SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name Acryloyl chloride

Stock number: L10363
CAS Number: 814-68-6
EC number: 212-399-0

1.2 Relevant identified uses of the substance or mixture and uses advised against.

Identified use: SU24 Scientific research and development

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier: Thermo Fisher (Kandel) GmbH
Zeppelinstr. 7b
76185 Karlsruhe / Germany
Tel: +49 (0) 721 84007 280
Fax: +49 (0)721 84007 300
Email: tech@alfa.com
www.alfa.com
Informing department: Product safety Tel + +049 (0) 7275 988687-0

1.4 Emergency telephone number:
Carechem 24: +44 (0) 1235 239 670 (Multi-language emergency number)
Poison Information Center Mainz
www.giftinfo.uni-mainz.de Telephone: +49(0)6131/19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

GHS02 flame
Flam. Liq. 2 H225 Highly flammable liquid and vapour.

GHS06 skull and crossbones
Acute Tox. 1 H330 Fatal if inhaled.

GHS05 corrosion
Skin Corr. 1B H314 Causes severe skin burns and eye damage.

GHS07
Acute Tox. 4 H302 Harmful if swallowed.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 The substance is classified and labelled according to the CLP regulation.

Hazard pictograms

GHS02 GHS05 GHS06

Signal word Danger
Hazard statements
H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H330 Fatal if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P320 Specific treatment is urgent (see on this label).
P405 Store locked up.
P581 Disposal of contents/container in accordance with local/regional/national/international regulations.

Additional information:
EUH014 Reacts violently with water.

2.3 Other hazards

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

SECTION 3: Composition/information on ingredients

3.1 Substances

CAS# Designation: 814-68-6 Acryloyl chloride
Identification number(s): EC number: 212-399-0
Impurities and stabilising additives:
Stabilised with:
Phenothiazine (CAS# 92-84-2)

SECTION 4: First aid measures

4.1 Description of first aid measures

General information
Instantly remove any clothing soiled by the product.

Remove breathing apparatus only after soiled clothing has been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult doctor if symptoms persist.
Seek immediate medical advice.

After skin contact
Instantly wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

After eye contact
Rinse opened eye for several minutes under running water. Then consult doctor.

After swallowing
Seek medical treatment.

4.2 Most important symptoms and effects, both acute and delayed
Causes severe skin burns.
Harmful if swallowed.
Fatal if inhaled.

4.3 Indication of any immediate medical attention and special treatment needed
No further relevant information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing agents in case of fire, use sand, carbon dioxide or powdered extinguishing agent. Never use water.

For safety reasons unsuitable extinguishing agents
Water.

5.2 Special hazards arising from the substance or mixture
Reacts violently with water
Danger of containers bursting upon heating.

If this product is involved in a fire, the following can be released:
Carbon monoxide and carbon dioxide
Hydrogen chloride (HCl)

5.3 Advice for firefighters
Protective equipment:
Wear self-contained breathing apparatus.
Wear full protective suit.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation
Keep away from ignition sources

6.2 Environmental precautions:
Do not allow product to reach sewage system or water bodies.

6.3 Methods and material for containment and cleaning up:
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.
Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Do not flush with water or aqueous cleansing agents

Prevention of secondary hazards:
Keep away from ignition sources.

6.4 Reference to other sections
See Section 7 for information on safe handling
See section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Handle under dry protective gas.
Keep containers tightly sealed.
Ensure good ventilation/exhaustion at the workplace.
Open and handle container with care.
Information about protection against explosions and fires:
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.
Keep ignition sources away - Do not smoke.

7.2 Conditions for safe storage, including any incompatibilities
Storage
Requirements to be met by storerooms and containers:
Store in freezer (-20°C).
Information about storage in one common storage facility:
Store in the dark.
Protect from heat.
Store away from water.
Store away from strong bases.
Store away from oxidising agents.
Store away from amines.

Further information about storage conditions:
Store under dry inert gas.
This product is moisture sensitive.
Protect from humidity and keep away from water.
Keep container tightly sealed.
Protect from the effects of light.
Store in a locked cabinet or with access restricted to technical experts or their assistants.

7.3 Specific end use(s)
No further relevant information available.

SECTION 8: Exposure controls/personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

8.1 Control parameters
Components with critical values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
Additional information: No data

8.2 Exposure controls
Personal protective equipment
General protective and hygienic measures
The usual precautionary measures should be adhered to in handling the chemicals.
Keep away from foodstuffs, beverages and food.
Instantly remove any soiled and impregnated garments.
Wash hands during breaks and at the end of the work.
Store protective clothing separately.
Do not inhale dust / smoke / mist.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use self-contained respiratory protective device in emergency situations.
Trade name: Acryloyl chloride

(Contd. of page 2)

Protection of hands:
Check protective gloves prior to each use for their proper condition. The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

Material of gloves: Chloroprene rubber, CR
Penetration time of glove material (in minutes): 30
Glove thickness: 0.6 mm
Eye protection:
Tightly sealed safety glasses.
Full face protection.
Body protection: Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance:</td>
</tr>
<tr>
<td>Form:</td>
</tr>
<tr>
<td>Liquid</td>
</tr>
<tr>
<td>Smell:</td>
</tr>
<tr>
<td>Acrid</td>
</tr>
<tr>
<td>Odour threshold:</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
<tr>
<td>pH-value:</td>
</tr>
<tr>
<td>Not determined</td>
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</table>

