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CVR No. DK 12 76 00 43

SAFETY DATA SHEET

Maleic anhydride 30% in cyclohexanone

Revision: Sections containing a revision or new information are marked with a ♣.

♣ SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. **Product identifier** ..... **Maleic anhydride 30% in cyclohexanone**
Contains maleic anhydride and cyclohexanone

1.2. **Relevant identified uses of the substance or mixture and uses advised against** ..... Can be used as chemical intermediate only.

1.3. **Details of the supplier of the safety data sheet**

CHEMINOVA A/S, a subsidiary of FMC Corporation
Thyborønvej 78
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Denmark
SDS.Ronland@fmc.com

1.4. **Emergency telephone number**
Company ..... +45 97 83 53 53 (24 h; for emergencies only)

Medical emergencies:
Austria: +43 1 406 43 43
Belgium: +32 70 245 245
Bulgaria: +359 2 9154 409
Cyprus: 1401
Czech Republic: +420 224 919 293
+420 224 915 402
Denmark: +45 82 12 12 12
England and Wales: 111
France: +33 (0) 1 45 42 59 59
Finland: +358 9 471 977
Greece: 30 210 77 93 777
Hungary: +36 80 20 11 99
Ireland (Republic): +353 1 837 9964
Italy: +39 02 6610 1029
Latvia: +371 670 42 473
112
Lithuania: +370 523 62052
+370 687 53378
Luxembourg: +352 8002 5500
Netherlands: +31 30 274 88 88
Norway: +47 22 591300
Poland: +48 22 619 66 54
+48 22 619 08 97
Portugal: 808 250 143 (in Portugal only)
+351 21 330 3284
Romania: +40 21318 3606
Scotland: +8454 24 24 24
Slovakia: +421 2 54 77 4 166
Slovenia: +386 41 650 500
South Africa: +27 83 123 3911 (Bateleur Emergency Response Co.)
Spain: +34 91 562 04 20
Sweden: +46 08-331231
112
Switzerland: 145
Turkey: 114
U.S.A. & Canada: +1 800 / 331 3148 (ProPharma)
All other countries: +1 651 / 632 6793 (ProPharma - Collect)

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♣ SECTION 2: HAZARDS IDENTIFICATION

2.1. **Classification of the substance or mixture**

Flammable liquid: Category 3 (H226)
Acute oral toxicity: Category 4 (H302)
Acute dermal toxicity: Category 4 (H312)
Skin corrosion: Category 1C (H314)
Sensitisation – respiratory: Category 1 (H334)
Sensitisation – skin: Category 1 (H317)

Physicochemical hazards ..... The product is flammable.

The product reacts slowly with water from the atmosphere.

Health hazards ..... The product is corrosive and may cause serious irritation/burns by all routes of exposure. It may cause allergic sensitisation by inhalation and by skin contact.

Environmental hazards ..... The product is not expected to be toxic to aquatic organisms.

2.2. **Label elements**

According to EU Reg. 1272/2008 as amended

Product identifier ..... Maleic anhydride 30% in cyclohexanone
Contains maleic anhydride and cyclohexanone

Hazard pictograms (GHS02, GHS07, GHS05, GHS08)

Signal word ..... Danger

Hazard statements

H226 ..... Flammable liquid and vapour.
H302 ..... Harmful if swallowed.
H312 ..... Harmful in contact with skin.
H314 ..... Causes severe skin burns and eye damage.
H317 ..... May cause an allergic skin reaction.
H334 ..... May cause allergy, asthma symptoms or breathing difficulties if inhaled.

Precautionary statements

P260 ..... Do not breathe mist.
P280 ..... Wear protective gloves, protective clothing and eye/face protection.
P301+P330+P331 ..... IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P305+P351+P338 ..... IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 ..... Call a POISON CENTER or doctor/physician if you feel unwell.
P501 ..... Dispose of contents/container as hazardous waste.

2.3. **Other hazards** ..... None of the ingredients meets the criteria for being PBT or vPvB.

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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. **Substances** — The material is a mixture, not a substance.

