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

1.1 Product identifier
Trade name: (+/-)-Propylene oxide
Stock number: 30765
CAS Number: 75-56-9
EC number: 200-879-2
Index number: 603-055-00-4

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: Alfa Aesar GmbH & Co.KG
A Johnson Matthey Company
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 +49 (0) 7275 988687-0
1.4 Emergency telephone number:
Carechem 24: +44 (o) 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. 1 H224 Extremely flammable liquid and vapour.
GHS08 health hazard
Muta. 1B H340 May cause genetic defects.
Carc. 1B H350 May cause cancer.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC
T; Toxic
Carc. Cat. 2, Muta. Cat. 2
R45-46: May cause cancer. May cause heritable genetic damage.
Xn; Harmful
R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
Xi; Irritant
R36/37/38: Irritating to eyes, respiratory system and skin.
F+; Extremely flammable
R12: Extremely flammable.

2.2 Label elements
Labelling according to Regulation (EC) No 1272/2008
Hazard pictograms
GHS02, GHS07, GHS08
Signal word
Danger
Hazard statements
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P241 Use explosion-proof electrical/ventilating/lighting/equipment.
P303+P361+P337 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.
P405 Stors locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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: 75-56-9 (+/-)-Propylene oxide
EC number: 200-879-2

(Contd. on page 2)
SECTION 4: First aid measures

4.1 Description of first aid measures

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

No further relevant information available.

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
CO₂, sand, extinguishing powder. Do not use water.

5.2 Special hazards arising from the substance or mixture

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

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.
Do not allow material to be released to the environment without proper governmental permits.
Do not allow product to reach sewage system or water bodies.
Do not allow to enter the ground/soil.

6.2 Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

6.3 Methods and material for containment and cleaning up:

Keep away from ignition sources.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Disperse of contaminated material as waste according to item 13.
Ensure adequate ventilation.

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

Keep containers tightly sealed.
Store in cool, dry place in tightly closed containers.
Keep away from heat and direct sunlight.
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.

7.2 Conditions for safe storage, including any incompatibilities

Storage Requirements to be met by storerooms and containers:
Store in cool location.

Information about storage in one common storage facility:
Store away from oxidizing agents.

Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.
Protect from heat and direct sunlight.
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:

<table>
<thead>
<tr>
<th>Substance</th>
<th>MAK (TRGS 900) (Germany)</th>
<th>TRK (TRGS 900) (Germany)</th>
<th>PEL (USA)</th>
<th>REL (USA)</th>
<th>TLV (USA)</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPE 30-8 (+/-)-Propylene oxide (100.0%)</td>
<td>8 mg/m³, 2.5 ppm</td>
<td>6 mg/m³, 2.5 ppm</td>
<td>240 mg/m³, 100 ppm</td>
<td>See Pocket Guide App. A</td>
<td>4.8 mg/m³, 2 ppm</td>
<td>SEN</td>
</tr>
</tbody>
</table>

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.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.

Breathing equipment:

Use breathing protection with high concentrations.
Trade name (+/-)-Propylene oxide

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
Impervious gloves
Penetration time of glove material
Not determined
Eye protection:
Safety glasses
Face protection
Body protection:
Protective work clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
General Information
Appearance:
Form: Liquid
Colour: Colourless
Smell: Ether-like
Odour threshold: Not determined.
pH-value: Not determined.

Change in condition
Melting point/Melting range: -112 °C
Boiling point/Boiling range: 34-35 °C
Sublimation temperature / start: Not determined

Flash point: -37 °C
Inflammability (solid, gaseous): Not applicable.
Ignition temperature: 430 °C
Decomposition temperature: Not determined
Self-inflammability: Not determined.
Critical values for explosion:
Lower: 1.9 Vol %
Upper: 15 Vol %
Steam pressure at 20 °C: 590 hPa
Density at 20 °C: 0.83 g/cm³
Relative density: Not determined.
Vapour density: Not determined.
Evaporation rate: Not determined.
Solubility in / Miscibility with
Water at 20 °C: 405 g/l
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not determined.
kinematic: Not determined.

