
Specific Gravity:	1.00
Solubility in Water:	Dispersible in water
Vapour Pressure:	< 20 mmHg
Vapour Density:	> 1 (Air = 1)

Packaging:	Product no:	Size (in Ltr):	Container:
	657 624882	12 x 0.47 Ltr	Pints in case

UNITOR CHEMICAL SERVICE

BROMINE TABLETS

DISINFECTANT AND SANITISER

Product Description

Bromine based disinfectant/sanitiser ideal for higher water temperatures.

How it Works

Bromine tablets slowly dissolve to provide effective on-going spa and pool sanitation and disinfection.

Directions for Use and Dosage Rates

These tablets are designed for use with a Bromine Feeder. When feeder device requires filling with tablets always follow manufacturers instructions. Ensure tablets used in the feeder are of the same chemical. If other materials have been used previously, wash out feeder thoroughly before adding tablets.

Adjust feeder to ensure a constant bromine residual is present in the pool or spa. Check bromine levels regularly with Unitor's Pool Test Kit (product number #624866) and maintain a bromine residual of 2–4 mg/l. Check pH regularly and maintain a level of 7.2 to 7.6.

Supplied in USA/Asia as Spa Essentials Sanitiser.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Features, Benefits and Applications

- Dissolving tablets for pools and spas
- Disinfects and sanitises
- Effective in warm water
- For use in Bromine Feeders

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

BROMINE TABLETS

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	White tablet		
Odour:	Faint Halogen odour		
pH:	3.5		
Solubility in Water:	0.15 (at 25°C)		
Melting Point:	Sublimes at 145 – 160°C approx.		
Specific Gravity:	0.96 g/cm^3		
Packaging:	Product no	Size (in kg)	Container
	657 625624	6 x 0.5 kg	Bottles in outer box

UNITOR CHEMICAL SERVICE

POOL SURFACE CLEANER

WATERLINE CLEANING

Product Description

For removal of scum line (bath tub ring) along the water line. Quickly eliminates oils, greases, light scale and fresh stains.

How it Works

This product removes most stubborn scale, metal stains, 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 household cleaners, this product surface cleaner is compatible with swimming pool water. Do not use on copper, brass, marble or galvanised surfaces. Do not allow undiluted material to remain on porous surfaces such as masonry bricks for extended periods of time (30–60 minutes).

Directions for Use and Dosage Rates

Apply a damp sponge or brush and scrub 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. Only use soft bristle brush or sponge on vinyl surfaces.

Supplied in Europe as Pool Surface Cleaner.
Guardex® and Spa Essentials® are registered trademarks of BioLab Inc., USA.

Guardex POOL & SPA PRODUCTS

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

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

POOL SURFACE CLEANER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Clear		
Physical State:	Liquid		
Odour:	Perfumed aroma		
Colour:	Red		
pH:	< 2.5		
Solubility in Water:	Miscible in water		
Specific Gravity:	1.08 g/ml		
Viscosity:	3500 to 5500 cps		
Packaging:	Product no:	Size (in kg):	Container:
	657 625376	12 x 0.94 Ltr	Box

UNITOR CHEMICAL SERVICE

pH INCREASER

Product Description

A convenient, 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 to 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 (#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.

Supplied in Europe as pH Increaser.

Guardex POOL & SPA PRODUCTS

RAISING KH
OF POOL WATER

Features, Benefits and Applications

- Quickly and easily raises pH

Ideal for use on Cruise Ships

UNITOR CRUISE SERVICE

pH INCREASER

UNITOR CHEMICAL SERVICE

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.

Product Properties

Appearance:	Granules		
Physical State:	Solid		
Odour:	Odourless		
Colour:	White		
pH:	11.6 (1% solution)		
Thermal Decomposition:	400°C		
Solubility in Water:	33 g/100 g Water		
Density:	62.0 lb./cu ft		
Specific Gravity:	2.533 (water = 1) at 25°C		
Packaging:	Product no:	Size (in kg):	Container:
	657 624833	4 x 2.72 kg	Pail

EQUIPMENT

UNITOR
CHEMICAL SERVICE

UNITOR CHEMICAL SERVICE

THE 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, and for 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.

Add range 15 – 810 cSt @ 40 or 50°C.

Density Meter

An easy to use, fast instrument to determine the density of a fuel. 850–1010 kg/m^3 @ 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 up to 1.2 volume percent in lube and fuel oil.

TBN Test

For accurate testing of TBN (Total Base Number) in the range of 0–40.

Salt Water Determination Test

Insolubles Test

Comprehensive Training Manual included

Product no.	**663 607820**

FUEL OIL
TEST KITS

THE OIL TEST CABINET

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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.

Product no.	**663 555755**

FUEL OIL TEST KITS

COMPATIBILITY TEST KIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

WATER-IN-OIL TEST KIT

- Reliable test for water content: 0–1.2%, 0–15%.
- 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.

Product number	**663 602797**

FUEL OIL
TEST KITS

WATER-IN-OIL TEST KIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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 50.

The results may be used as an in-service check of depleting TBN to the equilibrium value.

Product no.	**663 596783**

FUEL OIL
TEST KITS

TBN TEST KIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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.