3.2. **Mixtures** ..... See section 16 for full text of hazard statements.

Reportable ingredients	Content (% w/w)	CAS no.	EC no. (EINECS no.)	Classification
Cyclohexanone Reg. no. 01-2119453616-35	70	108-94-1	203-631-1	Flam. Liq. 3 (H226) Acute Tox. 4 (H332)
Maleic anhydride Reg. no. 01-2119472428-31	30	108-31-6	203-571-6	Acute Tox. 4 (H302) Skin Corr. 1B (H314) Resp. Sens. 1 (H334) Skin Sens. 1 (H317)

SECTION 4: FIRST AID MEASURES

4.1. **Description of first aid measures** — In case of exposure, do not wait for symptoms to develop. Immediately start the recommended procedures below.

Inhalation ..... If experiencing any discomfort, immediately remove from exposure. Light cases: Keep person under surveillance. Get medical attention immediately if symptoms develop. Serious cases: Get medical attention immediately or call for an ambulance.

If breathing has stopped, immediately start artificial respiration and maintain until a physician takes charge of the exposed person.

Skin contact ..... Immediately remove contaminated clothing and footwear. Flush skin with much water. Continue rinsing with water until all chemical is removed. Apply a sterile gauze bandage if skin is damaged. See physician if required.

Eye contact ..... Immediately rinse eyes with much water or eyewash solution, occasionally opening eyelids, until no evidence of chemical remains. Remove contact lenses after a few minutes and rinse again. Get medical attention if irritation immediately.

Ingestion ..... If the exposed person is conscious, let him/her rinse mouth and let him/her drink several glasses of water or milk, but do not induce vomiting. If vomiting does occur, rinse mouth and drink fluids again. Never give anything by mouth to an unconscious person. Get medical attention immediately.

4.2. **Most important symptoms and effects, both acute and delayed** — Irritation.

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4.3. **Indication of any immediate medical attention and special treatment needed**

Immediate medical attention is required in case of ingestion or eye contact.

It may be helpful to show this safety data sheet to physician.

Notes to physician .....

Irritated skin should be treated as usual against effects of acids or acid fumes. There is no specific antidote against this material. Probable mucosal damage may contraindicate the use of gastric lavage.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. **Extinguishing media** .....

Dry chemical or carbon dioxide for small fires, water spray or foam for large fires. Avoid heavy hose streams.

5.2. **Special hazards arising from the substance or mixture**

The essential breakdown products are carbon monoxide and carbon dioxide.

The product reacts slowly with water. The remaining water will be acidic.

5.3. **Advice for firefighters** .....

Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Fight fire from protected location or maximum possible distance. Dike area to prevent water runoff. Firemen should wear self-contained breathing apparatus and protective clothing.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. **Personal precautions, protective equipment and emergency procedures**

It is recommended to have a predetermined plan for the handling of spills. Empty, closable vessels (not metal) for the collection of spills should be available.

In case of large spill (involving 10 tonnes of the product or more):
1. use personal protection equipment; see section 8
2. call emergency telephone no.; see section 1
3. alert authorities.

Observe all safety precautions when cleaning up spills. Use personal protection equipment. Depending on the magnitude of the spill this may mean wearing respirator, face mask or eye protection, chemical resistant clothing, gloves and boots.

Stop the source of the spill immediately if safe to do so. Avoid and reduce formation of mist as much as possible. Keep unprotected persons away from the spill area. Personal exposure by splashing must be avoided. Remove sources of ignition.

6.2. **Environmental precautions** .....

Contain the spill to prevent any further contamination of surface, soil or water. Wash waters must be prevented from entering surface water

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drains. Uncontrolled discharge into water courses must be alerted to the appropriate regulatory body.

6.3. **Methods and materials for containment and cleaning up**

It is recommended to consider possibilities to prevent damaging effects of spills, such as bunding or capping. See GHS (Annex 4, Section 6).

