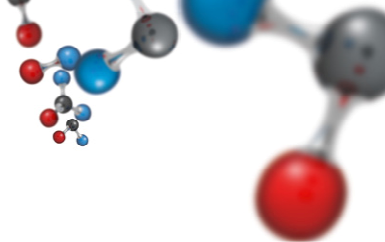


SAFETY DATA SHEET

TECHNICAL CYCLOHEXYLAMINE



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

1.1 Product identifier

Chemical name: **Cyclohexylamine**
Registration no.: **01-2119486803-29-0001**
Index number: **612-050-00-6**
ES (EINECS) number: **203-629-0**
CAS number: **108-91-8**
Other names of the substance: **Cyclohexanamine, Hexahydrobenzenamine**

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

Uses of the substance: **Cyclohexylamine is used in particular in rubber industry for production of the vulcanisation accelerator, corrosion inhibitor, synthetic sweeteners and for water treatment (the overview of exposure scenarios is set out in Annex 1).**

Uses advised against: **Not specified.**

1.3 Details of the supplier of the safety data sheet

Name: **BorsodChem MCHZ, s.r.o.**
Name or business name: **BorsodChem MCHZ, s.r.o.**
Place of business or headquarters: **Chemická 2039/1, 709 00 Ostrava – Mariánské Hory, Czech Republic**
Identification number: **26019388**
Telephone: **+420 596 641 111**
Fax: **+420 596 642 040**
E-mail of the technically competent person responsible for the safety data sheet:
zsvobodova@bc-mchz.cz

1.4 Emergency telephone number

Company telephone number: **+420 596 643 221 or 596 620 794 non-stop**
24-hours emergency contact CHEMTREC: 001-703-527-3887, company code CCN 206 072
The National Poisons Information Service (NPIS), City Hospital, Birmingham, B18 7QH, UK
Tel: +44 121 507 4123, fax: +44 121 507 5580, e-mail: allistervale@npis.org, www.npis.org
National Capital Poison Center, 3201 New Mexico Ave, Suite 310 Washington, DC 20016
Emergency Line: 1-800-222-1222, fax: 202-362-8377, e-mail: pc@poison.org, www.poison.org

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

According to Regulation (EC) no. 1272/2008:

Repr. 2; H361f Suspected of damaging fertility.

Acute Tox. 3; H311 Toxic in contact with skin.

Acute Tox. 3; H301 Toxic if swallowed.

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

Flam. Liq. 3; H226 Flammable liquid and vapour.

The most important human health adverse effects during use of the substance or preparation:
Caustic and toxic. Vapours severely irritate eyes and airways. Possible risk of impaired fertility.

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TECHNICAL CYCLOHEXYLAMINE

The most important adverse effects to environment during use of the substance/preparation:
Flammable.

2.2 Label elements

According to Regulation (EC) no. 1272/2008:

Symbols:



Signal word: DANGER

H phrases:

H226 Flammable liquid and vapour.

H301+H311 Toxic if swallowed or in contact with skin.

H314 Causes severe skin burns and eye damage.

H361f Suspected of damaging fertility.

P phrases:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313 IF exposed or concerned: Get medical advice/attention.

2.3 Other hazards

The substance is not identified as persistent, bioaccumulative and toxic (PBT) or very persistent, very bioaccumulative (vPvB) under Annex XIII of Regulation 1907/2006/ES.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Cyclohexylamine
Index number	612-050-00-6
EC No.	203-629-0
CAS No.	108-91-8
Substance content (% w.)	min. 99,4
Synonyms	Cyclohexanamine, Hexahydrobenzenamine

Impurities: < 1 % w., CMR impurities < 0,1 % w.

3.2 Mixtures

This is a chemical substance.

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TECHNICAL CYCLOHEXYLAMINE

SECTION 4: First aid measures

4.1 Description of first aid measures

Inhalation: Remove the victim quickly and considering own safety to fresh air, do not let the victim walk! Depending on situation, rinsing of oral cavity and nose, if necessary, with water is recommended. If the victim's clothing is contaminated, change the victim and protect him against cold. Ensure breathing. Call a physician!