Product no.	**663 606248**

FUEL OIL
TEST KITS

COMBINED OIL TEST KIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

DENSITY METER

A fast and reliable device to accurately determine the density of fuels from 800–1010 kg/m^3 @ 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.

Power:	Product no.
110–240 V AC.	**663 606251**

FUEL OIL TEST KITS

DENSITY METER

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

VISCOSITY METER

FUEL OIL TEST KITS

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.

Power:	Product no.
110–240 V AC.	**663 606250**

VISCOSITY METER

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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**

FUEL OIL TEST KITS

BUNKER SAMPLER

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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 in many navies. Nato Stock number 6630-99-215-5830.

FUEL OIL TEST KITS

OIL TEST CENTRE

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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.

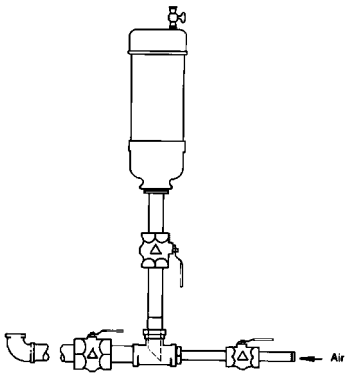
Note

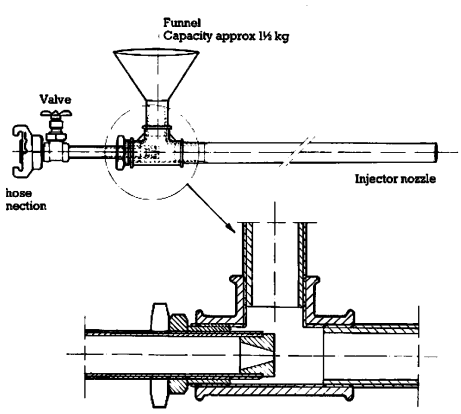
A. Place outlet from injector in same direction as gas flow.

B. Prevent bends in injection pipe, if not possible make bends of 45°, only last bend 90°.

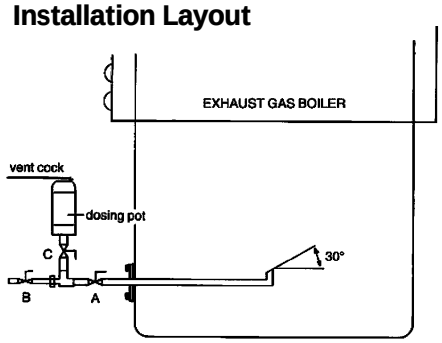
	Product no.
Fixed Injector	**664 572073**
Portable Injector	**664 572065**

Soot remover injector units





Installation Layout



CLEANING AND DOSING EQUIPMENT

Fixed injector

Portable injector

INJECTORS FOR SOOT REMOVER

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

MANUAL DOSING UNIT FOR SOOT REMOVER LIQUID

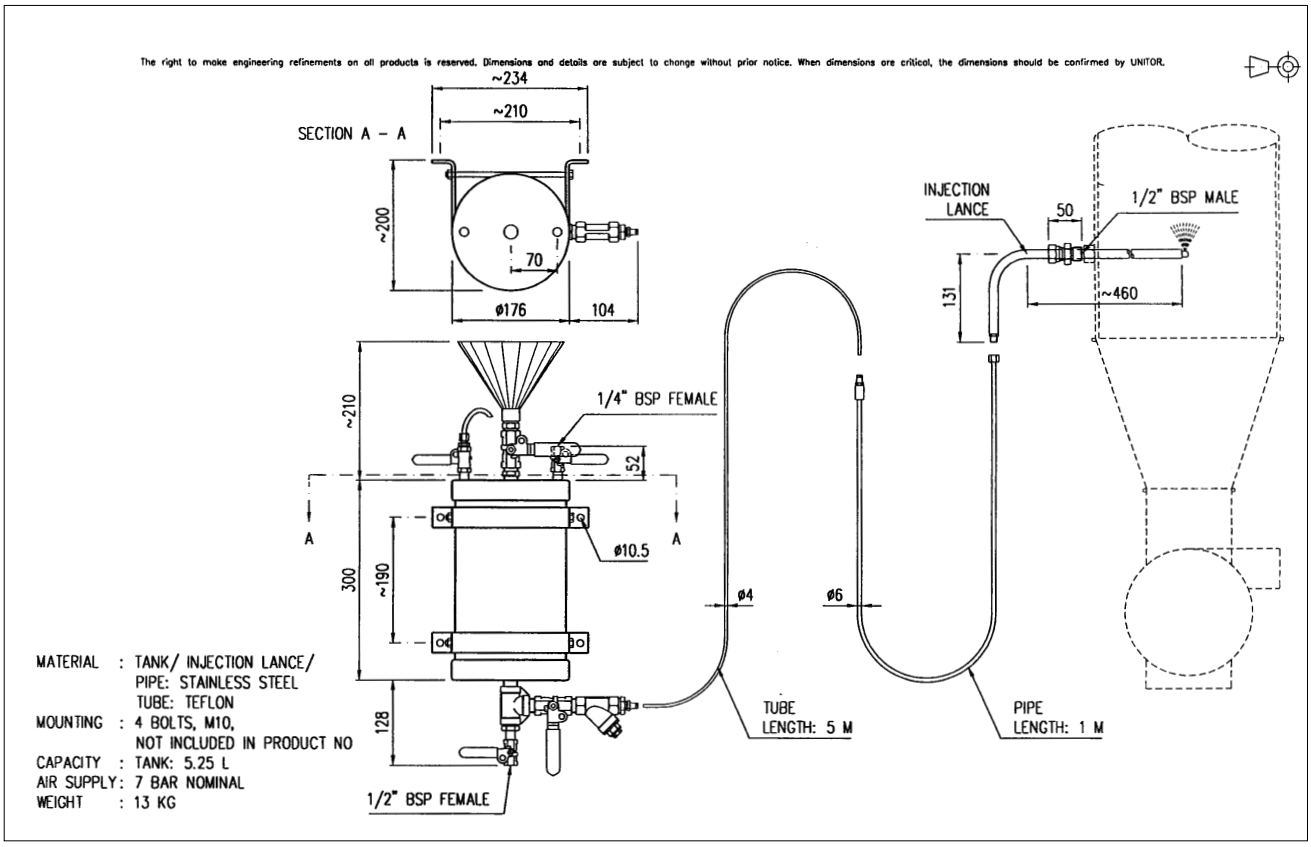
Equipment for the injection of Soot Remover Liquid into the exhaust ducting. The product is finely dispersed and prevents the build-up of soot and fire scale in the exhaust system and exhaust boiler.