Use non-sparking tools and equipment. If appropriate, surface water drains should be covered. Minor spills on the floor or other impervious surface should be absorbed onto an absorptive material such as universal binder, hydrated lime, Fuller's earth or other absorbent clays. Collect the contaminated absorbent in suitable containers. Clean area with soda lye and much water. Absorb wash liquid onto absorbent and transfer to suitable containers. The used containers should be properly closed and labelled.

Spills in water should be contained as much as possible by isolation of the contaminated water. The contaminated water must be collected and removed for treatment or disposal.

6.4. **Reference to other sections** .....

See subsection 8.2. for personal protection.
See section 13 for disposal.

SECTION 7: HANDLING AND STORAGE

7.1. **Precautions for safe handling** ....

Formation of explosive vapour-air mixtures is possible. Fire prevention measures should be taken. Take measures against electrostatic discharges. Keep away from sources of ignition and protect from exposure to fire and heat.

In an industrial environment, it is recommended to avoid all personal contact with the product, if possible by using closed systems with remote system control. The material should be handled by mechanical means as much as possible. Adequate ventilation or local exhaust ventilation is required. The exhaust gases should be filtered or treated otherwise. Splashing and the formation of aerosol or mist must be avoided. For personal protection in this situation, see section 8.

Remove contaminated clothing immediately. Wash thoroughly after handling. Before removing gloves, wash them with water and soap. After work, take off all work clothes and footwear. Take a shower, using water and soap. Wear only clean clothes when leaving job. Wash protective clothing and protective equipment with water and soap after each use.

Do not discharge to the environment. Collect all waste material and remains from cleaning equipment, etc., and dispose of as hazardous waste. See section 13 for disposal.

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7.2. **Conditions for safe storage, including any incompatibilities**

The product is stable under normal conditions of warehouse storage.

Store in closed, labelled containers. The storage room should be constructed of incombustible material, closed, dry, ventilated and with impermeable floor, without access of unauthorised persons or children. The room should only be used for storage of chemicals. Food, drink, feed and seed should not be present. A hand wash station should be available.

7.3. **Specific end use(s)** ..... The material can be used as chemical intermediate only.

♣ SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. **Control parameters**

Personal exposure limits

		Year	
Cyclo-hexanone	ACGIH (USA) TLV	2015	TWA 20 ppm STEL 50 ppm Skin notation; BEI
	OSHA (USA) PEL	2015	TWA 50 ppm (200 mg/m^3)
	EU, 2000/39/EC as amended	2017	8-hr TWA 10 ppm (40.8 mg/m^3) Peak level 20 ppm (81.6 mg/m^3); max. duration 15 min. Skin notation
	Germany, MAK	2014	Skin notation; EKA
	HSE (UK) WEL	2011	8-hr TWA 10 ppm (41 mg/m^3) STEL 20 ppm (82 mg/m^3); 15-minute reference period Skin notation; BMGV
Maleic anhydride	ACGIH (USA) TLV	2015	TWA 0.0025 ppm (0.01 mg/m^3); measured as inhalable fraction and vapor
	OSHA (USA) PEL	2015	TWA 0.25 ppm (1 mg/m^3)
	EU, 2000/39/EC as amended	2017	Not established
	Germany, MAK	2014	0.1 ppm (0.41 mg/m^3) Peak level 0.1 ppm (0.41 mg/m^3)
	HSE (UK) WEL	2011	TWA 1 mg/m^3 STEL: 3 mg/m^3, 15-min. reference period

However, other personal exposure limits defined by local regulations may exist and must be observed.

Cyclohexanone

DNEL, dermal	10 mg/kg bw/day
DNEL, inhalation	100 mg/m^3
PNEC, aquatic	0.0329 mg/l

Maleic anhydride

DNEL, dermal	0.04 mg/kg bw/day
DNEL, inhalation	0.4 mg/m^3
PNEC, freshwater	0.04 mg/l
PNEC, marine water	0.004 mg/l

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8.2. **Exposure controls** .....

When used in a closed system, personal protection equipment will not be required. The following is meant for other situations, when the use of a closed system is not possible, or when it is necessary to open the system. Consider the need to render equipment or piping systems non-hazardous before opening.