<table>
<thead>
<tr>
<th>Change in condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting point/Melting range: Not determined</td>
</tr>
<tr>
<td>Boiling point/Boiling range: 74-76 °C</td>
</tr>
<tr>
<td>Sublimation temperature / start: Not determined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flash point:</th>
</tr>
</thead>
<tbody>
<tr>
<td>-4 °C</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Inflammability (solid, gaseous)</th>
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</thead>
<tbody>
<tr>
<td>Not determined.</td>
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<table>
<thead>
<tr>
<th>Ignition temperature:</th>
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</thead>
<tbody>
<tr>
<td>Not determined.</td>
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<table>
<thead>
<tr>
<th>Decomposition temperature:</th>
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<tbody>
<tr>
<td>Not determined.</td>
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<table>
<thead>
<tr>
<th>Self-Inflammability:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Danger of explosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product is not explosive. However, formation of explosive air/steam mixtures is possible.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Critical values for explosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower:</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
<tr>
<td>Upper:</td>
</tr>
<tr>
<td>Not determined</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Steam pressure at 20 °C:</th>
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</thead>
<tbody>
<tr>
<td>106,6 hPa</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Density at 20 °C:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,114 g/cm³</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Relative density:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined.</td>
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</table>

<table>
<thead>
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<th>Vapour density:</th>
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</thead>
<tbody>
<tr>
<td>Not determined.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaporation rate:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Solubility in / Miscibility with Water:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reacts violently</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partition coefficient (n-octanol/water):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Viscosity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>dynamic:</td>
</tr>
<tr>
<td>Not determined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>kinematic:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not determined</td>
</tr>
</tbody>
</table>

9.2 Other information: No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity: Reacts violently with water.
10.2 Chemical stability: Stable under recommended storage conditions.

Thermal decomposition / conditions to be avoided: No decomposition if used and stored according to specifications.
10.3 Possibility of hazardous reactions:
Reacts with strong oxidising agents
Danger of polymerisation
Reacts violently with water
10.4 Conditions to avoid: No further relevant information available.
10.5 Incompatible materials:
- Bases
- Oxidising agents
- Amines
- Water/moisture
- Heat
- Light
- Ultraviolet radiation
- Free radical initiators

10.6 Hazardous decomposition products:
- Carbon monoxide and carbon dioxide
- Hydrogen chloride (HCl)

Additional information:
- Avoid loss of stabilizer.
- Unless inhibited, the product can polymerize resulting in a temperature and pressure increase that may rupture the container.

SECTION 11: Toxicological information

11.1 Information on toxicological effects:
Acute toxicity:
- Harmful if swallowed.
- Fatal if inhaled.
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.
LD/LC50 values that are relevant for classification:

<table>
<thead>
<tr>
<th>Inhalative</th>
<th>LC50/2H</th>
<th>92 mg/m3/2H (mouse)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LD10/LC10</th>
<th>values that are relevant for classification:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Skin irritation or corrosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes severe skin burns.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eye irritation or corrosion:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes serious eye damage.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sensitization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No sensitizing effect known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Germ cell mutagenicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carcinogenicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reproductive toxicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific target organ system toxicity - repeated exposure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific target organ system toxicity - single exposure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aspiration hazard:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subacute to chronic toxicity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>No effects known.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional toxicological information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.</td>
</tr>
</tbody>
</table>

(Contd. on page 4)
SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity: No further relevant information available.
12.2 Persistence and degradability
No further relevant information available.
12.3 Bioaccumulative potential
No further relevant information available.
Additional ecological information:
General notes:
Do not allow product to reach ground water, water bodies or sewage system.
Water hazard class 2 (Self-assessment): hazardous for water.
Danger to drinking water if even small quantities leak into soil.
Avoid transfer into the environment.
12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.
12.6 Other adverse effects
No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
Recommendation
Hand over to disposers of hazardous waste.
Must be specially treated under adherence to official regulations.
Consult state, local or national regulations for proper disposal.
13.3 Uncleaned packagings:
Recommendation:
Disposal must be made according to official regulations.

SECTION 14: Transport information

UN-Number
ADR, IMDG, IATA
UN3383
14.2 UN proper shipping name
ADR 3383 TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. (Acryloyl chloride)
IMDG TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. (Acryloyl chloride)
IATA TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S.
14.3 Transport hazard class(es)
ADR
Class 6.1 (TF1) Toxic substances.
Label 6.1+3
IMDG, IATA
Class 6.1 Toxic substances.
Label 6.1+3
Packing group
ADR, IMDG, IATA
I
14.5 Environmental hazards:
Not applicable.
14.6 Special precautions for user
Warning: Toxic substances.
Kemler Number:
663
EMS Number:
F,E,S-D
14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.
Transport/Additional information:
ADR
Excepted quantities (EQ): E5
Limited quantities (LQ) 0
Transport category 1
Tunnel restriction code C/D
UN "Model Regulation": UN3383, TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. (Acryloyl chloride), 6.1 (3), I

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
Australian Inventory of Chemical Substances Substance is listed.
Standard for the Uniform Scheduling of Medicines and Poisons Substance is not listed.
National regulations
Information about limitation of use:
Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.
Classification according to VbF: A I
Technical instructions (air):

<table>
<thead>
<tr>
<th>Class</th>
<th>Share in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

Water hazard class: Water hazard class 2 (Self-assessment): hazardous for water.
Other regulations, limitations and prohibitive regulations
ELINCS (European List of Notified Chemical Substances) Substance is not listed.
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
Substance is not listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.
15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.
SECTION 16: Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

vPvB: very Persistent and very Bioaccumulative

ACGIH: American Conference of Governmental Industrial Hygienists (USA)

OSHA: Occupational Safety and Health Administration (USA)

NTP: National Toxicology Program (USA)

IARC: International Agency for Research on Cancer

EPA: Environmental Protection Agency (USA)

Flam. Liq. 2: Flammable liquids, Hazard Category 2

Acute Tox. 4: Acute toxicity, Hazard Category 4

Acute Tox. 1: Acute toxicity, Hazard Category 1

Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B