

VACON[®] NX
LIQUID COOLED AC DRIVES

HEATSINK CLEANING INSTRUCTIONS

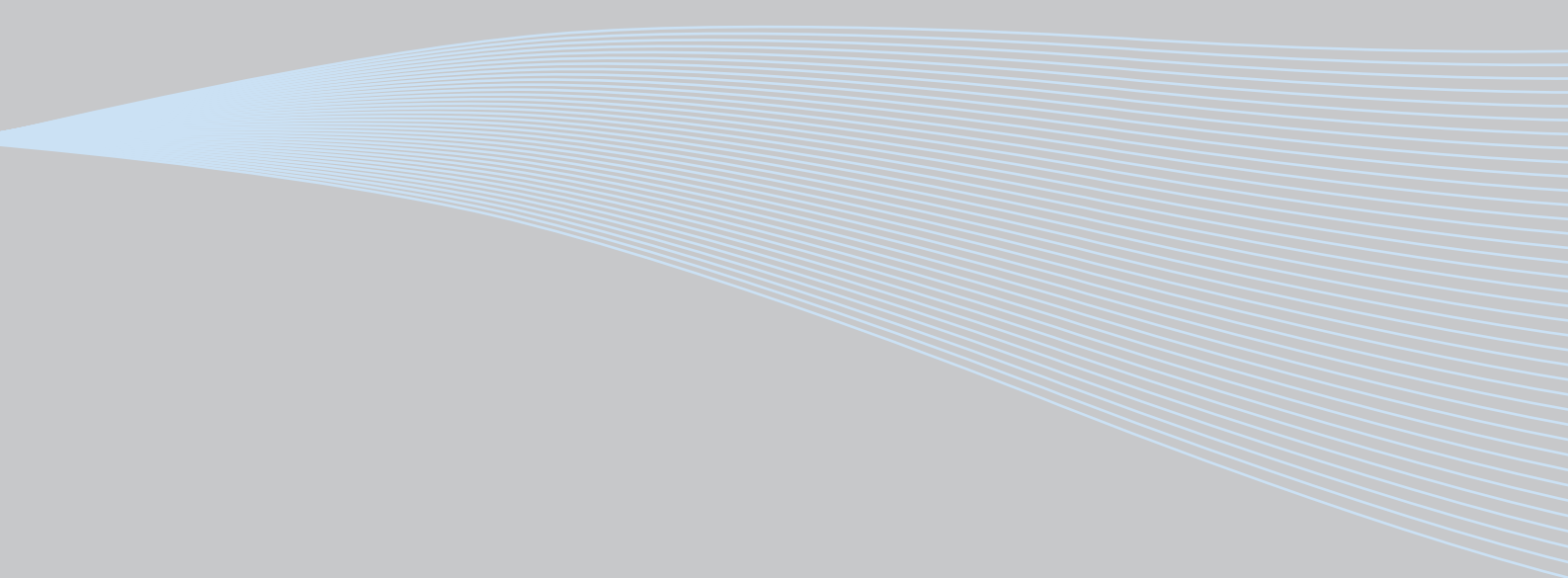


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Document ID: DPD01440

Revision: V001

Revision release date: 10.01.2014

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1. REQUIRED EQUIPMENT

You need the following equipment and chemicals.

Cleaning unit: Alfa - CIP 20 (not available from Vacon®, see www.alfalaval.com).



Figure 1. Alfa - CIP 20 cleaning unit

Cleaning agents (available from Vacon with the following order codes):

- STL-MST09707: KK-2015-ACID-CLEANING-AG, Acid cleaning agent for liquid cooled AC drives (weight 11kg/container).
- STL-MST09706: KK-1416-ALKALINE-NEU-AG, Alkaline neutralization agent for liquid cooled AC drives (weight 10kg/container).