In cases of incidental high exposure, maximal personal protection may be necessary, such as respirator, face mask, chemical resistant coveralls.

Respiratory protection

Inhalation of vapours must be avoided, preferentially by mechanical means. If protection of workers by mechanical means is not possible, a face mask or officially approved respiratory protection equipment with a universal filter type including particle filter must be used.

Protective gloves .....

Wear chemical resistant gloves, such as barrier laminate, butyl rubber or nitrile rubber. The breakthrough times of these materials for this product are unknown. Generally, however, the use of protective gloves will give only partial protection against dermal exposure. Small tears in the gloves and cross-contamination can easily occur. It is recommended to replace the gloves frequently and to limit the work to be done manually.

Eye protection .....

Wear face shield rather than safety glasses or goggles. It is recommended to have an eye wash fountain immediately available in the workplace when there is a potential for eye contact.

Other skin protection

Wear appropriate chemical resistant clothing to prevent skin contact depending on the extent of exposure. During most normal work situations where exposure to the material cannot be avoided for a limited time span, waterproof pants and apron of chemical resistant material or coveralls of polyethylene (PE) will be sufficient. Coveralls of PE must be discarded after use if contaminated. In cases of excessive or prolonged exposure, coveralls of barrier laminate may be required.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. **Information on physical and chemical properties**

Appearance	Colourless liquid
Odour	Pungent acetone-like smell
Odour threshold	Not determined
pH	Not determined
Melting point	8 - 9°C
Initial boiling point and boiling range	> 150°C
Flash point	58°C (Pensky-Martens closed tester)
Evaporation rate	(Butyl acetate = 1)
	Cyclohexanone : 0.3

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Flammability (solid/gas)	Not applicable (liquid)	
Upper/ lower flammability or explosive limits	**Cyclohexanone**	: 1 - 9.4 vol% (≈ 1 - 9.4 kPa)
	Maleic anhydride	: 1.4 - 7.1 vol% (≈ 1.4 - 7.1 kPa)
Vapour pressure	**Cyclohexanone**	: 0.47 kPa at 20°C
	Maleic anhydride	: 0.033 kPa at 25°C
Vapour density	(Air = 1)	
	Cyclohexanone	: 3.4
Relative density	Not determined Density: 1.04 g/ml at 25°C	
Solubilities	Maleic anhydride reacts with water.	
Partition coefficient n-octanol/water	**Cyclohexanone**	: log K_{ow} = 0.86 at 25°C
	Maleic anhydride	: reacts with water
Autoignition temperature	> 460°C	
Decomposition temperature	Decomposition of maleic anhydride starts at 200°C.	
Viscosity	Not determined	
Explosive properties	Not explosive	
Oxidising properties	Not oxidising	

9.2. **Other information** ..... No more relevant information is available.

♣ SECTION 10: STABILITY AND REACTIVITY

10.1. **Reactivity** ..... To our knowledge, the product has no special reactivities.

10.2. **Chemical stability** ..... The product is stable during normal handling and storage at ambient temperatures.

10.3. **Possibility of hazardous reactions** Explosion is possible at high temperatures in contact with basic materials such as ammonia, amines, pyridine, alkali metals, etc. Even small amounts of basic materials can cause explosion when the product is heated.

10.4. **Conditions to avoid** ..... Heating of the substance will produce harmful and irritant vapours.

10.5. **Incompatible materials** ..... See above.

10.6. **Hazardous decomposition products** See subsection 5.2.

♣ SECTION 11: TOXICOLOGICAL INFORMATION

11.1. **Information on toxicological effects** * = Based on available data, the classification criteria are not met.