The installation and operation is fully described in the installation instructions.

For dosages of Soot Remover Liquid please refer to the Product Data Sheet Lid. no. 815838

Product	Product no.
Manual Dosing Unit for Soot Remover Liquid	**664 625194**

CLEANING AND DOSING EQUIPMENT



MANUAL DOSING UNIT FOR SOOT REMOVER LIQUID

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

AUTOMATIC DOSING UNIT FOR SOOT REMOVER LIQUID

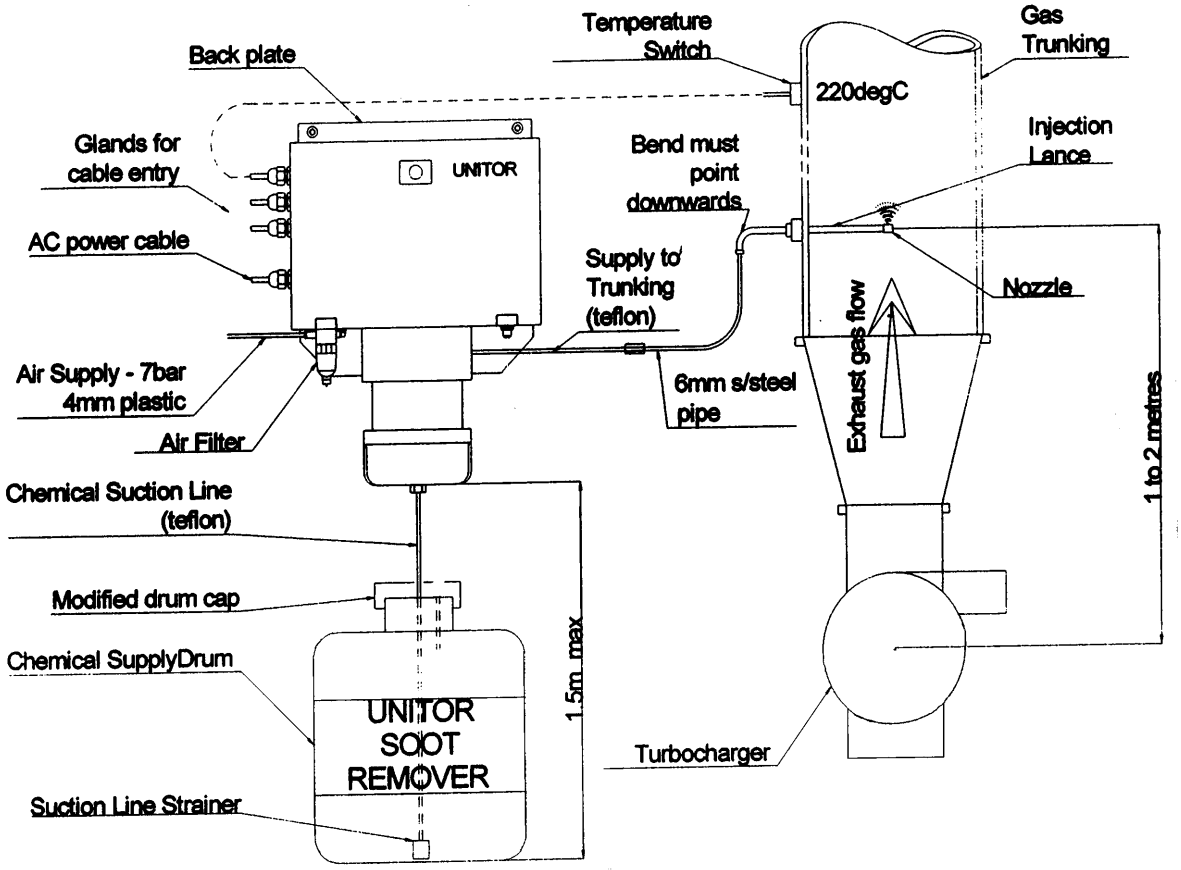
CLEANING AND DOSING EQUIPMENT

This State of the art Programmable Logic Controller (PLC) based automatic dosing unit injects the Soot Remover Liquid at programmed intervals into the exhaust ducting. The build-up of soot and fire scale in the exhaust system and exhaust boiler is effectively prevented.