9.2 Other information
No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity
No information known.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No decomposition if used and stored according to specifications.

10.5 Incompatible materials:
Oxidizing agents

10.6 Hazardous decomposition products:
Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity:
Harmful if inhaled.
Harmful in contact with skin.
Harmful if swallowed.
Danger by skin resorption.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LC50 values that are relevant for classification:
Oral LD50 380 mg/kg (rat)
Dermal LD50 1245 mg/kg (rabbit)
Inhalative LC50/4H 9.7 mg/l/4H (rat)

Skin irritation or corrosion:
Causes skin irritation.

Eye irritation or corrosion:
Causes serious eye irritation.

Sensitization:
No sensitizing effect known.

Germ cell mutagenicity:
May cause genetic defects.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.

Carcinogenicity:
May cause cancer.

EPA-B2: Probable human carcinogen, sufficient evidence from animal studies; inadequate evidence or no data from epidemiologic studies.
IARC-2B: Possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals.
NTP-R: Reasonably anticipated to be a carcinogen: limited evidence from studies in humans or sufficient evidence from studies in experimental animals.
ACGIH A3: Animal carcinogen: Agent is carcinogenic in experimental animals at a relatively high dose, by route(s) of administration, at site(s), of histologic type(s), or by mechanism(s) not considered relevant to worker exposure. Available epidemiologic studies do not confirm an increased risk of cancer in exposed humans.
Available evidence suggests that the agent is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or neoplastic data for this substance.

Reproductive toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.

Specific target organ system toxicity - repeated exposure:
No effects known.

Specific target organ system toxicity - single exposure:
May cause respiratory irritation.

Aspiration hazard:
No effects known.

Experience with humans:
The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.

Additional toxicological information:
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
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.

12.4 Mobility in soil
Do not allow material to be released to the environment without proper governmental permits.
Water danger class 3 (Self-assessment): extremely hazardous for water.
Do not allow product to reach ground water, water bodies or sewage system, even in small quantities.
Danger to drinking water if even extremely 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.

Uncleaned packagings:
Recommendation:
Disposal must be made according to official regulations.

SECTION 14: Transport information

14.2 UN proper shipping name
ADR 1280 PROPYLENE OXIDE
IMDG, IATA PROPYLENE OXIDE

14.3 Transport hazard class(es)
ADR

<table>
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<tr>
<th>Class</th>
<th>Label</th>
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<tbody>
<tr>
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IMDG

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IATA

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Packaging group
ADR, IMDG, IATA I

14.5 Environmental hazards:
Not applicable.

14.6 Special precautions for user
Kemler Number: 33

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):
Limited quantities (LQ): E3
Transport category: I
Tunnel restriction code: D/E
UN "Model Regulation": UN1280, PROPYLENE OXIDE, 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 Drugs and Poisons
75-56-9 (+/-)-Propylene oxide S7

National regulations
Information about limitation of use: Workers should not be exposed to this hazardous material. Exceptions can be made by the authorities in certain exceptional cases.
Employment restrictions concerning young persons must be observed.
For use only by technically qualified individuals.

Classification according to VbF:
Technical instructions (air):

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

Water hazard class:
Water danger class 3 (Self-assessment): extremely hazardous for water.

Other regulations, limitations and prohibitive regulations
ELINCS (European List of Notified Chemical Substances)
Substance is not listed.
<table>
<thead>
<tr>
<th>Trade name</th>
<th>(+/-)-Propylene oxide</th>
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</table>

**Substances of very high concern (SVHC) according to REACH, Article 57**

This product contains a product listed by the European Chemicals Agency (ECHA) as a Substance of Very High Concern (SVHC). Information concerning SVHC can be found in Annex XIV for the REACH Regulation.

**REACH - Pre-registered substances**

Substance is 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:**

Health, Safety and Environmental Department.

**Abbreviations and acronyms:**

- RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
- ICAO: International Civil Aviation Organization
- 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
- VbF: Verordnung über brennbare Flüssigkeiten, Österreich (Ordinance on the storage of combustible liquids, Austria)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent