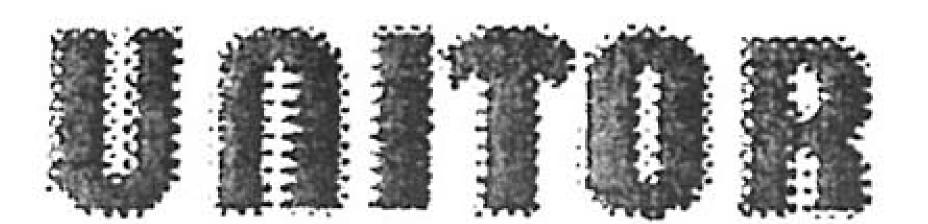
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Unitor's undated chemical cleaning procedure



Boiler cleaning from scale.

- 1 Boiler must be completely empty.
- 2 Disconnect the gauge glasses or fit a blind flange between them. Isolate control connections etc as reqd.
- 3 Open the safety valves and air vents to avoid that gasses entering the engine room during cleaning.
- Install flanges with hose connections and valves to be used for circulation and air injection. Be sure that you create the maximum circulation with a pump if it is possible or with air hose connections.
- 5 Fill the boiler up with 50% fresh water.
- Dissolve the Descalex in warm water to make a solution. Add adequate solution such that Descalex concentration is 5%. (Calculation from the total volume) Fill the chemical solution from deck with a hose and be sure that there is good ventilation in the engine room. Descalex solution must be filled slowly to control gas and foam formation and the crew must use protective clothing, face shield and mask.
- 7 Fill the boiler with fresh water above the normal water level.
- 8 Heat the boiler to a maximum 50 C and keep this temperature during the cleaning period.
- 9 Circulate this solution for minimum 8-12 hours and give regular air injections to create good circulation.
- 10 Drain the boiler till under the manhole, open the boiler and wash the top with fresh water to inspect the results. The boiler can be emptied once the results are good and flushed with fresh water.
- 11 The boiler must be circulated with 0.5% Alkalinity Control solution for one hour to neutralise the acids. (Check pH is more than 8,5)
- 12 When the boiler is empty disconnect the flanges and hoses and fit the gauge glasses.
- 13 Fill the boiler up with water and dose 1,25 ltr/ton Oxygen Control and keep the boiler under pressure of 3 bar for 8 hours and open the vent regularly.
- 14 After this passivation dose boiler chemicals including Boiler Coagulant.Boiler Coagulant 20 ml/ton should be dosed for one month daily to get the water clear. Bottom blowdowns must be given regularly for the first month after the Boiler Coagulant dosage.

Note: The pH (max.pH 5) must be checked regular during the cleaning to be sure that the acid is working.

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	Annex J
Ashland Drew's (Drew Marine (UK) Ltd) – undated chemical cleaning procedure using SAF	Acid



Removing Scale from a Boiler using SAF-ACID

CHEMICALS:

SAF-ACID (DESCALANT) **GC** (NEUTRALIZATION)

SOLUTION STRENGTH: 10 % SOLUTION STRENGTH: 1 %

Note: All Safety Data Sheets should be read and understood by the crew. All Oil and organic matter should be removed prior to this procedure.

- Secure equipment to be cleaned from service, segregate or blank off from system as a whole and cool before draining.
- Open all access ports, manhole covers and as many hand hole caps as practical.
- Remove as much debris and deposit accumulation as possible by flushing with high velocity water flow or manually.
- Fill equipment to approx. 75 % of its volume with fresh water (to cover the top row) and add SAF-ACID solution to establish recommended strength. Secure remaining opening in equipment making certain that vent is fully open.
- Internal heating and natural circulation of the cleaning solution is obtained by lightly firing the boiler for short periods (5 minutes every 15 to 30 minutes). Do not exceed 7 bar. Temperature range to be kept 60°-70°c. do not exceed acid solutions over 70°c. short blow downs will remove loosened soils.
- SAF-ACID has a built-in indicator, which shows by its color when its strength has weakened to the point where additional acid make-up is required. At its strongest point, its color is "golden". At it weakens, the color will change to "green".
- During the cleaning process as the scale, sludge, and other deposits are loosened the strength of the acid decreases. To assure success, the strength of the cleaning solution must be re-established. In this case more SAF-ACID (approx. 25 % of the initial dose) should be added. However, if the equipment has excessively large amounts of deposits, it is often a good practice to drain the initial cleaning solution after 2 6 hours. Then the cleaning process must be started from the beginning.





- Continue cleaning until the strength of the solution stabilizes, i.e., remains "golden" in color.
- Overall cleaning time will be in the order of 6 12 hours, but do not exceed 24 hours contact time with acid solutions.
- When the cleaning is complete, cool and drain the equipment. As soon as the solution level has dropped below the top access ports, open them and thoroughly flush with fresh water. Continue flushing while draining.
- Drain the acid waste solution to a tank or bilge where neutralization can be accomplished before overboard or shore side discharge.
- Remove all loosened deposits by flushing or manual cleaning.
- Refill the unit with fresh water to the top row.
- For neutralization add the required amount of GC to the equipment. Heat to 60° - 70°c and obtain natural circulation as mentioned above for 1 - 2 hours or until the ph of the solution is neutral or higher.
- Cool down and drain the solution to the same tank or bilge holding the waste acid from the cleaning and flush the unit with fresh water.
- Secure opening, refill system with water, and circulate for 30 minutes to 1 hour. Drain and flush system again.
- Initial dose boiler water treatment chemical.
- Equipment is now ready for return in service.



An	inex K
Eazychem's Eazy Descaler Product and Safety Data Sheets dated 30 September 2005 and 7 April	2006

PRODUCT DATA SHEET

EAZY DESCALER PLUS



Product Code: Packaging:

2011 251

2015 2001

Product Group: Issue/Date:

Descaling Products 1.40 - 30/09/2005

PRODUCT DESCRIPTION

eazy Descaler Plus is a fast acting and effective liquid descaling acid. It is used for cleaning the surfaces of heat exchangers and other areas where build up of calcium and magnesium salts (scale) occur and impair the efficiency of heat exchangers.

The product contains an inhibitor to prevent attack of the base metal after the cleaning program has been completed and a dye which visually indicates when the cleaning potential of the acid has been

An additional feature is that any rust present in the system will also be removed in the cleaning process.

N.B. Product does not contain hydrochloric acid and is therefore safe for use with stainless steel.

Product can be used for general descaling of heat exchangers, boilers, evaporators, coolers and condensers.

The degree and type of the deposits will determine the time required for the descaling programme In general the scale will be removed in 6 to 18 hours.

DIRECTIONS FOR USE

IMPORTANT NOTE: Prior to carrying out a cleaning programme, any sacrificial anodes present in the system must be removed and the system should be sufficiently vented to atmosphere at all times to prevent the accumulation of hazardous and explosive gases.

Contact Eazychem for further information and advice.

A solution of 10% of eazy Descaler Plus should be heated at 50 to 60°C and circulated through the heat exchanger. The colour indicator will turn from red to orange when the acid has been neutralised. In this case the process should be repeated as many times as is required for heavily scaled surfaces up to a maximum time of 24 hours.

After cleaning system should be flushed with fresh water. It is then recommended that a 1 to 2% solution of eazy Neutralise be circulated for 2 to 4 hours to ensure that metal surfaces are neutralised.

PRODUCT SPECIFICATION

Appearance:

Clear Red Liquid

pH (at 1%) @ 25°C:

2.30 (2.15-2.45)

Flashpoint:

N/A

S.G. @ 25°C:

1.125 (1.050-1.250)

Please refer to the Material Safety Data Sheet and Product Label for specific information.

LIMITATION OF LIABILITY

IMPORTANT: Eazychem's standard terms and conditions of sale apply and contain limitations on any liability that may be incurred by Eazychem arising in any way from the sale and use of any Eazychem products. In particular please note that Eazychem's terms and conditions state the following:

Except in respect of death or personal injury caused by Eazychem's negligence, or liability for defective products under the Consumer Protection Act 1987, Eazychem shall not be liable to the Buyer by reason of any representation (unless fraudulent), or any implied warranty, condition or other term, or any duty at common law, or under the express terms of the Contract, for loss of profit or for any indirect, special or consequential loss or damage, costs, expenses or other claims for compensation whatsoever (whether caused by the negligence of Eazychem, its employees or agents or otherwise) which arise out of or in connection with the supply of the Products (including any delay in supplying or any failure to supply the Products in accordance with the Contract or at all) or their use or resale by the Buyer, and the entire liability of Eazychem under or in connection with the Contract shall not exceed the price of the Products, except as expressly provided in these Terms.

SAFETY DATA SHEET

Page 1 of 3

eazy Descaler Plus

Revision No.

0

Revision Date

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product name

eazy Descaler Plus

Company

Eazychem Limited

Basepoint Metcalf Way Crawley RH117XX United Kingdom

sales@eazychem.co.uk www.eazychem.co.uk

Telephone

+44 (0)1293 813950

Telefax

+44 (0)1293 813951

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components	Cone.	CAS	EINECS	Pisks	
Sulfamic acid	1-10%	5329-14-6	226-218-8	Xi;R36 Xi;R38 R52/53	
Citric acid anhydrous	10-20%	77-92-9	201-069-1	Xi;R36	

3. HAZARDS IDENTIFICATION

Most important hazards

Irritating to eyes.

4. FIRST AID MEASURES

Skin contact May cause skin irritation in susceptible persons. Wash off immediately with soap and

plenty of water removing all contaminated clothes and shoes. In the case of skin

irritation or allergic reactions see a physician.

Eye contact May cause eye irritation of susceptible persons. Rinse immediately with plenty of water,

also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a

specialist.

Inhalation of vapours may cause mild irritation to the mucous membrane. Move to fresh

air.

Ingestion Ingestion may cause irritation to mucous membranes. Do not induce vomiting. Consult

a physician if necessary.

eazy Descaler Plus

Revision No. Revision Date 0

5. FIRE-FIGHTING MEASURES

Suitable extinguishing

media

Use extinguishing measures that are appropriate to local circumstances and the

surrounding environment.

Specific hazards

Burning produces irritant fumes.

Special protective

equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Ensure adequate ventilation.

Environmental precautions

Do not let product enter drains. Prevent further leakage or spillage.

Methods for cleaning up

Soak up with inert absorbent material. Sweep up and shovel into suitable containers for

disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling

Avoid contact with skin and eyes. Ensure adequate ventilation or exhaust ventilation in the working area. Handle in accordance with good industrial hygiene and safety

practice.

Storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly

labelled containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Ensure adequate ventilation, especially in confined areas.

Hand protection

PVC or other plastic material gloves.

Eye protection

If splashes are likely to occur, wear:. Goggles.

Skin and body protection

Lightweight protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Description

Liquid.

Colour

Red.

Odour

Characteristic.

рH

2.3 +/- 0.5

Relative density

1.125 +/- 0.1

Water solubility

soluble.

10. STABILITY AND REACTIVITY

Stability

Stable under normal conditions.

eazy Descaler Plus

Revision No. Revision Date 0

11. TOXICOLOGICAL INFORMATION

Toxicological information

Citric acid anhydrous

LD50/oral/rat =11700 mg/kg

Surfactant blend 01

LD50/oral/rat =>200<2000 mg/kg

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Citric acid anhydrous

LC50/96h/goldfish =>440<706 mg/l

Surfactant blend 01

EC50/72h/algae =<1 mg/l LC50/48h/daphnia =<1 mg/l LC50/96h/goldfish =1-10 mg/l

13. DISPOSAL CONSIDERATIONS

General Information

Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

Further Information

Not classified as dangerous in the meaning of transport regulations.