The installation and operation is fully described in the installation instructions.

For dosages of Soot Remover Liquid please refer to the Product Data Sheet Lid. no.815838.

Product	Product no.
Automatic Dosing Unit for Soot Remover Liquid	**664 625202**



AUTOMATIC DOSING UNIT FOR SOOT REMOVER LIQUID

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

UNITOR'S COOLING WATER TREATMENT PROGRAMME

WATER TEST KITS

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, Unitor 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).

UNITOR'S COOLING WATER TREATMENT PROGRAMME

UNITOR CHEMICAL SERVICE

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's Rapid Response log forms to record all readings and to keep track of all results.

   1. Log form – Cooling Water Treatment Log, No. 309.
   2. 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 completed log sheet for the month should be distributed as shown at the bottom of the form, at the end of each month:

   1. Blue copy – to Unitor's Rapid Response Centre in Norway (address labels at back of log pad)
   2. Beige copy – Vessel owner
   3. Lilac copy – to be kept onboard

C. Evaluation

   1. Logs will be reviewed at the Unitor Rapid Response Centre for adherence to recommended specifications, by Unitor's RAPID RESPONSE staff.
   2. A report letter indicating the status of the ship's system, any problems and relevant recommendations will be issued to the ship's operator.

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.

UNITOR CHEMICAL SERVICE

SPECTRAPAK 309 COOLING WATER TEST KIT

Cooling Water Treatment NITRITE, CHLORIDE & pH

Product no.	**661 555466**

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 x 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 x 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 Unitor Representative.

REAGENTS RE-ORDER	Product no.
Nitrite No. 1 tablets	**661 555623**
Nitrite No. 2 tablets	**661 555631**
Chloride tablets	**661 555656**
pH papers (6.5.10)	**661 555698**
EQUIPMENT	
Plastic sample container	**661 555714**

SPECTRAPAK 309 COOLING WATER TEST KIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

UNITOR'S COMBINED BOILER WATER TREATMENT PROGRAMME

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 CaCO3

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 Unitor's **CONDENSATE CONTROL** in conjunction with your combined product boiler water treatment. 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. 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 9.5–12.0. 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 and 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's Rapid Response log forms to record all readings and to keep track of all results.
   1. Log form – Combined Boiler Water Treatment Log, No. 310.
   2. Frequency – Samples should be drawn, tested and results logged minimum every third day.

B. Reporting – The completed log sheet for the month should be distributed as shown at the bottom of the form, at the end of each month:
   1. Blue copy – to Unitor Rapid Response Centre in Norway (address labels at back of log pad)
   2. Beige copy – Vessel owner
   3. Lilac copy – to be kept onboard

C. Evaluation
   1. Logs will be reviewed at the Unitor Rapid Response Centre for adherence to recommended specifications, by Unitor's RAPID RESPONSE staff.
   2. A report letter indicating the status of the ship's system, any problems and relevant recommendations will be issued to the ship's operator.

WATER TEST KITS

SPECTRAPAK 310

UNITOR'S COMBINED BOILER WATER TREATMENT PROGRAMME

UNITOR CHEMICAL SERVICE

SPECTRAPAK 310

Low Pressure Boiler Water Test Kit

Boiler Water Treatment Test Kit P. ALKALINITY, CHLORIDE & pH

Product no.	**661 555474**

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/cm^2) 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 Unitor Representative.

Reagents	Product no.
P. Alkalinity tablets	**661 555664**
Chloride tablets	**661 555656**
pH paper replacement pack (7.5–14 & 5.5–10) and pH reagent)	**661 555706**
EQUIPMENT:	
250 ml sample bottles	**661 555557**

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.

UNITOR CHEMICAL SERVICE

UNITOR'S CO-ORDINATED BOILER WATER TREATMENT PROGRAMME

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 have the possibility to change the chemical conditions and test parameters individually.

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.

Oxygen Control (Hydrazine, $N_2 H_4$)

Hydrazine is a colorless liquid at ambient temperatures, being completely miscible 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.

Catalysed Sodium Sulphite (powder) and Catalysed Sodium Sulphite L (liquid)

Unitor's catalyzed sulphite products are 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 hydrazine test is optional (Spectrapack 312).

Product no.	**661 555482**

Phosphate (ppm $P0_4$)

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.

WATER TEST KITS

SPECTRAPAK 311/312

UNITOR'S CO-ORDINATED BOILER WATER TREATMENT PROGRAMME

UNITOR CHEMICAL SERVICE

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 $CaC0_3$)

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 CaC03 = (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.

M. Alkalinity (ppm $CaC0_3$)

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 CaC03 = (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 CaC03
4. Record the result obtained on the log sheet provided, against the date on which the test was taken.