Figure 2. Cleaning agents KK-2015 and KK-1416








Personal protective equipment:

- Protective clothing
- Safety boots
- Safety gloves
- Eye protection

2. SAFETY

These safety instructions are intended for all who work on the Vacon® Liquid cooled NX units and cooling units. These instructions include only a part of the complete safety instructions. Also read the safety instructions in Vacon NX Liquid Cooled User's Manual and NXP Enhanced AC Drives Service manuals.

Ignoring the instructions can cause physical injury or death. It can also cause serious malfunctions to the Vacon NX Liquid Cooled drives and the cooling unit that is not covered by the warranty. When working on the Vacon NX Liquid Cooled drives and the cooling unit you must also follow generally acknowledged safety standards, EU directives and national regulations. Safety data sheets of the cleaning agents are in Appendix 1, SAFETY DATA SHEET KK-2015 and Appendix 2, SAFETY DATA SHEET KK-1416. Read from the liquids' safety data sheet the instructions on what actions to take if liquid has come into contact with skin or eye.

	Only qualified and authorized electricians and mechanics are allowed to carry out the described installation and maintenance work on Vacon NX Liquid Cooled drives and cooling units.
	When working with the cooling unit together with the AC drive, also follow the Vacon NX Liquid Cooled Drive User's Manual safety instructions to prevent any accidents.
	Do not open the drive section doors while the drives are online. If you suspect a coolant leak in the drive section, shut down the drives and disconnect the power supply before opening the drive section doors.
	Any installation work on the cooling unit must be done with power off. The power must not be reconnected before the installation work is complete.
	The primary cooling circuit can contain hot coolant (over +50°C) during normal operation. Serious burns are possible. Before performing maintenance, switch off the unit and allow it to cool down.
	The primary cooling circuit can contain high-pressure coolant (6 bar) during operation. Release the pressure in the cooling unit before performing maintenance. Use safety goggles.
	The coolant consists, depending on the project, of plain drinking water or of a mix of water, propylene glycol and corrosion inhibitors. Glycol and corrosion inhibitors are dangerous to health. If you get coolant mixed with glycol or corrosion inhibitors in your eyes, on your skin, or in your mouth, rinse with plenty of water and seek medical advice.