15. REGULATORY INFORMATION

Labelling

The product is non-dangerous in accordance with Directive 1999/45/EC. This product is not a hazardous article and need not to labelled according to EC-Directive 67/548, as amended.

Symbol(s):

Xi - Irritant

R-phrase(s)

R36 - Irritating to eyes.

16. OTHER INFORMATION

Text of R phrases

R36 - Irritating to eyes.

mentioned in Section 2

R38 - Irritating to skin.

R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the

aquatic environment.

Further information

The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information relates only to the specific material

designated and may not be valid for such material used in combination with any other

materials or in any process,.

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Nalfleet's (Nalco) "Sea Shield" Safe Acid 79125 – Product Description (undated) and Material Safety Data Sheet dated 15 March 2006

NALFLEET "SEA SHIELD" SAFE ACID 79125

PRODUCT DESCRIPTION

NALFLEET "SEA SHIELD" SAFE ACID is a blend of dry acids, inhibitor, dye indicator and anticaking agent.

PRODUCT USES

NALFLEET "SEA SHIELD" SAFE ACID is a dry acid product especially formulated for off-line removal of water hardness deposits from the waterside of marine equipment. Its dry form and built-in dye indicator make it convenient to use in routine maintenance cleaning. An effective inhibitor minimises base metal attack during the cleaning application.

NALFLEET "SEA SHIELD" SAFE ACID is particularly effective for dissolving hardness scale in .

Heat Exchangers

Evaporators

Piping systems

Boilers

Engine cooling systems

Steam Generators

PRODUCT APPLICATION

Approximately 2 kg of NALFLEET "SEA SHIELD" SAFE ACID is required for every 1 kg of deposit to be removed.

NALFLEET "SEA SHIELD" SAFE ACID working strength should be 5% by weight in fresh water. Based on the capacity of the equipment, use 50 kg of NALFLEET "SEA SHIELD" SAFE ACID per tonne of water.

NALFLEET "SEA SHIELD" SAFE ACID should be dissolved in water before adding to the system mixed well. The solution should be poured or pumped into the system at a point where good mixing can be achieved.



Product Bulletin

- Removes scale deposits from marine equipment.
- Safer and more convenient than strong mineral liquid acids.
- Contains inhibitor to protect base metal.
- Contains indicator dye to make cleaning more efficient.



POB 11, Northwich, Cheshire CW8 4DX Tel 44 (0) 1606 721687 Fax 44 (0) 44 783875 Solution Temperature - Although cool solutions of NALFLEET "SEA SHIELD" SAFE ACID will dissolve scale, this is greatly accelerated as temperatures increase. When cleaning systems fabricated from steel, brass, bronze or copper, the solution temperature can be raised to 70 Deg C. In aluminium or galvanised equipment, the temperature should be kept below 50 Deg C.

Cleaning Time - Generally 4 to 12 hours - varies with solution temperature, strength, circulation and severity of the scaling.

Colour Change - As NALFLEET "SEA SHIELD" SAFE ACID (in solution) reacts with scale the pH of the solution will increase. When the solution loses its strength, the colour changes from blue to pink. If the deposit has not been completely removed, more NALFLEET "SEA SHIELD" SAFE ACID can be added to bring back the blue colour, or the cleaning process may be repeated.

Rinsing - After cleaning, flush the equipment thoroughly with water to remove all loosened deposits.

To ensure complete removal of acid, neutralisation of the metal surfaces with a 2% solution of NALFLEET ALKALINE TREATMENT LIQUID (9-512) for 30 minutes is recommended following the cleaning with NALFLEET "SEA SHIELD" SAFE ACID.

Precautions - Do not apply NALFLEET "SEA SHIELD" SAFE ACID to any system while it is operating under pressure. Remove all zinc anodes prior to cleaning. Provide suitable venting when cleaning closed systems. Keep open flames away from the vent during and immediately following cleaning as some hydrogen gas may evolve during acid cleaning.

Two Stage Cleaning - Oils, grease, silica, organics and calcium sulphate do not respond to acid treatment. when a deposit contains substantial amounts of these substances, a two-stage cleaning (alkaline followed by acid) using either NALFLEET "SEA SHIELD" ALKALINE CLEANER or "SEA SHIELD" TANK ALKLEAN is recommended.

Consult your Nalfleet Representative for specific cleaning recommendations and techniques .

SAFETY AND HANDLING

NALFLEET "SEA SHIELD" SAFE ACID should be stored in a dry area away from alkalis and oxidising agents.

NALFLEET "SEA SHIELD" SAFE ACID and its solutions are more convenient and safer to handle than liquid acids. However, reasonable precautions should be taken to avoid contact with eyes and prolonged or repeated contact with skin. In case of contact, wash skin with soap and water; for eyes, immediately flush with large amounts of water for at least 15 minutes and obtain medical attention. Avoid breathing dust. Do not take internally. If swallowed do not induce vomiting, give plenty of water to drink and call a doctor immediately.

N.B. Do not give an unconscious person anything to drink

A **Precaution Card** is available from Nalfleet and should be displayed where the product is stored and used.

PACKAGING

NALFLEET "SEA SHIELD" SAFE ACID is normally supplied in drums containing 25 kgs.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME:

NALFLEET® 79125 SAFE ACID

APPLICATION:

ACID CLEANER

COMPANY IDENTIFICATION:

NALCO EUROPE B.V.

Postbus 627

2300 AP Leiden, The Netherlands

EMERGENCY TELEPHONE NUMBER(S):

See section 16, for Emergency Telephone Numbers.

Date issued :

15.03.2006

1.9

Version Number :

COMPANY CONTACT TELEPHONE NUMBERS.