Skin: Remove contaminated clothing immediately; before washing or during washing, remove any rings, watches, bracelet that are in places of contact of the substance with skin. Rinse affected areas with stream of lukewarm water, if possible, for 10 to 30 minutes; do not use a brush, soap or neutralising agents! Cover burned areas of skin with a sterile dressing, do not use any ointments or other medical and pharmaceutical products. Cover the victim to protect him against cold. Depending on situation, call the rescue service or ensure medical attention.

Eyes: Rinse eyes immediately under running water, open eyelids (even by force); if the victim wears contact lenses, remove them immediately. Do never neutralise! Rinse for 10 to 30 minutes from the inner to the outer ocular angle to prevent running of water in the other eye. Ensure as soon as possible medical treatment by an expert, if possible; the victim must get medical attention even in case of small injury.

Ingestion: **DO NOT INDUCE VOMITING** – higher risk of harm to digestive tract!!! Risk of perforation of oesophagus and stomach!

Rinse mouth immediately with water and give to drink 2-5 dl of cold water to attenuate thermal effect of the caustic (*due to almost immediate effect to mucous membranes, it is suitable to offer immediately tap water than loose time by looking for chilled liquid – each minute of delay causes irreversible harm to mucous membranes! Soda water or mineral waters are not recommended, as they may release gaseous carbon dioxide. It is not recommended to consume a lot of liquid, as it could induce vomiting and possible aspiration of the caustic in lungs*). Do not force the victim to drink, especially if he/she feels pain in mouth or throat. In this case, make the victim rinse his/her mouth. **DO NOT ADMINISTER ACTIVATED CARBON!** (*blackening will make examination of the mucous membranes more difficult and activated charcoal has not positive effect in case of acids and lyes*). Do not give to eat. Do not administer anything by mouth if the victim is unconscious or has convulsions. Get immediate medical attention!

4.2 Most important symptoms and effects, both acute and delayed

Vapours severely irritate eyes, airways, lungs and skin and cause burning. Possibility of pulmonary oedema, attention, it may occur up to 2 days later! Medical attention is necessary in case of inhalation of vapours. Contact with the liquid causes severe burns to eyes and skin. The liquid is absorbed by skin.

4.3 Indication of any immediate medical attention and special treatment needed

Symptomatic treatment. In case of contact with eyes, immediately rinse carefully with water. In case of irritating cough, administer Codeine. In case of contact with airways, administer 5 doses of a dexamethasone aerosol each 10 minutes (Auxison dos. aerosol). In case of risk of pulmonary oedema take into account a delay of up to 2 days! Prophylactic treatment, even in case of missing symptoms, 5 doses each 10 minutes, at least 3 times until symptoms disappear, at least 1 pack. Possibly Hydrocortisone or Prednisolone intravenously, 250 mg immediately, up to 1000 mg the first day, less the 2nd and the 3rd day. Strict rest in bed, infection prophylaxis. Oxygen as needed. Human albumin 20 %. In case of strong eyelid spasms, several drops of local anaesthetic (Xylocain).

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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: **big fire – foam for polar liquids, water mist or water spray**
small fire – water mist or water spray, dry powder, CO₂

Unsuitable extinguishing media: **not specified**

5.2 Special hazards arising from the substance or mixture: **Flammable liquid. Possibility of release of carbon monoxide and nitrogen oxides. Formation of toxic and explosive mixtures.**

5.3 Advice for firefighters: **Self-contained breathing apparatus, special protective clothing! (Hazchem-Code: 3WE).**

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: **Protection of air ways, protection of non-protected body parts, protection of eyes. Measure concentration of cyclohexanamine (hereinafter only CHA) in the environment, provide sufficient ventilation.**

6.2 Environmental precautions: **Prevent contamination of soil and water, check concentration of CHA in the environment in the vicinity of accident.**

6.3 Methods and material for containment and cleaning up: **Cover with an absorbent material (Vapex, Vermikulit) and sweep up into a waste container. For methods of disposal see Section 13.**

6.4 Reference to other sections: **Refer to section 10 and 13.**

SECTION 7: Handling and storage

7.1 Precautions for safe handling: **Delivered in rail or truck tanks or in steel barrels or in IBC containers in Ex-version. Ventilation provided during emptying.**

7.2 Conditions for safe storage, including any incompatibilities:

Store in easily ventilated rooms in original packages or in steel tanks. The highest allowable storing temperature is 35 °C. Do not store together with foodstuffs, strong oxidising agents and concentrated strong acids.