SPECTRAPAK 312.

Product no.	**661 555490**

Hydrazine (ppm N_2H_4)

This is an option to the Spectrapak 311. This test must be performed below 21°C. A cooling coil should be fitted at he 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.

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 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.

UNITOR CHEMICAL SERVICE

UNITOR'S CO-ORDINATED BOILER WATER TREATMENT PROGRAMME

Spares

Standard spares packs for the Spectrapak Test Kit range are available from your local Unitor Representative.

Spares for this Test Kit – Spectrapak 311

REAGENTS	Product no.
Phosphate tablets	**661 555649**
Chloride tablets	**661 555656**
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	
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**

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.

UNITOR'S CO-ORDINATED BOILER WATER TREATMENT PROGRAMME

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

HP-BOILER WATER TEST KIT PC 22

WATER TEST KITS

Accurately monitoring the quality of boiler water is of vital importance. 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, alkalinity etc.), the accuracy of the test procedure used should also increase with the operating pressure of the boiler. In order to enable the ships engineers to check the water quality in high purity systems in an accurate but simple way, Unitor has developed the PC 22 Test Kit.

The "heart" of this test kit is the PC 22 photometer. The use of this modern equipment eliminates the need for less accurate titration methods and (subjective) visual colour comparisons. The use of LED's instead of ordinary light bulbs makes the instrument perfectly suitable for use onboard ships.

Photometer PC 22

System Specifications

In designing the casing, the aspects of compact measurement, ergonomical operation, modern design and a high measure of spray water protection, was taken into account.

The foil keyboard which incorporates an acoustic feedback via a beeper, is scratch resistant and acid/solvent resistant. The electronic components are sealed to provide maximum protection against corrosion.

The cell compartment is hermetically sealed from the electronics to prevent damage in the event of accidental sample spillage. This also applies to the light source and detector windows in the cell compartment as the optical system is housed in a splash proof casing.

Zero Balance and Measurement

The dialling of the desired parameters takes place after the

3-positioned codes have been entered. Displayed in the four-line digital display, e.g. zinc test.

Zn: 0–1.0 mg/l	Serial No: 097	Code No: 060155

The allocation of the serial number appears automatically. Up to the 6-positioned code number, the selection criteria can be given through the user. The Zero Calibration can be stored by pressing the Zero key. When Zero Calibration is completed, the cell is taken out of the cell compartment. When the reagent has been added, colour development takes place.

The cell with the coloured water is then placed in the cell compartment and the photometer lid closed. The analysis of the substances is carried out by pressing the test key. A number of values are measured internally and averaged out to give the result.

24.09.1993 11:15	Zn: 0,27 mg/l

CheckIt Micro

Technical Data and Delivery Contents

Technical Data PC 22 Test Kit

- Display: -4 lines, 16 digit alphanumeric LCD display.
- Optics: Temperature compensated light diodes, filter/photosensor amplifier in protected cell compartment.
- Operation: Acid and Solvent Resistant Foil keyboard with Beeper.
- Power Supply: Supplied with standard size 9V. battery and external 12V. Mains adaptor. Integrated overload protection.
- Measuring Capacity: Approx 100 measurements.

HP-BOILER WATER TEST KIT PC 22

UNITOR CHEMICAL SERVICE

- Measuring tolerance: < 1%.
- Weight: Gross weight 8 kg, net weight 6 kg 66 x 46 x 31 cm
- Humidity: Approx. 30–90% rel. (non condensing).
- Operating Temperature Range: Approx 0–50°C.
- Shut-Off Cycle: Approx. 20 mins. after 1st operation with no loss of data
- Language Options: English, German, Spanish, French, Italian, Dutch, Portuguese, Danish and Polish.
- Auto-Check: By switching the ON/OFF key after 200 measurements.
- Memory Capacity: Approx. 1000 sets of data.

Delivery Contents of PC 22 Test Kit
PC 22 Photometer in a case, 9V. Battery. 12V.
Mains Adaptor, Cells, pH-meter, Conductivity meter, Stoppers, Measuring Cylinder 100 ml, Test Tube Brush, Stirring Rod, Cleaning Kit, Manual, Guarantee Instructions.

Reagents

Ammonia, Silica, P-ALK, M-ALK, Hardness, Phosphate, Hydrazine, Chloride.

Indicator System

Every photometer is only as good as the quality of the Indicator-System. For the current test methods, a 5-year (best-before) guarantee is used for reagent tablets. Every tablet is wrapped individually in aluminium foil and therefore not subject to atmospheric conditions. Change in the appearance of the indicator is thus prevented

Handling of the Reagent Tablets

With the basic handling and precise dosage of reagent tablets, this results in high analysis precision. This applies even more so with the unfavourable scale requirements which you would expect to find in the analytic field.

No safety risks apply to the user when used in accordance with the instructions.An important aspect of Unitor Reagent-tablets concerns the environmental degradability, so that the indicators without having to use high concentrations.

Count-Down Function

In some methods, the user has to wait for a specified time after adding the reagent to 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.