NALCO EUROPE B.V.	+31 71 5241 100		
NALCO AB (SE)	+46 (0)8-50074000	NALCO ITALIANA S.R.L.(I)	+39 06-542971
NALCO ANADOLU KIMYA (TR)	+90 216 5743464	NALCO Kft. (HU)	+36 (0)1 471 91 81
NALCO APPLIED SERVICES OF EUROPE BV	+31 (0)73 6456980	NALCO LIMITED	+44 (0)1606 74488
NALCO BELGIUM N.V./S.A. (B)	+32 (0)3-450 69 10	NALCO NETHERLANDS B.V.	+31 (0)13-5952200
NALCO DANMARK A/S	+45-48195800	NALCO NORGE AS (NO)	+47 51 96 36 00
NALCO DEUTSCHLAND GmbH (D)	+49 (0)69-79340	NALCO ÖSTERREICH Ges.m.b.H. (A)	+ 43(0)1 27026350
NALCO ESPAÑOLA S.A. (E)	+34 93-4095555	NALCO POLSKA Sp.z.o.o. (PL)	+48 (0)32-3262750
NALCO FINLAND OY (FI)	+358 (0)9 2517 4700	NALCO PORTUGUESA LDA. (P)	+351 214130996
NALCO FRANCE SAS	+33 (0)3 20 11 70 00	WYSS WASSERTECHNIK AG (CH)	+41 (0)52 235 38 38

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product is classified as dangerous in accordance with the Preparations Directive 1999/45/EC.

Hazardous Substance(s)

EINECS /

SYMBOL

R-PHRASES /

% (w/w)

Sulfamic Acid

ELINCS NO 226-218-8

Χi

NOTAS R36/38, R52/53

60 - 100

Refer to Section 16 for descriptions of relevant risk phrases and Notas.

3. HAZARDS IDENTIFICATION

HAZARD CLASSIFICATION:

This product is classified as dangerous in accordance with the Preparations Directive 1999/45/EC.

Irritating to eyes and skin. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

HUMAN HEALTH HAZARDS - ACUTE:

INHALATION:

Not a likely route of exposure. No adverse effects expected. Elevated temperatures or mechanical action may form vapors, mists or fumes which may be irritating to the eyes, nose, throat and lungs.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

SKIN CONTACT:

Can cause moderate irritation.

EYE CONTACT:

Irritating, and may injure eye tissue if not removed promptly.

INGESTION

Not a likely route of exposure. There may be irritation to the gastro-intestinal tract.

HUMAN HEALTH HAZARDS - CHRONIC:

No adverse effects expected other than those mentioned above.

4. FIRST AID MEASURES

INHALATION :

Remove to fresh air, treat symptomatically. If symptoms develop, seek medical advice.

SKIN CONTACT

Flush affected area with water. If symptoms develop, seek medical advice.

EYE CONTACT:

Flush affected area with water. Get medical attention.

INGESTION

Get medical attention. Do not induce vomiting without medical advice. If conscious, washout mouth and give water to drink. If reflexive vomiting occurs, rinse mouth and repeat administration of water.

NOTE TO PHYSICIAN:

Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical condition.

5. FIRE FIGHTING MEASURES

FLASH POINT:

Not applicable

EXTINGUISHING MEDIA:

Not expected to burn. Use extinguishing media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARD:

Not flammable or combustible.

SPECIAL PROTECTIVE EQUIPMENT FOR FIRE FIGHTING:

In case of fire, wear a full face positive-pressure self contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Restrict access to area as appropriate until clean-up operations are complete. Use personal protective equipment recommended in Section 8 (Exposure Controls/Personal Protection). Stop or reduce any leaks if it is safe to do so. Ventilate spill area if possible. Ensure clean-up is conducted by trained personnel only. Do not touch spilled material. Have emergency equipment (for fires, spills, leaks, etc.) readily available. Notify appropriate government, occupational health and safety and environmental authorities.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

METHODS FOR CLEANING UP:

Sweep up and shovel. Reclaim into recovery or salvage drums. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

ENVIRONMENTAL PRECAUTIONS:

Do not contaminate surface water.

7. HANDLING AND STORAGE

HANDLING:

Do not get in eyes, on skin, on clothing. Do not take internally. Use with adequate ventilation. Avoid generating dusts. Keep the containers closed when not in use. Ensure all containers are labelled.

STORAGE CONDITIONS:

Store in suitable labelled containers. Store the containers tightly closed. Keep in dry place.

SUITABLE CONSTRUCTION MATERIAL:

Compatibility with Plastic Materials can vary; we therefore recommend that compatibility is tested prior to use.

SPECIFIC USE(S):

ACID CLEANER

For specific dosages and customized applications please contact your representative.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS

This product does not contain any substance that has an established exposure limit.

ENGINEERING MEASURES:

General ventilation is recommended. Local exhaust ventilation may be necessary when dusts or mists are generated.

PERSONAL PROTECTION

GENERAL ADVICE:

The use and choice of personal protection equipment is related to the hazard of the product, the workplace and the way the product is handled. In general, we recommend as a minimum precaution that safety glasses with side-shields and workclothes protecting arms, legs and body be used. In addition any person visiting an area where this product is handled should at least wear safety glasses with side-shields. The applicable European standard can be found in EN 166.

RESPIRATORY PROTECTION:

No exposure limits have been assigned to this product or its components. Nalco recommend the use of a half face filter mask or air supplied breathing apparatus. A suitable filter material depends on the amount and type of chemicals being handled. Consider the use of filter type: A-B-E-K-P The applicable European standard can be found in EN 141, EN 143 and EN 371. In event of emergency or planned entry into unknown concentrations a positive pressure, full-facepiece SCBA should be used. If respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

HAND PROTECTION:

When handling this product, the use of chemical gauntlets is recommended. The choice of work glove depends on work conditions and what chemicals are handled, but we have positive experience under light handling conditions using gloves made from PVC Gloves should be replaced immediately if signs of degradation are observed. Breakthrough time not determined as preparation, consult PPE manufacturers. The applicable European standard can be found in EN 374.