7.3 Specific end use(s): **Use only under strictly controlled conditions or while observing conditions stated in the exposure scenario – see Annex 1.**

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Czech republic: PEL(8-hour.)/NPK-P (15 minutes) = 20/40 mg.m⁻³

EC countries (2000/39/EC): Not established.

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Country	Limit (8 hours)		Limit (15 minutes)	
	ppm	mg/m ³	ppm	mg/m ³
Austria	10	40	10	40
Belgium	10	42	-	-
Canada - Quebec	10	41	-	-
Denmark	10	40	20	80
France	10	40	-	-
Germany (AGS)	-	-	-	-
Germany (DFG)	2	8.2	4	16.4
Hungary	-	40	-	40
Poland	-	-	-	-
Spain	10	41	-	-
Sweden	5	20	10	40
Switzerland	2	8.2	4	16.4
USA - NIOSH	10	40	-	-
USA - OSHA	-	-	-	-
UK	10	41	-	-

Source: http://limitvalue.ifa.dguv.de/Webform_gw.aspx

8.1.1 DNEL (Derived No Effect Level) for exposure of workers

Acute exposure (systemic effects) – inhalation:	8.2 mg/m³
Acute exposure (systemic effects) – dermal:	0.8 mg/kg of weight/day
Acute exposure (local effects) – inhalation:	not established
Acute exposure (local effects) – dermal:	not established
Prolonged exposure (systemic effects) – inhalation:	5.0 mg/m³
Prolonged exposure (systemic effects) – dermal:	0.4 mg/kg of weight/day
Prolonged exposure (local effects) – inhalation:	not established
Prolonged exposure (local effects) – dermal:	not established

8.2 Exposure controls

When used in a closed circuit or with sufficient vapour exhaust, it is necessary to use standard personal protective equipment. When used in an open facility and insufficient vapour exhaust (CHA concentration > DNEL inhalation), it is necessary to use respiratory protection.

Engineering controls: **Ensure ventilation. Check measurement of CHA concentration in the working environment.**

Engineering controls: **Ensure ventilation. Check measurement of CHA concentration in the working environment.**

Respiratory protection: **protective mask or half mask with filter (EN 140) against organic vapours - type A/P2**

Hand protection: **protective gloves (e.g. EN 374)**

Eye protection: **protective goggles or face shield (e.g. EN 166)**

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Skin protection: **protective clothing**

Other data: **Do not eat, drink and smoke during work. Wash your hands with hot water and soap after work, apply suitable reparative preparations.**

Environmental exposure controls:

Use in a closed circuit, waste gases burnt in a fire crack or cleaned by adsorption (activated carbon), wastewater treated biologically.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	oily colourless to yellowish liquid
Odour:	strong fishy
Odour threshold:	not established
pH:	not established
Melting point/freezing point (°C) at 1013 hPa:	-17
Initial boiling point (at 1013 hPa in °C):	134.5
Flash point (at 1013 hPa in °C):	28
Evaporation rate:	not established
Flammability (solid, gas):	the product is liquid
Upper/lower flammability or explosive limits (% vol.):	21.7/0.52
Vapour pressure (kPa at 20 °C):	1.43
Vapour density:	not established
Relative density (at 25 °C):	0.8647
Solubility (in g/l at 20 °C):	soluble
Partition coefficient: n-octanol/water (log p_{ow} at 25 °C and pH 6,8):	3.7
Auto-ignition temperature (at 1013 hPa in °C):	293
Decomposition temperature:	not established
Viscosity (mPa.s at 20 °C):	2.1
Explosive properties:	no explosive properties
Oxidising properties:	no oxidising properties