3. WORKING INSTRUCTIONS

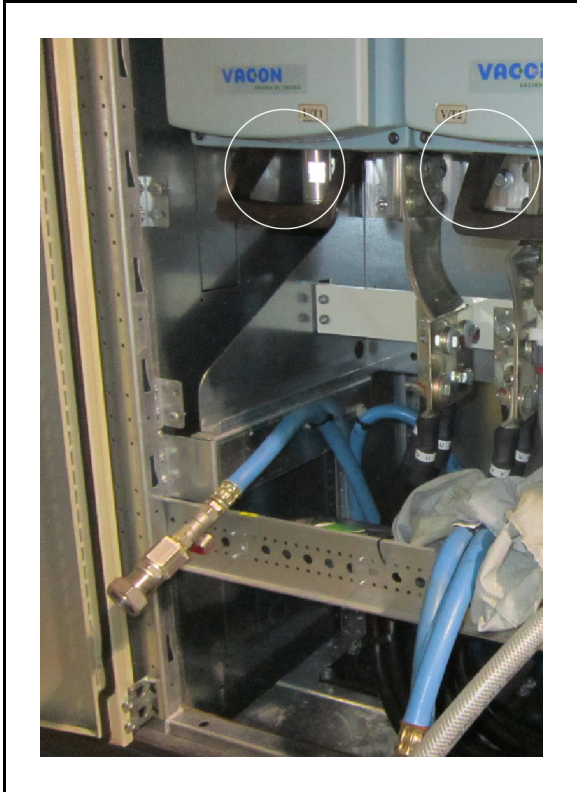

1	<p>Check the heatsink channels with an endoscope for possible dirt deposit or blockage of cooling channels or, if possible, check and write down the unit temperatures of the drive (Unit temp 1, Unit temp 2, and Unit temp 3) at a specific load point preferably as close to the nominal load point as possible. These values can later be compared to the values taken after the cleaning operation and used as verification that the cleaning has made an improvement.</p>
2	<p>Check that it is safe to turn off the drives connected to the cooling unit, and that there is enough time reserved for the maintenance.</p>
3	<p>Take the main drives connected to the cooling unit offline, according to the Vacon® NX Liquid Cooled User's Manual or other operational instructions. Ensure that the power source supplying the drives is properly shut off, and is locked and tagged out.</p>
4	<p>Shut down the power to the cooling unit, in accordance with the cooling unit's instructions. Ensure that the power source supplying the cooling units is properly shut off and that it is locked and tagged out.</p>
5	<p>Use personal protective equipment when cleaning the exchanger.</p>
6	<p>Drain the cooling system side of the drive.</p> <ul style="list-style-type: none"> • Connect a hose to the drainage valve of the cooling unit or the branch that supplies the drives, if available. Put the other end of the hose into a drain pit or a bucket. Open the valve and let all the liquid come out from the drive. • If the cooling system has shut-off valves for each drive, shut off the valves and open the hose connection to the adapter and drain the coolant to a bucket.
7	<p>Disconnect the hoses supplying coolant to the drive from the adapters.</p> <div style="text-align: center;">  </div>

Figure 3. Disconnected hoses

<p style="text-align: center; font-size: 24pt; font-weight: bold;">8</p>	<p>Connect the cleaning unit to the adapter of the drive. Make sure that the flow direction of the cleaning unit is opposite to the normal flow direction.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><i>Figure 4. Cleaning unit connected to drive and container left open</i></p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">9</p>	<p>Fill in the cleaning unit, preferably with warm water (~40°C). Cleaning is most effective at about 40°C.</p> <p>NOTE! Exchangers made of aluminum or nickel coated aluminum must be cleaned in open containers to allow observation of the circulating solution.</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">10</p>	<p>Start the pump and add hot water until water flows sufficiently through the heat sink. Simultaneously, check the tightness of the hose connections. Add KK-2015 until the mixing proportion is at least 30%.</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">11</p>	<p>Let the pump circulate the solution for about 1 to 2 hours depending on the fouling of the drive. KK-2015 solution dissolves the impurities, which is indicated by the change in the colour of the solution.</p>

<p>12</p>	<p>Drain the solution from the drive and cleaning unit into a separate container. Neutralize the solution in the container using KK-1416 (or NaOH) until the pH value of the solution ranges from 6 to 9. Discharge the solution into a sewer (observe local waste water regulations).</p> <div data-bbox="539 353 1203 913" style="text-align: center;"> </div> <p><i>Figure 5. Check the pH value and add more KK-1416 if needed to get the pH value in range 6 to 9.</i></p>
<p>13</p>	<p>Add clean water to the cleaning unit and rinse the drive shortly. Add about 15% KK-1416 in the rinsing water and circulate the solution for about 15 minutes (this increases the pH value on the drive surfaces and prevents acidic deposits on them). Discharge the solution into a sewer (observe local waste water regulations).</p>
<p>14</p>	<p>Drain the drive and rinse it thoroughly e.g. by connecting a water hose directly to the fitting or by circulating enough water in both directions using the cleaning unit. At the same time, measure the pH value of the water. The pH value must be between 7-8. Discharge the solution into a sewer.</p>
<p>15</p>	<p>Disconnect the hoses of the cleaning unit from the drive.</p>
<p>16</p>	<p>Connect the drive hoses back to the drive adapters. Tightening tool: 25mm fork wrench, torque: 25Nm.</p>
<p>17</p>	<p>If the drive consists of several power modules, do the same cleaning procedure for the other power modules. If several drives need to be cleaned, do the same procedure to the other drives connected to same cooling unit.</p>
<p>18</p>	<p>When all drives and power modules are ready to be taken into operation and the cooling unit draining valve has been closed and possible shut off valves supplying the drive have been opened, the supply voltage can be applied to the cooling unit and the cooling unit can be started in accordance with the instructions. Add liquid and de-air the cooling unit in accordance with the instructions and check for possible leakages.</p>
<p>19</p>	<p>The main supply for the drive can be connected and the drives can be operated according to normal operation.</p>
<p>20</p>	<p>Check the result of the cleaning with the endoscope, that there is no dirt in the cooling channels of the heat sink, or if possible, check the unit temperatures of the drive (Unit temp 1, Unit temp 2, and Unit temp 3) at the same specific load point as before the cleaning, preferably as close to the nominal load point as possible and verify that the cleaning process has decreased the unit temperatures.</p>