Product

Acute toxicity	The product is expected to be harmful by ingestion and dermal contact. The acute toxicity is estimated as:	
Route(s) of entry	- ingestion	LD_{50}, oral, rat: 1000 – 2000 mg/kg
	- skin	LD_{50}, dermal, rat: 1000 – 2000 mg/kg
	- inhalation	LC_{50}, inhalation, rat: 2 mg/l/4 h

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Skin corrosion/irritation	Expected to be irritating to skin. *
Serious eye damage/irritation	Expected to be severely irritating to eyes.
Respiratory or skin sensitisation ...	Expected to be a respiratory and a skin allergen.
Germ cell mutagenicity	The product contains no ingredients known to be mutagenic. *
Carcinogenicity	The product contains no ingredients known to be carcinogenic. *
Reproductive toxicity	The product contains no ingredients found have adverse effects on reproduction. *
STOT – single exposure	To our knowledge, no specific effects have been observed after single exposure. *
STOT – repeated exposure	Organic solvents generally are suspected to cause irreversible damage to the nervous system on repeated exposure. For cyclohexanone this effect was observed in humans after exposure to approx. 40 ppm (0.160 mg/l) during working hours for several years. * The following has been found for maleic anhydride: NOEL, ingestion, 40 mg/kg bw/day in a 90-day study with rats (method OECD 408) NOAEC, inhalation, was found to be 3.3 mg/m^3 (0.8 ppm) both for rats and monkeys in 6-months studies (method OECD 413) based on decreased body weight and eye/nasal irritation effects. *
Aspiration hazards	The product is not of a type known to present an aspiration pneumonia hazard. *
Symptoms and effects, acute and delayed	Irritation.

Cyclohexanone

Toxicokinetics, metabolism and distribution		After oral intake, cyclohexanone is readily absorbed and widely distributed in the body. It is extensively metabolised to natural body constituents and partially taken up in the organism.
Acute toxicity		Cyclohexanone is harmful by inhalation. It may have harmful effects by ingestion and skin contact as well. Study results for inhalation toxicity are divergent. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: 1820 mg/kg (average of 6 study results)
	- skin	LD_{50}, dermal, rabbit: 950 mg/kg (average of 5 study results)
	- inhalation	LC_{50}, inhalation, rat: 3 - 30 mg/l/4 h
Skin corrosion/irritation		Cyclohexanone has irritating properties to skin as has been found in several studies. It is not clear if the classification criteria are met.

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Serious eye damage/irritation		Cyclohexanone has irritating properties to eyes as has been found in several studies. It is not clear if the classification criteria are met.
Respiratory or skin sensitisation ...		To our knowledge, no indications of allergenic effects have been reported. Negative results were found in a number of tests. *
Maleic anhydride		
Toxicokinetics, metabolism and distribution		After oral intake, maleic anhydride is readily absorbed and widely distributed in the body. It is extensively metabolised to natural body constituents and partially taken up in the organism.
Acute toxicity		The substance is harmful by ingestion. The acute toxicity is measured as:
Route(s) of entry	- ingestion	LD_{50}, oral, rat: 1090 mg/kg (method OECD 401)
	- skin	LD_{50}, dermal, rabbit: 2620 mg/kg (method OECD 402) *
	- inhalation	LC_{50}, inhalation, rat: no reliable data available
Skin corrosion/irritation		The substance is corrosive (method similar to OECD 404).
Serious eye damage/irritation		The substance is corrosive.
Respiratory or skin sensitisation ...		Allergenic properties have been observed in humans.

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity** ..... The product is not considered as harmful to aquatic organisms.

The acute toxicity of the ingredients is measured as:			**Maleic anhydride**	**Cyclohexanone**
- Fish	Ide (*Leuciscus idus*)	48-h LC_{50}	115 mg/l	536 mg/l
	Fathead minnow (*Pimephales promelas*)			527 mg/l
- Invertebrates	Daphnids (*Daphnia magna*)	24-h EC_{50}	88 mg/l	820 mg/l
- Algae	Green algae (*Scenedesmus subspicatus*)	72-h IC_{50}	29 mg/l	

12.2. **Persistence and degradability** .... Both maleic anhydride and cyclohexanone are readily biodegradable.

12.3. **Bioaccumulative potential** ..... See section 9 for octanol-water partition coefficient.

Neither maleic anhydride nor cyclohexanone are expected to bioaccumulate.

12.4. **Mobility in soil** ..... Cyclohexanone has high mobility in the environment. It will rapidly evaporate.