9.2 Other information

Surface tension in $mN.m^{-1}$ at 20 °C and 1000 $mg.l^{-1}$	68.8
Dissociation constant pK_a at 25 °C:	10.68

SECTION 10: Stability and reactivity

10.1 Reactivity: **Possibility of reaction at temperatures higher than 35 °C.**

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- 10.2 Chemical stability: **Stable under normal conditions. The highest admissible temperature for storing is 35 °C.**
- 10.3 Possibility of hazardous reactions: **On warm days and in case of heating up, the substance forms corrosive and explosive mixtures heavier than air. When ignited, fire spreads quickly in long distances.**
- 10.4 Conditions to avoid: **Possibility of ignition in contact with hot surfaces, sparks or open fire.**
- 10.5 Incompatible materials: **It reacts explosively with strong oxidisers and acids. Avoid contact with food.**
- 10.6 Hazardous decomposition products: **Combustion may produce toxic carbon monoxide and nitrogen oxides.**

SECTION 11: Toxicological information

Information on toxicological effects:

CLP evaluation:

11.1 Acute toxicity: **category 3**

- LD₅₀ (oral, rat) **approx. 432 mg.kg⁻¹**
- LD₅₀ (oral, rat: 1 – 4 % solution) = **350 ml.kg⁻¹** (i.e. **300 mg.kg⁻¹**)/7 days
- LC₅₀ (inhal., rat) > **700 mg.m⁻³/4 hours**
- LD₅₀ (derm., rabbit) = **275 mg.kg⁻¹**

11.2 Irritation

Dermal irritation (rabbit): **corrosive**

Eye irritation (rabbit): **corrosive**

11.3 Sensitisation

Skin sensitisation: **the substance is corrosive, was not tested**

11.4 Mutagenicity (in vitro and in vivo studies): **not mutagenic**

11.5 Carcinogenicity: **not carcinogenic**

11.6 Reproductive toxicity (oral., rat): **causes fertility – NOAEL = 100 mg.kg⁻¹/day**

11.7 STOT– single exposure: **not classified**

11.8 Specific target organs toxicity – repeated exposure: **not classified**

11.9 Aspiration hazard: **data not available**

SECTION 12: Ecological information

12.1 Toxicity

12.1.1 Aquatic toxicity

Acute for fish

Fresh-water fish: LC₅₀ (14 days) = **19 mg.l⁻¹**

Acute for the invertebrates

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Daphnia magna: EC₅₀ (48 h) = 36.3 mg.l⁻¹

Prolonged for the invertebrates

Daphnia magna: NOEC (21 days) = 1.6 mg.l⁻¹

Effective concentration for algae

Selenastrum capricornutum: EC₅₀ (72 h) = 29.3 mg.l⁻¹

in river water: NOEC (72 h) 10.3 mg.l⁻¹ (static)

Classification conclusion: Not dangerous for aquatic environment.

12.1.2 Sediment toxicity: **not tested**

12.1.3 PNEC (Predicated No Effect Concentration)

PNEC water (surface): **0.016 mg.l⁻¹**

PNEC water (sea): **0.0016 mg.l⁻¹**

PNEC sediments (river water): **4.1 mg.kg⁻¹ of weight of dry sediment (extrapolation P_{ow})**

PNEC sediments (sea water): **0.41 mg.kg⁻¹ of weight of dry sediment (extrapolation P_{ow})**

PNEC sewage treatment plant: **22.52 mg.l⁻¹**

PNEC soil: **0.805 mg.kg⁻¹ of weight of dry soil (extrapolation P_{ow})**

12.2 Persistence and degradability

Evaluation: **The product is not a high bioaccumulation potential substance.**

Evaluation: **Readily degradable in aqueous environment (in accordance with OECD criteria).**

12.3 Bio-accumulative potential: **for fish: BCF = 2.8**

12.4 Mobility in soil: **May enter the environment from waste water.**

Stability: **readily soluble in water**

Adsorption: **possible in soil, adsorption coefficient value: log K_{oc} = 3.4 at 25 °C, pH = 6.7**

Conclusion – has big sorption potential – Henry's constant H = 0.42 Pa.m³.mol⁻¹ at 25 °C.