**APPENDIX 1:
SAFETY DATA SHEET KK-2015**

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

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

1.1 Product identifier**1.1.1 Commercial Product Name**

KK-2015

1.2 Relevant identified uses of the substance or mixture and uses advised against**1.2.1 Recommended use**

Cleaning chemical (acid)

1.3 Details of the supplier of the safety data sheet**1.3.1 Supplier**

KL-Lämpö Oy

P.O.Box

Golfkentäntie 8

Postcode and post office

33960 Pirkkala

FINLAND

Telephone

+35820 761 9900

Telefax

+35820 761 9909

Business ID

0906 108-8

Email

kl-lampo@kl-lampo.com

1.3.3 Identification of the foreign producer

KL-Lämpö Oy

Golfkentäntie 8

33960 Pirkkala

FINLAND

Telephone: +35820 761 9900

Telefax: +35820 761 9909

Business ID: 0906 108-8

Email: kl-lampo@kl-lampo.com

1.4 Emergency telephone number**1.4.1 Telephone number, name and address**

+358(0)9 471 977

Myrkytystietokeskus, Haartmanninkatu 4, 00290 HELSINKI FINLAND

2. HAZARDS IDENTIFICATION

The product is dangerous under 67/548/EEC and 1999/45/EC regulations and subsequent amendments.

2.1 Classification of the substance or mixture**67/548/EEC - 1999/45/EC**

Xi; R37/38

2.2 Label elements**67/548/EEC - 1999/45/EC**

Xi

Irritant

R-phrases(s)

R37/38

Irritating to respiratory system and skin.

S-phrases(s)

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.

**2.3 Other hazards**

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

3.2 Mixtures

Chemical nature: acid liquid.

Hazardous components

CAS/EC and EINECS Reg.number	Chemical name of the substance	Concentration	Classification
5949-29-1	citric acid	30 %	Xi;R37/38;Wng H335
144-62-7	oxalic acid	<5%	Xn; R21/22; Acute Tox. 4 (), H312; Acute Tox. 4 (), H302

4. FIRST AID MEASURES**4.1 Description of first aid measures**

No hazards which require special first aid measures.

4.1.2 Inhalation

Move the victim to fresh air. If symptoms persist, call a physician or Poison Control Centre immediately.

4.1.3 Skin contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If symptoms persist, call a physician.

4.1.4 Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.

4.1.5 Ingestion

Do NOT induce vomiting. Rinse mouth with water. If conscious, give the victim plenty of water to drink. If swallowed, seek medical advice immediately and show this container or label.

4.2 Most important symptoms and effects, both acute and delayed

None known.

4.3 Indication of immediate medical attention and special treatment needed

-

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****5.1.1 Suitable extinguishing media**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. The product itself does not burn.

5.1.2 Extinguishing media which must not be used for safety reasons

Not known

5.2 Special hazards arising from the substance or mixture

Not known.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire, wear self-contained breathing apparatus.

5.4 Specific methods

Keep containers and surroundings cool with water spray.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus.

6.2 Environmental precautions

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Flush away traces with water. Do not flush into surface water or sanitary sewer system.

6.3 Methods and materials for containment and cleaning up

Clean-up methods - small spillage : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

No

7. HANDLING AND STORAGE**7.1 Precautions for safe handling**

For personal protection see section 8. Do not get in eyes, on skin, or on clothing.

7.2 Conditions for safe storage, including any incompatibilities

Keep tightly closed in a dry and cool place. Keep away from oxidising agents and strongly acid or alkaline materials.

7.3 Specific end use(s)

No

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1 Control parameters**

Not known.