SKIN PROTECTION:

When handling this product, the use of overalls, a chemical resistant apron and rubber boots is recommended. A full slicker suit is recommended if gross exposure is possible. The applicable European standard can be found in EN 345.

EYE PROTECTION:

When handling this product, the use of safety glasses with side shields is recommended. The applicable European standard can be found in EN 166.

HYGIENE RECOMMENDATIONS:

Use good work and personal hygiene practices to avoid exposure. Keep an eye wash fountain available. Keep a safety shower available. If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse. Always wash thoroughly after handling chemicals. When handling this product never eat, drink or smoke.

ENVIRONMENTAL EXPOSURE CONTROL PRECAUTIONS:

Consider the provision of containment around storage vessels.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE

Crystalline

APPEARANCE

Blue Green

ODOR

Characteristic

FLASH POINT:

Not applicable

SPECIFIC GRAVITY

2.15

BULK DENSITY

1.27 kg/m3

SOLUBILITY IN WATER

Complete

pH (1 %)

1.2

MELTING POINT

Decomposes 205 °C

Note: These physical properties are typical values for this product and are subject to change.

10. STABILITY AND REACTIVITY

STABILITY:

Stable under normal conditions.

HAZARDOUS POLYMERIZATION:

Hazardous polymerization will not occur.

CONDITIONS TO AVOID:

Moisture Freezing temperatures.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

MATERIALS TO AVOID:

Strong Bases, Oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS:

Under fire conditions:

Oxides of nitrogen, Oxides of sulfur, ammonia

11. TOXICOLOGICAL INFORMATION

The following results are for the product.

ACUTE ORAL TOXICITY:

Species Rat LD50 3,160 mg/kg Test Descriptor

Product

SENSITIZATION:

This product is not expected to be a sensitizer.

CARCINOGENICITY:

None of the substances in this product are listed as carcinogens by the International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP) or the American Conference of Governmental Industrial Hygienists (ACGIH).

For additional information on the hazard of the preparation, please consult section 3 and 12.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL EFFECTS:

No toxicity studies have been conducted on this product.

MOBILITY:

The environmental fate was estimated using a level III fugacity model embedded in the EPI (estimation program interface) Suite TM, provided by the US EPA. The model assumes a steady state condition between the total input and output. The level III model does not require equilibrium between the defined media. The information provided is intended to give the user a general estimate of the environmental fate of this product under the defined conditions of the models. If released into the environment this material is expected to distribute to the air, water and soil/sediment in the approximate respective percentages;

Air	Water	Soil/Sediment
<5%	30 - 50%	30 - 50%

The portion in water is expected to be soluble or dispersible.

BIOACCUMULATION POTENTIAL

This preparation or material is not expected to bioaccumulate.

13. DISPOSAL CONSIDERATIONS

If this preparation becomes a waste, the final user must define and assign the appropriate European Waste Catalogue code. Use only authorized contractors. Ensure compliance with EC, national and local regulations.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

Dispose of wastes in an approved incinerator or waste treatment/disposal site, in accordance with all applicable regulations. Do not dispose of wastes in local sewer or with normal garbage. This product is ashless and can be burned directly in appropriate equipment. This product is NOT suitable for disposal via municipal sewers, drains, natural streams or rivers.

Empty drums should be taken for recycling, recovery, or disposal through a suitably qualified or licensed contractor.

EUROPE WASTE CODE:

16 03 03* - OFF SPECIFICATION BATCHES AND UNUSED PRODUCTS - Inorganic wastes containing dangerous substances. If this product is used in any further processes, the final user must redefine and assign the most appropriate European Waste Catalogue Code.

14. TRANSPORT INFORMATION

The information in this section is for reference only and should not take the place of a shipping paper (bill of lading) specific to an order. Please note that the proper Shipping Name / Hazard Class may vary by packaging, properties, and mode of transportation. Typical Proper Shipping Names for this product are as follows.

LAND TRANSPORT

Proper Shipping Name:

SULPHAMIC ACID, MIXTURE, SOLID

Technical Name(s):

UN/ID No:

UN 2967

Hazard Class - Primary :

8

Packing Group:

111

ADR/RĬD H.I.n. :

80 C2

CLASSIFICATION CODE:

AIR TRANSPORT (ICAO/IATA)
Proper Shipping Name:

SULPHAMIC ACID, MIXTURE, SOLID

Technical Name(s):

UN/ID No:

UN 2967

Hazard Class - Primary :

8

Packing Group :

IATA Cargo Packing Instructions:

100 KG (Max net quantity per package)

IATA Cargo Aircraft Limit : IATA Passenger Packing Instructions :

Y822 / 822

IATA Passenger Aircraft Limit :

5 KG / 25 KG

MARINE TRANSPORT (IMDG/IMO)

Proper Shipping Name:

SULPHAMIC ACID, MIXTURE, SOLID

Technical Name(s):

UN/ID No :

UN 2967

Hazard Class - Primary :

8 III

Packing Group :

OTHER APPLICABLE INFORMATION

80GC2-II+III

CEFIC TREMCARD REFERENCE : EMERGENCY ACTION CODE :

2Z



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

15. REGULATORY INFORMATION

CLASSIFICATION AND LABELLING:

GOVERNING DIRECTIVE(S): Dangerous Substances Directive 67/548/EEC and Dangerous Preparations Directive 1999/45/EC.

HAZARD SYMBOLS



IRRITANT

RISK PHRASES

R36/38 - Irritating to eyes and skin.

R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES

S22 - Do not breathe dust.

S24/25 - Avoid contact with skin and eyes.

S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S28 - After contact with skin, wash immediately with plenty of water.