12.5 Results of PBT and vPvB assessment: **not included**

12.6 Other adverse effects: **not specified**

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: **Incineration in a hazardous waste incineration plant in accordance with Act on Wastes under the catalogue numbers 16 0305 or 16 0508.**

Disposal of contaminated packaging: **Rinse with water, dispose the caught water and packaging in accordance with valid regulations.**

SECTION 14: Transport information

Land transport (ADR/RID)

Marine transport (IMPG)

Air transport (ICAO/IA TA)

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14.1 UN number:	2357
14.2 UN proper shipping name:	CYCLOHEXYLAMINE
14.3 Transport hazard class(es):	8 (3), CF1
Hazard identification number (Kemler code):	83
14.4 Packing group:	II
14.5 Environmental hazards:	no
Marine pollutant:	no
14.6 Special precautions for user:	not included in „Segregation Groups“
EMS:	F-E, S-C
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code:	irrelevant

SECTION 15: Regulatory information

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

15.1.1 EU regulations concerning safety, health and environment/specific legislation concerning substances or mixtures, as amended:

- Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006;
- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives;
- Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances.

15.1.2 Regulations valid in CR and concerning safety, health and environment/specific legislation concerning substances or mixtures, as amended:

- Act 350/2011 Coll., on chemical substances and chemical mixtures and on amendments to some acts;
- Decree of Ministry of Environment no. 93/2016 Coll. laying down Waste Catalogue;
- Governmental decree no. 361/2007 Coll., laying down occupational health and safety conditions.

15.2 Chemical safety assessment

Chemical safety assessment is part of the report on chemical safety of cyclohexylamine -- the overview of risk management measures is provided in Annex 1.

Detailed information on exposure scenarios will be contained in Annex 2 available at the customer's request.

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TECHNICAL CYCLOHEXYLAMINE

SECTION 16: Other information

16.1 This safety data sheet supersedes all previous versions.

16.2 List of abbreviations

Carc.:	Carcinogenicity
CAS:	Chemical Abstracts Service
CLP:	Classification, labelling, packaging regulation
CSR:	Chemical safety report
DNEL:	Derived no-effect level
ES:	Exposure scenario
EC:	European Commission
EC ₅₀ :	Median effective concentration EC ₅₀ – used in toxicity tests. Median effective concentration EC ₅₀ is the concentration of substance that causes 50 % mortality or 50 % decrease of growth or growth rate with reference to the control sample.
EINECS:	European Inventory of Existing Commercial Chemical Substances
ELINCS:	European List of Notified Chemical Substances
Irrit.:	Irritant
LC ₅₀ :	Lethal concentration, 50 % (lethal concentration) is used for toxicity tests
LD ₅₀ :	Absolute lethal dose that kills 50 % of members of population
LOAEC:	Lowest observed adverse effect concentration
NOAEC:	No observed adverse effect concentration
NOEC:	No observed effect concentration
OECD:	Organisation for Economic Cooperation and Development
PBT:	Persistent, bioaccumulative and toxic
PNEC:	Predicted no-effect concentration
REACH:	Registration, Evaluation, Authorisation and Restriction of Chemicals
Sens.:	Sensitivity
STOT:	Specific target organs toxicity
STOT SE:	Specific target organs toxicity - single exposure
STOT RE:	Specific target organs toxicity - repeated exposure
STP:	Sewage treatment plant
SU:	Sector of use
Tox.:	Toxicity
vPvB:	Very persistent and very bioaccumulative

16.3 A list of mentioned phrases:

H phrases:

H361f Suspected of damaging fertility.

H301+H311 Toxic if swallowed or in contact with skin.

H314 Causes severe skin burns and eye damage.

H226 Flammable liquid and vapour.

P phrases:

**P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.
No smoking.**

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313 IF exposed or concerned: Get medical advice/attention.

16.4 Sources used

Registration dossier for cyclohexylamine.

Report on chemical safety of cyclohexylamine (Currenta GmbH & Co. OHG) from 10/2010.