8.1.2 Other information on limit values

-

8.1.3 Limit values in other countries

-

8.1.4 DNELs

-

8.1.5 PNECs

-

8.2 Exposure controls**8.2.1 Appropriate engineering controls**

Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke.

8.2.2 Individual protection measures**8.2.2.1 Respiratory protection**

Provide adequate ventilation.

8.2.2.2 Hand protection

Wear suitable gloves and eye/face protection.

8.2.2.3 Eye/face protection

Wear suitable gloves and eye/face protection. Ensure that eye flushing systems and safety showers are located close to the working place.

8.2.2.4 Skin protection

Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing. Remove and wash contaminated clothing before re-use.

8.2.3 Environmental exposure controls

The product should not be allowed to enter drains, water courses or the soil.

9. PHYSICAL AND CHEMICAL PROPERTIES

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

9.1	Important Health Safety and Environmental Information	
9.1.1	Appearance	
	Colourless liquid	
9.1.2	Odour	Slight odour
9.1.3	Odour threshold	Not known.
9.1.4	pH	n. 2 (1 % solution)
9.1.5	Melting point/freezing point	-
9.1.6	Initial boiling point and boiling range	> 100°C
9.1.7	Flash point	not applicable
9.1.8	Evaporation rate	not applicable
9.1.9	Flammability (solid, gas)	not significant
9.1.10	Explosive properties	
9.1.10.1	Lower explosion limit	not determined
9.1.10.2	Upper explosion limit	not determined
9.1.11	Vapour pressure	no data available
9.1.12	Vapour density	not applicable
9.1.13	Relative density	appr. 1,1 g/cm ³
9.1.14	Solubility(ies)	
9.1.14.1	Water solubility	completely soluble
9.1.16	Auto-ignition temperature	not applicable
9.1.17	Decomposition temperature	not applicable
9.2	Other information	
	no data available	

10. STABILITY AND REACTIVITY

10.1	Reactivity	Stable under normal conditions.
10.2	Chemical stability	Stable under normal conditions. Stable under recommended storage conditions.
10.3	Possibility of hazardous reactions	Burning produces noxious and toxic fumes. Carbon monoxide, carbon dioxide.
10.4	Conditions to avoid	Extremes of temperature and direct sunlight.
10.5	Incompatible materials	None.
10.6	Hazardous decomposition products	Stable under normal conditions. Stable under recommended storage conditions.

11. TOXICOLOGICAL INFORMATION

11.1	Information on toxicological effects	
11.1.1	Acute toxicity	
	LD50/oral/rat =7500 mg/l (oxalic acid).	
	LD50 Oral> 6730 mg/kg (citric acid). Acute oral toxicity slight.	
11.1.2	Irritation and corrosion	
	Harmful in contact with skin and if swallowed. According to concentration, aqueous solution causes irritation or burns of eyes, skin and mucous membranes.	
11.1.5	STOT-single exposure	
	Application Route:skin,ingestion.Target Organs:Eyes,respiratory organs, skin ,mucous membranes.	

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

12. ECOLOGICAL INFORMATION

- 12.1 Toxicity**
- 12.1.1 Aquatic toxicity**
 No data is available on the product itself. The product is harmful because of its acidity. pH under 5,5 is harmful to fish. LC50/96h/goldfish =440-706 mg/l. Harmful to fish. (citric acid). EC50/48h/daphnia =80 mg/l.
- 12.1.2 Toxicity to other organisms**
 Toxicity to bacteria= >10 000 mg/ml. Toxicity to bacteria is not significant (citric acid)
- 12.2 Persistence and degradability**
- 12.2.1 Biodegradation**
 -
- 12.2.2 Chemical degradation**
 Chemical demand of oxygen COD=665 mg O₂ /g. Environmental hazards not significant. (citric acid).
- 12.3 Bioaccumulative potential**
 -
- 12.4 Mobility in soil**
 No information available.
- 12.5 Results of PBT and vPvB assessment**
 No information available.
- 12.6 Other adverse effects**
 Not known.