Auto-Check

By switching the ON/OFF key after 200 measurements, the PC 22 Photometer performs an auto-check to detect such things as contamination of the windows in the cell compartment. If the optical system needs to be cleaned, this can be done by using the cleaning kit supplied.

User Instructions

The advanced technical design of the PC 22 Photometer includes automatic fault recognition e.g. outside measuring range (over or under) charging status of the battery, opened Photometer lid, excess turbidity in the water sample etc. Appropriate user instructions then appear in the digital display.

CHECKIT micro

The PC 22 kit is equipped with pH and Conductivity meters. The Micro CHECKIT is the ideal supplement to the photometric test methods. It is easy to use and gives reliable results.

CHECKIT micro	pH	Conductivity
Range	0 to 14 pH	0 to 1990 µ S
Resolution	0.1 pH	10 µ S
Accuracy	± 0.2 pH	± 2%
Calibration	pH 4, 7, 10	1400 µ S
Operating Temperature Range	0° to 50°C	0° to 50°C
Automatic Temperature Compensation (ATC)	No	Yes
Power Requirements	3 x 1.4V.	4 x 1.4V.
Battery Life	Approx. 100 hours	Approx. 100 hours
Dimensions (L x B x H)	152 x 42 x 23 mm	152 x 42 x 23 mm
Weight	Approx. 90 g	Approx. 90 g
Order Code	607 800	607 801

Description	Product no.
Refill reagent tablets	**661 607796**
PC 22, UK plug connection	**661 607797**
PC 22, USA plug connection	**661 607798**
PC 22, EURO plug connection	**661 607799**

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.

UNITOR CHEMICAL SERVICE

DOSING SYSTEM FOR WATER TREATMENT AND FUEL OIL TREATMENT

Optional accessory

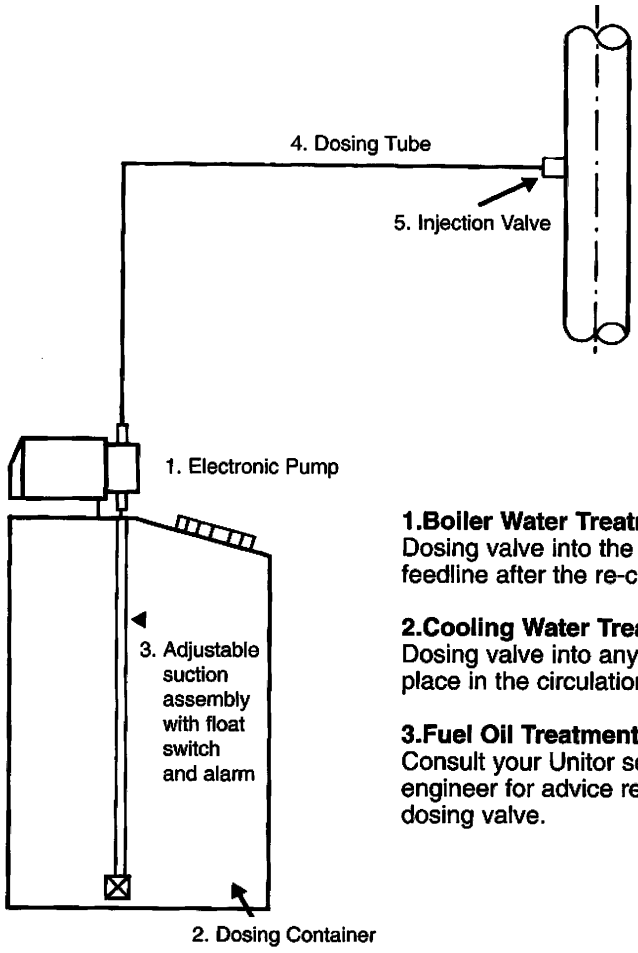
Consult your Unitor service engineer for advice.

Please refer to the Unitor Product Guide for product no.

The standard dosing unit consists of:

1. Electronic metering pump.
2. Dosing container.
3. Adjustable suction assembly, with float switch and alarm.
4. Dosing tube.
5. Injection valve assembly for hot systems, complete with 1 metre stainless steel pipe.

Recommended installation layout



1.Boiler Water Treatment
Dosing valve into the boiler water feedline after the re-circulation line.

2.Cooling Water Treatment
Dosing valve into any convenient place in the circulation system.

3.Fuel Oil Treatment
Consult your Unitor service engineer for advice regarding the dosing valve.

Information required when considering installation

1. Treatment flow rate.
2. Pressure of the system into which the treatment is being dosed.
3. Available voltage.

CLEANING AND DOSING EQUIPMENT

DOSING SYSTEM FOR WATER TREATMENT AND FUEL OIL TREATMENT

UNITOR CHEMICAL SERVICE

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 597120**
Boiler water treatment dosing unit w/alarm option	**664 597179**

2. Cooling Water Treatment

Dosing valve into any convenient place in the circulation system.

Product	Product no.
Seawater system dosing unit	**664 597203**
Seawater system dosing unit w/alarm option	**664 597211**

3. Fuel Oil Treatment

Consult your Unitor service engineer for advice regarding the dosing valve.

Product	Product no.
Fuel oil treatment dosing unit	**664 597187**
Fuel oil treatment dosing unit w/alarm option	**664 597195**

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.