S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

NATIONAL REGULATIONS SWITZERLAND

BAGT-Nr: 621364 Toxic class: 4

PRODUCT REGISTRATION NUMBER

Denmark

1788216

Norway

053568

INTERNATIONAL CHEMICAL CONTROL LAWS

UNITED STATES

The substances in this preparation are included on or exempted from the TSCA 8(b) Inventory (40 CFR 710)

EUROPE

The substances in this preparation have been reviewed for compliance with the EINECS or ELINCS inventories., The surfactant(s) contained in this preparation complies(comply) with the biodegradability criteria as laid down in Regulation (EC) No.648/2004 on detergents.



PRODUCT

NALFLEET® 79125 SAFE ACID

EMERGENCY TELEPHONE NUMBER(S)

See section 16, for Emergency Telephone Numbers.

16. OTHER INFORMATION

LIST OF RELEVANT R-PHRASES AND NOTAS IN SECTION 2

R36/38 - Irritating to eyes and skin.

R52/53 - Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

This product material safety data sheet provides health and safety information. The product is to be used in applications consistent with our product literature. Individuals handling this product should be informed of the recommended safety precautions and should have access to this information. For any other uses, exposures should be evaluated so that appropriate handling practices and training programs can be established to insure safe workplace operations. Please consult your local sales representative for any further information.

EMERGENCY TELEPHONE NUMBER(S)

Trans-European	+32-(0)3-575-5555
Belgium / Luxembourg	+32-(0)3-575-0330
Czech Republic	+420-602-669421
Denmark	+47-22-33-69-99
Finland	+358-(0)9-4711
France / French Switzerland	+33-(0)6-11-07-32-81
Germany / Austria / German Switzerland	+49-(0)6232-130128
Hungary	+36-30-9-506-447
Italy / Italian Switzerland	+39-333-210-7947
The Netherlands	+32-(0)3-575-0330
Norway	+47-22-33-69-99
Poland	+48-(0)601-66-2626
Portugal	+351-91-911-1399
Russia / Belarus	+7-812-449-0474
Saudi Arabia	+966-(3)847-1515
Slovak Republic	+421-(0)905-585-938
Spain	+34-977-551577
Sweden	+47-22-33-69-99
UAE	+44-(0)7071-223-738
UK and Republic of Ireland	+44-(0)7071-223-738
Nalfleet International	+32-(0)3-575-5555

POISON CONTROL CENTER TELEPHONE NUMBERS

Belgium	+32-70-245245
Czech Republic	+420 224 91 92 93
France	+33-(0)145-42-59-59 ORFILA
Slovak Republic	+421 (0)2 5477 4166

Prepared By: SHE Department Date issued: 15.03.2006 Version Number: 1.9

Numbers quoted in the MSDS are given in the format: 1,000,000 = 1 million and 1,000 = 1 thousand

	Annex M
Grand Bahama Shipyard Ltd's Health and Safety Policy Statement dated 28 March 200	5



GRAND BAHAMA SHIPYARD LTD SAFETY MANAGEMENT SYSTEM

Revision:	3
Date:	28-03-05
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Health and Safety Policy Statement

Grand Bahama Shipyard are committed to a policy of effective management and continual improvement of all aspects of Health, Safety & Welfare through the development of a coherent framework of measures designed to promote team work, planning, training and discipline. The activities of Grand Bahama Shipyard Limited will be carried out in accordance with the procedures so prescribed and all reasonable practical steps will be taken to avoid risks to its employees and any other persons who may be affected by provactivities.

Management and Supervisory Staff are responsible for implementing this policy and will ensure that Health and Safety issues are always given priority. Grand Bahama Shipyard will adhere to the Bahamas Health and Safety at work act and other applicable legal requirements.

All employees and sub-contractors are expected to co-operate with the company in carrying out this policy, and will ensure that their own work, so far as is reasonably practical is carried out with minimum risk to themselves and others. All employees are directly responsible for their own safety and the safety of others within their work area and should never carry out a task that they consider to be dangerous.

Consultation with staff and employees, is structured to ensure feed back is encouraged to continually improve safe systems of work.

Grand Bahama Shipyard will ensure that such resources, facilities, finances, information, instruction, and training are provided as necessary to maintain the Health and Safety and welfare of all of its employees and others who may be affected at their workplace or as a consequence of their work.

The Health and Safety Manager is the person having particular responsibility for the Health and Safety Management System and he will report to the Managing Director on such matters. Reference should be made to the Health and Safety Manager in the event of any difficulty arising is the implication of this policy.

This policy, and the associated procedures in the Health and Safety Management System, will be formally reviewed annually although changes may be implemented at other times as required by changes in legislation, changes in company activities and external requirements.

This Policy shall be made avalable to all interested parties upon request.

Signed:

Mr David Dalgleish. Managing Director.

Α	nr	ne:	X	Ν

Grand Bahama Shipyard Ltd's - Section 10 of the H&S Manual - Safe Work in Confined Spaces - undated but in force on 10 October 2003

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SSOW 10

SAFE WORK IN CONFINED SPACES

10.1	SCOPE
10.2	DEFINITIONS
10.3	GUIDANCE INFORMATION
10.4	PROCEDURES
10.5	OTHER RELEVANT LEGISLATION AND DOCUMENTATION

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10.1 SCOPE

The following SSOW deals with procedures for safe working in confined spaces, covers all work activities carried out in any confined space and applies to employees, contractors, subcontractors, ship's crews and any other persons involved in work within the confines of Shipyards/Drydocks or on vessels/structures under repair/construction at any other site at that time operated by the Company. The SSOW will be supported through the issue and use of the following certification.

- (1) Entry Certificates
- (2) Naked Light Certificates

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10.2 DEFINITIONS

10.2.1 Confined Space

Confined space means any place, including any chamber, tank, vat, silo, pit, trench, pipe, sewer, flue, well or similar space in which, by virtue of its enclosed nature, there arises a reasonably foreseeable 'specified risk'.