13. DISPOSAL CONSIDERATIONS

The product should not be allowed to enter drains, water courses or the soil without neutralizing. pH of waste water should be between 6-8. Dispose of in accordance with local regulations.

- 13.1 Waste treatment methods**
 Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

	Land transport ADR/RID	Sea transport IMDG/IMO
14.1 UN number	Not classified as dangerous for conveyance in the meaning of the regulations for the transport of dangerous goods by road and rail.	
14.2 UN proper shipping name		
14.3 Transport hazard class(es)		
14.4 Packing group		
14.5 Environmental hazards		
Other information		

KK-2015

Date 6.9.2013

Previous date: 2.4.2012

14.6 Special precautions for users

None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**15. REGULATORY INFORMATION****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****15.2 Chemical safety assessment**

None

16. OTHER INFORMATION**16.3 Key literature references and sources for data**

Raaka-ainevalmistajien toimittamat käyttöturvallisuustiedotteet 2010/02/03, 4.8.2005, 7.4.2005. Sosiaali- ja Terveysministeriö, Julkaisuja 2009:I I: HTP-arvot 2009, Kemian työsuojeluneuvottelukunta. STMp 509/2005 vaarallisten aineiden luettelosta. Environmental properties of chemicals, Vol.1, 2000, <http://www.cerij.or.jp7/ceri_en/koukai_menu.html>, NIOSH. Chemical listing and documentation for immediately dangerous to life and health concentrations (IDLHs). www.occup.health.fi/tt/OVA <<http://www.occup.health.fi/tt/OVA>>. Kemikaalilaki, Opas valmistajille ja käyttäjille, osat 1 ja 2, 2002

16.5 List of relevant R phrases, hazard statements, safety phrases and/or precautionary statements

R21	Harmful in contact with skin.
R22	Harmful if swallowed.
R36	Irritating to eyes.
R37	Irritating to respiratory system.
R41	Risk of serious damage to eyes.

**APPENDIX 2:
SAFETY DATA SHEET KK-1416**

KK-1416

Date 6.9.2013

Previous date: 2.4.2012

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

1.1 Product identifier**1.1.1 Commercial Product Name**

KK-1416

1.2 Relevant identified uses of the substance or mixture and uses advised against**1.2.1 Recommended use**

Cleaning chemical (base)

1.3 Details of the supplier of the safety data sheet**1.3.1 Supplier**

KL-Lämpö Oy

P.O.Box

Golfkentäntie 8

Postcode and post office

33960 Pirkkala

FINLAND

Telephone

+35820 761 9900

Telefax

+35820 761 9909

Business ID

0906 108-8

Email

kl-lampo@kl-lampo.com

1.3.3 Identification of the foreign producer

KL-Lämpö Oy

Golfkentäntie 8

33960 Pirkkala

FINLAND

Telephone: +35820 761 9900

Telefax: +35820 761 9909

Business ID: 0906 108-8

Email: kl-lampo@kl-lampo.com

1.4 Emergency telephone number**1.4.1 Telephone number, name and address**

+358(0)9 471 977

Myrkytystietokeskus, Haartmanninkatu 4, 00290 HELSINKI FINLAND

2. HAZARDS IDENTIFICATION

The product is not dangerous under 67/548/EEC ja 1999/45/EC regulations and subsequent amendments.

2.1 Classification of the substance or mixture**2.2 Label elements****67/548/EEC - 1999/45/EC****S-phrase(s)**

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.

S39

Wear eye/face protection.

2.3 Other hazards

None known.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Chemical nature: slightly basic liquid.

Hazardous components

KK-1416

Date 6.9.2013

Previous date: 2.4.2012

CAS/EC and Reg.number	EINECS	Chemical name of the substance	Concentration Classification	
102-71-6		Triethanol ammine	<0,5%	Xi;R41;Wng, Eye dam1, H318
200-573-9		Tetranatriumethylene diammine tetra-acetate	<1%	Xn;R22;Xi;R41; Wng, Acute Tox.4, H302; Eye irrit.2, H319

3.3 Other information

The product consists of not dangerous compounds: for ex. corrosion inhibitors, chelates and polymers.