UNITOR CHEMICAL SERVICE

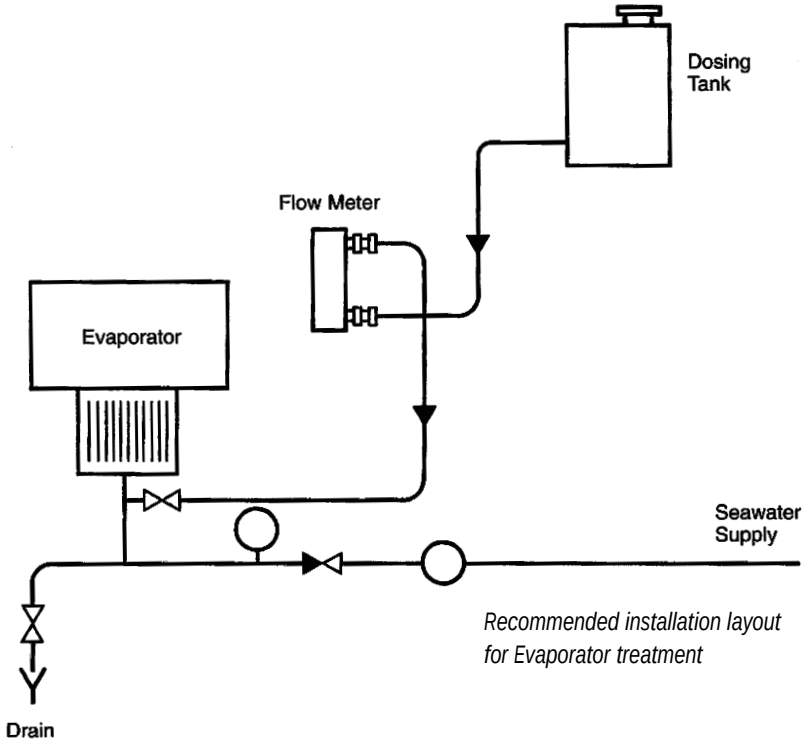
DOSING SYSTEM FOR EVAPORATOR TREATMENT

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 electrical metering pump for these applications can also be supplied–details on request.



Recommended installation layout for Evaporator treatment

Product no.	**664 572388**

CLEANING AND DOSING EQUIPMENT

DOSING SYSTEM FOR EVAPORATOR TREATMENT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

AIR COOLER CLEANER INJECTION SYSTEM

CLEANING AND DOSING EQUIPMENT

Unitor air cooler cleaner Injection System Layout

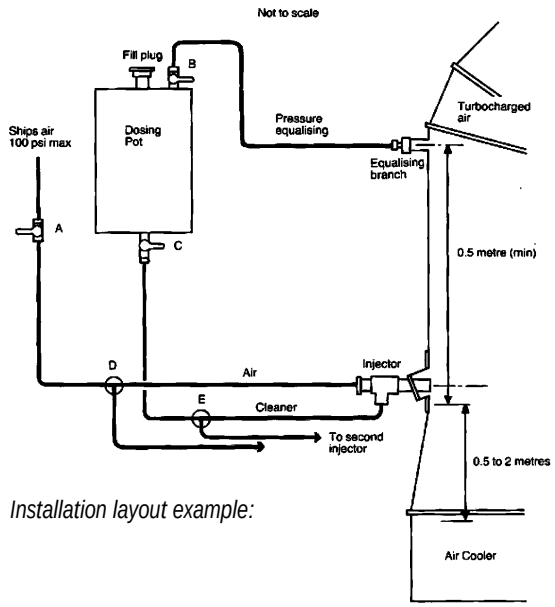
Tests show that vessels using this type of injection equipment with chemical cleaners such as air cooler cleaner suffer no degradation of cylinder lubrication and liner wear rates are not increased.

As the air cooler size and position, (baffle plates etc.) vary from engine to engine, Unitor 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:

	Product no.
Stainless steel 6 litre container	**664 567149**
Injector Order code:	**664 567156**

AIR COOLER CLEANER INJECTION SYSTEM

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

RECHARGEABLE SPRAYERS

The sensible alternative to aerosols, using compressed air instead of CFC propellants

The UNITOR 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.

Suitable for UNITOR products such as

- Enviroclean
- Fore and Aft
- Coldwash HD
- Uniwash
- Electrosolv-E
- Aquabreak PX

Model A: 0,5 litre stainless steel sprayer.

Product no.	**664-572 156**

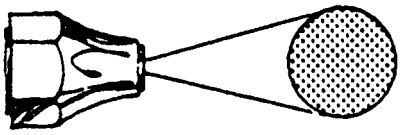
Model B: 1 litre chrome plated brass sprayer with pressure guard.

Product no.	**664-572 172**

Extension piece and different nozzles available:

General purpose mist

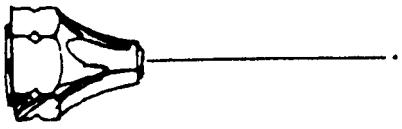
Standard solid cone pattern, medium density.