- i) serious injury to persons at work from fire or explosion
- ii) loss of consciousness of any person at work arising from an increase in body temperature
- loss of consciousness or asphyxiation of any person at work arising from gas, fume, vapour or the lack of oxygen.
- iv) The drowning of any person at work arising from the increase in the level of liquid, or
- v) The asphyxiation of any person at work arising from a free flowing solid or the inability to reach a respirable environment due to entrapment by a free flowing solid.

10.2.2 Entry Certificate

Entry Certificate (Safe for Men - Not Safe for Hot Work) means a Certificate which:

- (a) is written by a person who is competent to give such a Certificate, and
- (b) is authorised by the Company to issue such a Certificate, and
- (c) certifies that he has in an adequate and suitable manner tested the atmosphere in the space specified in the Certificate, and found that having regard to all the circumstances of the case, including the likelihood or otherwise of the atmosphere being or becoming dangerous, entry to the space without the wearing of breathing apparatus may in his opinion be permitted.

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10.2.3 Naked Light Certificate

Naked Light Certificate (Safe for Men - Safe for Hot Work) means a Certificate which:

- (a) is issued by a person competent to give such a Certificate, and
- (b) is authorised by the Company to issue such a Certificate, and
- (c) certifies that he has in an adequate and suitable manner tested for the presence of flammable vapour in the spaces/areas specified and found it to be free therefrom and having regard to all the circumstances of the case, including the likelihood or otherwise of the atmosphere becoming flammable, the use of naked lights may in his opinion be permitted in the spaces/areas specified in the Certificate.

10.2.4 Naked Lights

Naked lights are any source of ignition which could ignite a flammable atmosphere, and include:

- welding

- burning

- grinding

- heating

- drilling

- portable electric tools

- portable electric lights

- internal combustion engines

- eddy currents from remote welding earths which are not suitably protected

'Hot Work' is a common expression used in our industry and the above are all 'hot work' activities. The list is not exhaustive.

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10.3 GUIDANCE INFORMATION

10.3.1 Confined Spaces

A 'confined space' is defined in the Confined Spaces Regulations 1997 (See Definitions) and, in principle, <u>any</u> enclosed place within a ship/structure can be a confined space. The extent to which there is a need to be concerned about any confined space will vary and depend upon previous use, previous content and any proposed work which is planned, as well as the extent of the enclosure.

Spaces which should always be regarded as 'confined spaces' include:

- Cargo, ballast, fresh water tanks
- Fuel, hydraulic and lubricating oil tanks
- Pump rooms
- Voids, cofferdam spaces
- Bilge, holding and sewage tanks
- All other spaces normally kept closed with limited or no ventilation

The first consideration should be whether entry is actually necessary. Some tasks may be achieved without entry, e.g. testing atmospheres using appropriate probes and pipes, or steam cleaning storage tanks from outside rather than inside.

Where it is not reasonably practicable to carry out work from outside and entry into a confined space is the only solution, then the procedure in 10.4 describes a safe system designed to give priority to eliminating sources of danger as well as detailing the precautions needed for entry.

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10.3.2 Naked Lights and risk from fire

General guidance on fire prevention is given elsewhere. However, a brief explanation of the mechanisms of fire will be of value.

The appropriate mix of flammable substance (fuel), oxygen and a source of ignition are required for a fire or explosion to occur.

oxygen

fuel

fire triangle

ignition

Removal of any one element of the 'fire triangle' will remove the possibility of fire occurring. Effective prevention in practical terms requires that steps be taken to:

- avoid the presence of flammable substances where hot work or naked lights are likely to be present
- avoid sources of ignition where flammable substances are present

Flammable substances are commonly found in our industry and may be in solid, liquid and gaseous forms. For a solid or liquid to burn its temperature must be such that a flammable vapour or gas is given off. A substance's 'flash point' is the temperature at which enough flammable vapour is given off in air to cause a flame when an ignition source is applied. It is therefore a measure of flammability.

Heavy fuel oil (flash point between 70° - 200°C (requires considerable heating before a flammable vapour is given off, while petrol (flash point approximately - 45°C) needs none at all.

Solids, such as wood and furnishing materials, insulation such as polystyrene and polythene foam are commonly found.

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Liquids commonly found include former or present cargoes, fuel, hydraulic oils, paints, solvents and cleaning liquids.

Gases that may be found include former or present cargoes, fuel gases used in burning, welding, heating or cutting operations.

Experience indicates that sources of flammable substances are found or can accumulate in various locations. Cargo tanks, pump rooms and cofferdams may contain flammable substances in:

- main pipelines

tank wash equipment

stripping lines

hollow handrails

bunker lines

pumps

heating coils

valves

Sources outside cargo tanks, etc. but which are physically connected to such spaces may include:

- heating coil pipelines
- fire extinguishing equipment pipelines
- inerting systems

Other spaces on vessels which could contain flammable substances include:

- bilges
- shaft tunnels
- spaces adjacent to cargo and fuel tanks
- savealls

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Safe Work in Confined Spaces

'Hot Work' and 'Naked Lights' are expressions which are commonly used for any source of ignition which might ignite a flammable atmosphere. They include:

- welding

- burning

grinding

heating

- drilling

portable electric tools

portable electric lights

internal combustion engines

- eddy currents from remote welding earths which are not suitably protected

10.3.3 Naked Light Certificates are a statutory requirement of the Shipbuilding and Shiprepairing Regulations 1960 with regard to introducing naked lights into or onto specified spaces or types of vessel.

A Naked Light Certificate is required before the introduction of 'naked lights' into:

- any space on any vessel where oil with a flash point of less than 132°C in quantities sufficient to cause fire or explosion is detected (Reg. 65)
- in or any part of a tanker where the cargo last carried had a flash point of less than 132°C (Reg. 59a).
- in an oil tank or on a vessel in which the oil last carried had a flash point of less than 22°C or was liquid butane, liquid propane or liquid methane, and certification must include adjacent compartments and tanks on a DAILY basis (Reg. 59b).