4. FIRST AID MEASURES**4.1 Description of first aid measures**

No hazards which require special first aid measures.

4.1.2 Inhalation

Move the victim to fresh air. Keep at rest. If symptoms persist, call a physician or Poison Control Centre immediately.

4.1.3 Skin contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. If symptoms persist, call a physician.

4.1.4 Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.

4.1.5 Ingestion

Do NOT induce vomiting. Rinse mouth with water. If conscious, give the victim plenty of water to drink. If swallowed, seek medical advice immediately and show this container or label.

4.2 Most important symptoms and effects, both acute and delayed**4.3 Indication of immediate medical attention and special treatment needed**

-

5. FIREFIGHTING MEASURES**5.1 Extinguishing media****5.1.1 Suitable extinguishing media**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. The product itself does not burn.

5.1.2 Extinguishing media which must not be used for safety reasons

Ei ole

5.2 Special hazards arising from the substance or mixture

Exposure to decomposition products may be a hazard to health.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary. In the event of fire, wear self-contained breathing apparatus.

5.4 Specific methods

Keep containers and surroundings cool with water spray.

6. ACCIDENTAL RELEASE MEASURES**6.1 Personal precautions, protective equipment and emergency procedures**

Personal protection through wearing a tightly closed chemical protection suit and a self-contained breathing apparatus.

6.2 Environmental precautions

Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13). Flush away traces with water. Do not flush into surface water or sanitary sewer system.

KK-1416

Date 6.9.2013

Previous date: 2.4.2012

- 6.3 Methods and materials for containment and cleaning up**
Clean-up methods - small spillage Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
- 6.4 Reference to other sections**
Ei

7. HANDLING AND STORAGE

- 7.1 Precautions for safe handling**
For personal protection see section 8. Do not get in eyes, on skin, or on clothing.
- 7.2 Conditions for safe storage, including any incompatibilities**
Keep containers tightly closed in a dry, cool and well-ventilated place. Store at room temperature in the original container. Protect from frost.
- 7.3 Specific end use(s)**
No

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- 8.1 Control parameters**
Not known.
- 8.1.1 Threshold limits**
Triethanol ammine 5 ppm (8 h)
- 8.1.2 Other information on limit values**
-
- 8.1.3 Limit values in other countries**
-
- 8.1.4 DNELs**
-
- 8.1.5 PNECs**
-
- 8.2 Exposure controls**
- 8.2.1 Appropriate engineering controls**
Wash hands before breaks and immediately after handling the product. Handle in accordance with good industrial hygiene and safety practice. When using, do not eat, drink or smoke.
- 8.2.2 Individual protection measures**
- 8.2.2.1 Respiratory protection**
Provide adequate ventilation.
- 8.2.2.2 Hand protection**
Wear suitable gloves and eye/face protection.
- 8.2.2.3 Eye/face protection**
Wear suitable gloves and eye/face protection. Ensure that eye flushing systems and safety showers are located close to the working place.
- 8.2.2.4 Skin protection**
Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing
Remove and wash contaminated clothing before re-use.
- 8.2.3 Environmental exposure controls**
The product should not be allowed to enter drains, water courses or the soil.

9. PHYSICAL AND CHEMICAL PROPERTIES

- 9.1 Important Health Safety and Environmental Information**

KK-1416

Date 6.9.2013

Previous date: 2.4.2012

9.1.1	Appearance	
	Yellowish liquid	
9.1.2	Odour	Slight Odour
9.1.3	Odour threshold	not determined
9.1.4	pH	appr. 9 (1 % solution)
9.1.5	Melting point/freezing point	-
9.1.6	Initial boiling point and boiling range	> 100°C
9.1.7	Flash point	not determined
9.1.8	Evaporation rate	not determined
9.1.9	Flammability (solid, gas)	not significant
9.1.10	Explosive properties	
9.1.10.1	Lower explosion limit	not applicable
9.1.10.2	Upper explosion limit	not applicable
9.1.11	Vapour pressure	not determined
9.1.12	Vapour density	not applicable
9.1.13	Relative density	appr. 1,02 g/cm ³
9.1.14	Solubility(ies)	
9.1.14.1	Water solubility	completely soluble
9.2	Other information	
	None	