In the environment, maleic anhydride reacts with moisture in the soil or in the atmosphere.

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12.5. **Results of PBT and vPvB assessment** ..... None of the ingredients meets the criteria for being PBT or vPvB.

12.6. **Other adverse effects** ..... Other relevant hazardous effects in the environment are not known.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. **Waste treatment methods** ..... Remaining quantities of the material and empty but unclean packaging should be regarded as hazardous waste.

Disposal of waste and packagings must always be in accordance with all applicable local regulations.

Disposal of product ..... According to the Waste Framework Directive (2008/98/EC), possibilities for reuse or reprocessing should first be considered. If this is not feasible, the material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Disposal of packaging ..... It is recommended to consider possible ways of disposal in the following order:
1. Reuse or recycling should first be considered. If offered for recycling, containers must be emptied and triply rinsed (or equivalent). Do not discharge rinsing water to sewer systems.
2. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.
3. Delivery of the packaging to a licensed service for disposal of hazardous waste.
4. Disposal in a landfill or burning in open air should only occur as a last resort. For disposal in a landfill, containers should be emptied completely, rinsed and punctured to make them unusable for other purposes. If burned, stay out of smoke.

♣ SECTION 14: TRANSPORT INFORMATION

ADR/RID/IMDG/IATA/ICAO classification

14.1. **UN number** 2924

14.2. **UN proper shipping name** ..... Flammable liquid, corrosive, n.o.s. (cyclohexanone and maleic anhydride)

14.3. **Transport hazard class(es)** 3 (8)

14.4. **Packing group** III

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14.5. **Environmental hazards** ..... May be harmful in the aquatic environment.

14.6. **Special precautions for user** ..... Avoid any unnecessary contact with the product. Misuse can result in damage to health. Do not discharge to the environment.

14.7. **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code** ..... The product is not transported in bulk by ship.

♣ SECTION 15: REGULATORY INFORMATION

15.1. **Safety, health and environmental regulations/legislation specific for the substance or mixture**

Seveso category in Dir. 2012/18/EU, Annex I: flammable

Young people under the age of 18 are not allowed to work with this product.

All ingredients are covered by EU chemical legislation.

15.2. **Chemical safety assessment** ..... The results of a chemical safety assessment have been attached as Annex to this safety data sheet.

♣ SECTION 16: OTHER INFORMATION

Relevant changes in the safety data sheet ..... Minor corrections only.

List of abbreviations .....

ACGIH	American Conference of Governmental Industrial Hygienists
BMGV	Biological Monitoring Guidance Value
CAS	Chemical Abstracts Service
Dir.	Directive
DNEL	Derived No Effect Level
EC	European Community
EC_{50}	50% Effect Concentration
EINECS	European INventory of Existing Commercial Chemical Substances
EKA	Expositionsäquivalent für Krebserzeugende Arbeitsstoffe
GHS	Globally Harmonized classification and labelling System of chemicals, Fifth revised edition 2013
HSE	Health & Safety Executive, UK
IBC	International Bulk Chemical code
IC_{50}	50% Inhibition Concentration
LC_{50}	50% Lethal Concentration
LD_{50}	50% Lethal Dose
MAK	Maximale Arbeitspaltz-Konzentration
MARPOL	Set of rules from the International Maritime Organisation (IMO) for prevention of sea pollution
NOAEC	No Observed Adverse Effect Concentration
NOEL	No Observed Effect Level

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n.o.s.	Not otherwise specified
OSHA	Occupational Safety and Health Administration
PBT	Persistent, Bioaccumulative, Toxic
PEL	Personal Exposure Limit
PBT	Persistent, Bioaccumulative, Toxic
PNEC	Predicted No Effect Concentration
Reg.	Registration, or Regulation
STEL	Short-Term Exposure Limit
STOT	Specific Target Organ Toxicity
TLV	Threshold Limit Value
TWA	Time Weighted Average
vPvB	very Persistent, very Bioaccumulative
WEL	Workplace Exposure Limit

References ..... Data are available from published literature and can be found several places.