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The regulations allow for minor external repairs to be carried out without a Naked Light Certificate to tanks or adjacent compartments where the oil last carried had a flash point above 66°C. For tanks where oil remains, repairs must be below the surface of liquid. For empty tanks, adequate local cleaning inside and outside must be carried out and ventilation provided to ensure an explosive atmosphere does not form.

The control of hot work following application of flammable paints or other similar materials will be through the issue of Naked Light Certificates. The risk of fire or explosions will be related to the type of solvents used, its flash point the amount being applied, and its method of application.

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10.4 PROCEDURE

10.4.1 Entry into Confined Spaces and Entry Certificates

Entry into any confined space will only be permitted following an assessment of whether the proposed work could be carried out from outside the confined space. If it is not reasonably practical to prevent work in a confined space then entry will only be allowed following the issue of an Entry Certificate.

Entry Certificates will only be issued by an authorised competent person when all assessments have been made and they are satisfied that safe entry can be made without the use of breathing apparatus.

Entry Certificates will be posted at gangways or at other positions where all persons may conveniently read them.

To provide local information on status of spaces, plastic tags ('Skafftag' type) containing information extracted from the Certificate will be placed as near as practical to tank/space entrances.

Entry Certificates will indicate:

- Name of vessel

Duration of Certificate/Cancellation Time

Certificate Number

Any other conditions applied to entry

- Date/Time

Any other contaminants

- Identification of Space

Competent persons signature

ENTRY CERTIFICATES WILL BE COLOURED GREEN

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10.4.2 Invalidation/Cancellation

Entry Certificates will be Invalidated/Cancelled:

- (a) after the time limit indicated under duration has expired, or
- (b) if during the course of work in any space covered by an Entry Certificate, any pipeline, valve, joint or casing is opened up, or any other event occurs so that there is a risk of hazardous substances entering that space.

If 'Entry' is required after Invalidation/Cancellation then re-assessment and recertification is required.

10.4.3 Responsibilities

The authorised competent person, on request from Managers/Supervisors, will carry out the necessary assessments and tests and, where conditions are satisfactory issue Entry Certificates.

Managers will ensure through Supervision that:

- No Confined Space is entered before the required assessments and tests are carried out by the competent person.
- Control measures indicated by the competent person to enable safe entry are provided and (where necessary) maintained in operation.
- If Entry Certificates become invalidated or are cancelled, re-certification is carried out before re-entering the affected space.

Employees must not enter any confined space which is not at that time covered by an Entry Certificate, or remain in a confined space after that space's Entry Certificate has been cancelled or invalidated.

Contractors will ensure they are aware of the contents if this procedure and comply with all requirement.

The Health and Safety Department will monitor compliance with the requirements of this procedure.

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10.4.4 Naked Light Certificates

Naked Light Certificates are required in circumstances described in 10.3.3 Naked Light Certificates.

Naked Light Certificates will only be issued by the authorised competent person when, in an adequate and suitable manner, tests for the presence of flammable vapours show the space, compartment, tank, etc. to be free therefrom and having regard for the circumstances, the likelihood of contamination of that space, etc. by flammable vapours has been adequately prevented.

Naked Light Certificates will be posted at gangways or at other positions where all persons may conveniently read them.

To provide local information on status of hot work sites requiring Naked Light Certification, plastic tags ('Skafftag' type) containing information extracted from the Certificates will be placed as near as practical to the work area.

Naked Light Certificates will include:

- Name of vessel - Duration of Certificate/Cancellation Time

- Certificate Number - Any other conditions applied to entry

- Date/Time - Any other contaminants

- Identification of Space - Competent persons signature

NAKED LIGHT CERTIFICATES WILL BE COLOURED BLUE

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10.4.5 Invalidation/Cancellation

Naked Light Certificates will be invalidated/cancelled:

- (a) after the time limit indicated under "Duration" has expired, or
- (b) if during the course of work in any space covered by a Naked Light Certificate, any pipeline, valve, joint or casing is opened up, or any other event occurs so that there is a risk of flammable vapours entering that area/space.

If hot work is required after invalidation/cancellation, then re-assessment and re-certification is required.

The authorised competent person may specify, taking regard of the conditions applying, that the daily certification requirements of Reg. 59b, SSR Regs. 1960 may be waived and certification would be required only to a specified extent.

10.4.6 Responsibilities

The authorised competent person on request from Managers/Supervisors will carry out the necessary assessments and tests and, where conditions are satisfactory, issue Naked Light Certificates.

Managers will ensure through supervision that:

- No hot work is carried out in an area on a vessel which requires a Naked Light Certificate before the required tests and assessments are carried out and a Naked Light Certificate is issued.
- Control measures indicated by the Analyst to enable hot work to be carried out safely are provided and, where necessary, maintained in operation.
- If Naked Light Certificates are cancelled or become invalidated, recertification is carried out before re-commencing hot work.

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Employees must not carry out any hot work activity in any area on any vessel which requires a Naked Light Certificate unless such a Certificate is in force at that time, or continue to carry out hot work activities when the Naked Light Certificate in force for that particular area becomes invalidated or is cancelled.

Contractors will ensure they are aware of the contents of this procedure and comply with all requirements.

The Health and Safety Department will monitor compliance with this procedure.

10.4.7 Emergency Arrangements

Emergency rescue equipment is provided together (where necessary) with personnel trained in its use.

This equipment includes (list not exhaustive):

- i) self-contained breathing apparatus
- ii) rescue lines
- iii) stretchers complete with lifting arrangements
- iv) first aid man rider skips
- v) artificial respiration equipment

Emergency rescue equipment will be inspected by competent persons along with any maintenance/servicing required.