10. STABILITY AND REACTIVITY

- 10.1 Reactivity**
Stable under normal conditions.
- 10.2 Chemical stability**
Stable under normal conditions. Stable under recommended storage conditions.
- 10.3 Possibility of hazardous reactions**
Burning produces noxious and toxic fumes. Carbon dioxide (CO₂), carbon monoxide (CO).
- 10.4 Conditions to avoid**
Extremes of temperature and direct sunlight.
- 10.5 Incompatible materials**
Not known
- 10.6 Hazardous decomposition products**
Heating can release hazardous gases.

11. TOXICOLOGICAL INFORMATION

- 11.1 Information on toxicological effects**
There is no data available for this product. Data available only for some components.
- 11.1.1 Acute toxicity**
There is no data available for this product.
LD₅₀/oral/rat =>2000 mg/kg.
EC₅₀ (48h)>100 mg/l.
- 11.1.2 Irritation and corrosion**
There is no data available for this product.
- 11.1.5 STOT-single exposure**
No data is available on the product itself.

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12. ECOLOGICAL INFORMATION

- 12.1 Toxicity**
- 12.1.1 Aquatic toxicity**
No data is available on the product itself. LEC50/48h/daphnia => 100 mg/l.
- 12.1.2 Toxicity to other organisms**
-
- 12.2 Persistence and degradability**
- 12.2.1 Biodegradation**
-
- 12.2.2 Chemical degradation**
-
- 12.3 Bioaccumulative potential**
-
- 12.4 Mobility in soil**
No information available.
- 12.5 Results of PBT and vPvB assessment**
No information available.
- 12.6 Other adverse effects**
None.

13. DISPOSAL CONSIDERATIONS

Can be disposed as waste water, when in compliance with local regulations. pH of waste water should be between 6-8 before to enter drains.

- 13.1 Waste treatment methods**
Taking into account local regulations the product may be disposed of as waste water after neutralisation.
- 13.2 Waste from residues / unused products**
Empty containers can be landfilled, when in accordance with the local regulations.

14. TRANSPORT INFORMATION

	Land transport ADR/RID	Sea transport IMDG/IMO
14.1 UN number	Not classified as dangerous for conveyance in the meaning of the regulations for the transport of dangerous goods by road and rail.	Not classified as dangerous in the meaning of sea and air transport regulations.
14.2 UN proper shipping name		
14.3 Transport hazard class(es)		
14.4 Packing group		
14.5 Environmental hazards		
Other information		

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14.6 Special precautions for users

None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

No

15. REGULATORY INFORMATION**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****15.2 Chemical safety assessment**

None

16. OTHER INFORMATION**16.3 Key literature references and sources for data**

Material Safety Data Sheets of manufacturers 2010/02/03, 30.9.2011, 5.10.2005/. Sosiaali- ja Terveysministeriö, Julkaisuja 2009:I I: HTP-arvot 2009, Kemian työsuojeluneuvottelukunta. STMp 509/2005 vaarallisten aineiden luettelosta. Environmental properties of chemicals, Vol.1, 2000, <http://www.cerij.or.jp7/ceri_en/koukai_menu.html>, NIOSH. Chemical listing and documentation for immediately dangerous to life and health concentrations (IDLHs). www.occup.health.fi/tt/OVA <<http://www.occup.health.fi/tt/OVA>>. Kemikaalilaki, Opas valmistajille ja käyttäjille, osat 1 ja 2, 2002

16.5 List of relevant R phrases, hazard statements, safety phrases and/or precautionary statements

R22 Harmful if swallowed.
R41 Risk of serious damage to eyes.

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Document ID:



Rev. V001