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TECHNICAL CYCLOHEXYLAMINE

Risk Assessment for ES5 from 02/2015

Material safety data sheet – Technical Cyclohexylamine, BC MCHZ, version 6.0 issued in 11/2016
Report on chemical safety of cyclohexylamine from 08/2017.

16.5 History of revisions

Issue	Date	Change
1.0	30 November 2010	Preparation of the safety data sheet according to Regulation (EC) No 1907/2006 of the European Parliament and of the Council
2.0	30 April 2012	Overall revision of all sections of the safety data sheet according to Regulation (EC) No 453/2010 of the European Parliament and of the Council
3.0	1 November 2012	Complementation of the overview of exposure scenarios, update of classification (use of a combination of H-phrases), update of the regulations valid in the Czech Republic, and revisions according to Regulation (EC) No 286/2011 of the European Parliament and of the Council
4.0	16 March 2015	Add Exposure scenario 5.
5.0	1 June 2015	Modification of Section 2 (deletion of classification under DSD) and other sections according to regulations 2015/830/EU.
6.0	14 November 2016	Revision according to Commission Regulation (EU) no. 918/2016
7.0	1 September 2017	Modification of Section 2 (H361f) and Section 12.

Prepared by: IT&Quality, ecology and safety department – Ing. Zuzana Svobodová

Approved by: Head of IT&Quality, ecology and safety department – Ing. Stanislav Pekara, MBA

Version: English
Date: 01.09.2017
Safety Data Sheet
Technical cyclohexylamine

www.borsodchem-cz.com

The mentioned data reflect the present state of knowledge and experience and they are in compliance with valid legislation of the Czech Republic. The client is responsible for observing valid national legislation in the place of use.

Manufactured by:

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Fax: +420 596 626 258

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TECHNICAL CYCLOHEXYLAMINE

Annex No. 1

OVERVIEW OF EXPOSURE SCENARIOS

Number of exposure scenario	Volume (t/r)	Production	Identified use			Stage of life cycle		Areas of application (SU)	Chemical products (PC)	Processes (PROC)	Release to the environment (ERC)	Items (AC)
			Formulation	End use	Consumers	Period of use (for items)	Stage of waste					
ES2 Use for formulation of preparations: industrial	N/A		X					SU3, 10	PC20, 37	PROC1, 2, 3, 4, 5, 8a, 8b, 9	ERC2	NR
ES3 Use of formulations containing the substance as water treatment chemical: industrial	N/A			X				SU3, 23 NACE D 35.1	PC37	PROC 1, 2, 8b, 9	ERC4	NR
ES4 Use of formulations containing the substance as water treatment chemical: professional	N/A			X				SU22, 23 NACE D 35.1	PC37	PROC1, 2, 8b, 9	ERC8a, 8d	NR
ES5 Use of formulations containing the substance as water treatment chemical: industrial	N/A			X				SU3, 23 NACE D 35.1	PC37	PROC2, 8a, 8b, 9	ERC7	NR