Method for classification ..... Flammable liquid: test data
Acute oral toxicity: calculation method
Acute dermal toxicity: calculation method
Skin corrosion: calculation method
Sensitisation – respiratory: calculation method
Sensitisation – skin: calculation method

Used hazard statement .....

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H332	Harmful if inhaled.
H334	May cause allergy, asthma symptoms or breathing difficulties if inhaled.

Advice on training ..... This material should only be used by persons who are made aware of its hazardous properties and have been instructed in the required safety precautions.

The information provided in this safety data sheet is believed to be accurate and reliable, but uses of the product vary and situations unforeseen by FMC Corporation may exist. The user has to check the validity of the information under local circumstances.

Prepared by: FMC Corporation / Cheminova A/S / GHB

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Annex I: Estimation of operator exposure during use of the product at a dedicated facility

1. Exposure scenario

Table 1. Description of the ES

1. Title			
Free short title	Industrial use as an intermediate		
Systemic title based on use descriptor	ERC 1, 6a, PC 19, PROC 1, 2, 3, 8b and 15; SU 3 and 8		
Processes, tasks, activities covered	Industrial use resulting in manufacture of another substance		
Exposure assessment methodology	Tool used: ECETOC TRA workers (v2.3) modified		
2. Operational conditions and risk management measures			
Control of workers exposure for PROC 1, 2, 3, 8b and 15			
Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Product characteristics			
Physical state of product	liquid		
Concentration of substance in product	35	%	
Vapour pressure	12.04	hPa	
Fugacity	moderate		
Amounts used			
			Not relevant in ECETOC TRA
Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		Relevant for PROC 1, 3 and 15
	Palm of both hands (480 cm^2)		Relevant for PROC 2 and 8b
Other given operational measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Relevant for PROC 2, 3 and 15: effectiveness 90%
			Relevant for PROC 8b: effectiveness 97%
Conditions and measures to prevent /limit releases, dispersion and exposure			

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			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	Yes		Relevant for PROC 2 and 8b: effectiveness 95%
			Relevant for PROC 3: effectiveness 97.5%
			Relevant for PROC 15: effectiveness 90%
Use of suitable gloves	Yes		Relevant for PROC 1, 3 and 15: effectiveness 80%
	Yes + basic training		Relevant for PROC 2: effectiveness 90%
	Yes + int. managm. supervision controls		Relevant for PROC 8b: effectiveness 98%

Table 2: Estimated exposure for workers / contributing scenario for PROC 1

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic, inhalative	0.04	mg/m^3	
Long term exposure, local, dermal	20.0	$\mu g/cm^2$	
Short-term exposure, systemic, inhalative	0.08	mg/m^3	
Short-term exposure local, dermal	20.0	$\mu g/cm^2$	

Table 3: Estimated exposure for workers / contributing scenario for PROC 2

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic, inhalative	0.20	mg/m^3	

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Long term exposure, local, dermal	20.0	µg/cm^2	
Short-term exposure, systemic, inhalative	0.41	mg/m^3	
Short-term exposure local, dermal	20.0	µg/cm^2	

Table 4: Estimated exposure for workers / contributing scenario for PROC 3

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic, inhalative	0.26	mg/m^3	
Long term exposure, local, dermal	20.0	µg/cm^2	
Short-term exposure, systemic, inhalative	0.51	mg/m^3	
Short-term exposure local, dermal	20.0	µg/cm^2	

Table 5: Estimated exposure for workers / contributing scenario for PROC 8b

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic, inhalative	0.31	mg/m^3	
Long term exposure, local, dermal	20.0	µg/cm^2	
Short-term exposure, systemic, inhalative	0.61	mg/m^3	
Short-term exposure local, dermal	20.0	µg/cm^2	

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Table 6: Estimated exposure for workers / contributing scenario for PROC 15

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic, inhalative	0.10	mg/m^3	
Long term exposure, local, dermal	20.0	µg/cm^2	
Short-term exposure, systemic, inhalative	0.20	mg/m^3	
Short-term exposure local, dermal	20.0	µg/cm^2	