Product no.	**664-572 180**

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.	**664-572 206**

CLEANING AND DOSING EQUIPMENT

Features, Benefits and Applications

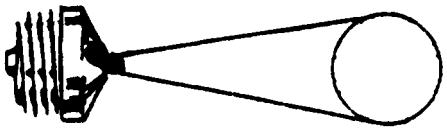
- Environmentally safe
- Rechargeable
- Easy to maintain
- Versatile
- Economical

RECHARGEABLE SPRAYERS

UNITOR CHEMICAL SERVICE

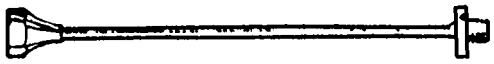
Fine mist

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.	**664-572 214**

Rigid 6-inch, extension piece



Product no.	**664-572 230**

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.

UNITOR CHEMICAL SERVICE

SPRAY GUN, 1 LITRE

CLEANING AND DOSING EQUIPMENT/ SPRAYING DEVICES

Description

The Unitor Spray Gun has been designed for efficient spraying of Unitor's range of Electrosolvents and Solvents 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, Tankleen, Tankleen 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**

SPRAY GUN, 1 LITRE

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

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**

JET SPRAY UNIT

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

UNITOR ULTRASONIC T-1040/HM

CLEANING AND DOSING EQUIPMENT

General Description

The Unitor ULTRASONIC T-1040/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 T-1 040/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 Unitor ULTRASONIC T-1040/HM may also be used together with the following Unitor products: Metal Brite, Enviroclean, Coldwash HD and Aquabreak PX.

Specifications:

Capacity:	65 ltr. total.
Material:	2 mm welded sheet. Stainless CrNi 1.4571, mounted on friction fitted sturdy steel frame. Portable.
Weight:	43 kg.
Measurements:	External x Internal
Length:	550 mm x 500 mm
Width:	350 mm x 300 mm
Height:	760 mm x 450 mm
Mains voltage:	230 V AC/50 and 60 Hz, optional 110 V AC/50 and 60 Hz.
Heating:	1600 Watt, temperature adjustable 20–80°C.
Operating Frequency:	40 kHz.
Ultrasoninc energy consumption:	300 Watt effective.
Transducer type:	Piezo-electric.
Connected power:	1950 Watt.
Timer:	0–120 min., continuous operation.
Drainage:	3/4" ballvalve

	Product no.
Ultrasonic cleaning unit T-1040/HM 230 volt AC.	**664 607818**
Ultrasonic cleaning unit T-1040/HM 110 volt AC.	**664 607813**

UNITOR ULTRASONIC T-1040/HM

UNITOR CHEMICAL SERVICE

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.

UNITOR CHEMICAL SERVICE

CIRCULATION CLEANING UNITS

General Description

The Circulation Cleaning Units are portable integral units comprising mixing tank with lid, airdriven pump, hoses, heating element (option) and connections.

Applications

Designed for use with acid and caustic based products for descaling boilers, calorifiers, heat exchangers and other types of equipment where rust and scale form. It is also ideally suited for degreasing or decarbonising contaminated systems.

Advantages by use of the CIRCULATION CLEANING UNIT

1. The portability and thoroughness of the design reduces the preparation requirements for the descaling operations to a minimum.
2. The Circulation Cleaning Units are stable. The pump can be operated remotely.
3. The pump and base unit fit inside the tank for transportation purposes.

Product no. 664-618603 WO HEATING – MILD STEEL DRUM. The mild steel drum is disposable and can be replaced by a clean drum.

Specifications

Tank

Capacity:	210 litre stainless steel/205 ltr mild steel
Material:	304/316 grad stainless steel and mild steel
Connections:	2 x 2 BSP threaded flenge openings in removable head.

Pump in a powder coated steel frame

Type:	Graco air driven 1" stainless steel Double Diaphragm pump Model 1040 with Teflon wetted parts.
Max. flow:	150 litres/min.
Air supply:	Up to 8.4 bar.

Heating element (Optional) for the Stainless Steel Drum

Heater:	6 kW (110 or 240 volt)
Protection:	Perforated cover.
Thermostat:	Preset adjustable.
Weight:	60 kg with heating element and 54 kg without heating element.
Measurements:	Height: 1300 mm. Width: 590 mm (700 mm over heater head).

The Chemical Cleaning Unit can be used in conjunction with the following Unitor chemicals:

• Descalex • Descaling Liquid • Disclean • Metal Brite H.D. • Seaclean • Coldwash HD • Enviroclean • Alkleen Liquid • Aquabreak PX • Carbonclean LT • ACC LT • Air Cooler Cleaner • Carbon Remover • Electrosolv-E • Aquatuff • Tankleen • Tankleen Plus • Commissioning Cleaner

	Product no.
W HEATING – Stainless Steel Drum	**664 613807**
WO HEATING – Mild Steel Drum	**664 618603**

CHEMICAL CLEANING UNITS

PRODUCT NAME

UNITOR CHEMICAL SERVICE

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®

Mail: Unitor ASA, P.O. Box 300 Skøyen,
N-0213, Oslo, Norway
Office: Drammensvn. 211, N-0277 Oslo, Norway.
Tel: +47 22 13 14 15 Fax: +47 22 13 45 00
Telex: 76004 UNTOR N
www.unitor.com