N/A – Not available NR – Not relevant SCC – Strictly controlled conditions

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TECHNICAL CYCLOHEXYLAMINE

SUMMARY OF RISK MANAGEMENT MEASURES

Title	Summary ES - Manufacture of use of Cyclohexylamine (CHA)
Sector of Use	SU0, SU8, SU9, SU10, SU23
Process Category	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15
Product Category	PC19, PC20, PC37,
Environmental release Category	ERC1, ERC2, ERC4, ERC6a, ERC7, ERC8a, ERC8d
Processes, tasks, activities covered	<p>Covers the manufacture and use of cyclohexylamine in closed/opened processes where exposure to cyclohexylamine is contained, or where exposure (inhalation or dermal) to cyclohexylamine may occur during sampling, maintenance or equipment breakage.</p> <p>Covers further processing (use) of cyclohexylamine to form a number of different products such as rubber chemicals, pesticides, additives, other chemicals, corrosion inhibitors during which <u>cyclohexylamine predominantly contained</u> but there may be some exposure during sampling, maintenance and equipment breakage.</p> <p>Covers the same processing (use) of cyclohexylamine in batch or other processes here, due to the nature of the process design opportunity for exposure to cyclohexylamine may occur but with <u>exposure to cyclohexylamine controlled by operational conditions or risk management measures</u>.</p> <p>Covers the transfer of cyclohexylamine by charging/discharging from/to small or large containers at dedicated or non-dedicated facilities, <u>with exposure to cyclohexylamine controlled by operational conditions or risk management measures</u>.</p> <p>Covers use of cyclohexylamine as laboratory reagent at small scale laboratories with quantities of 1 L or 1 kg cyclohexylamine or less present in the workplace with <u>exposure to cyclohexylamine controlled by operational conditions or risk management measures</u>.</p>
	Operational conditions and risk management measures
	Control of worker exposure
Product characteristics	-
Physical form of product	Liquid
Vapour pressure	Low volatility
Concentration of substance in product	n/a
Amounts used	Not relevant for this scenario
Operational conditions	-
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [OC1]
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	<p>Cyclohexylamine carries a high hazard warning due to its H361f classification, therefore where procedures in the manufacture or use of cyclohexylamine are not designed to contain emissions, workers exposure to cyclohexylamine must be prevented by use of local exhaust ventilation and good work practices. These may include:</p> <ul style="list-style-type: none"> • keeping equipment under slightly increased pressure, • control of staff entry to work area,

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	<ul style="list-style-type: none"> ensuring all equipment is well maintained, permits to work for maintenance work, regular cleaning of equipment and work area, systems in place to ensure correct use of RMMs and that OCs are being followed, training for staff on good practice, procedures and training for emergency decontamination and disposal, good standards of personal hygiene, recording of any 'near miss' situations. 	
Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures *
Manufacture and use	1, 2, 3, 4, 5, 8a, 8b, 9, 15	Ensure material transfers are under containment or extract ventilation [E66]. Cyclohexylamine carries a high hazard warning due to its H361f classification, therefore where exceptional procedures may result in exposure to cyclohexylamine: Use suitable eye protection and gloves [PPE14]. Wear suitable coveralls to prevent exposure to the skin [PPE27].
Manufacture or use in enclosed processes.	1 – Use in closed process, no likelihood of exposure	Handle substance within a closed system [E47].
Manufacture or use in continuous enclosed processes.	2 – Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	Handle substance within a closed system [E47]. Ensure samples are obtained under containment or extract ventilation [E76] Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Further processing of cyclohexylamine in closed systems, batchwise, to form a number of different products.	3 – Use in closed, batch process (synthesis or formulation)	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Ensure samples are obtained under containment or extract ventilation [E76]. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Manufacture or use of cyclohexylamine (synthesis) in processes that are not fully contained.	4 – Use in batch and other process (synthesis) where opportunity for exposure arises	Provide extract ventilation to points where emissions occur [E54]. Ensure samples are obtained under containment or extract ventilation [E76]. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Mixing or blending of cyclohexylamine in batch processes for formulation of preparations.	5 – Mixing or blending in batch processes for formulation of preparations.	Provide extract ventilation to points where emissions occur [E54]. Ensure samples are obtained under containment or extract ventilation [E76]. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Material transfers.	8a – Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities.	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]. Provide extract ventilation to material transfer points and other openings [E82]. A 97% efficiency is required by means of the use of LEV described above. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Material transfers.	8b – Transfer of chemicals from/to	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].

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	vessels/ large containers at dedicated facilities.	Provide extract ventilation to material transfer points and other openings [E82]. A 97% efficiency is required by means of the use of LEV described above. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Material transfers.	9 – Transfer of substance into small containers (dedicated filling line, including weighing)	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]. Provide extract ventilation to material transfer points and other openings [E82]. Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].
Quality control in a laboratory	15 – Use of laboratory reagents in small scale laboratories.	Carry out in a vented booth or extracted enclosure [E57]. Ensure samples are obtained under containment or extract ventilation [E76].

* standard phrases and codes are extracted from GES Worker Chemical Safety Assessment (CSA) Template on the Cefic web-site <http://www.cefic.be/templates/shwPublications.asp?HID=750>