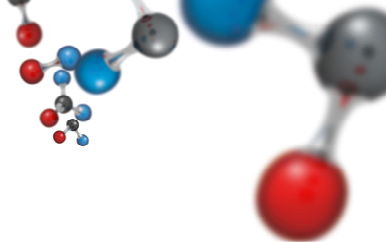


# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE



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

#### 1.1 Product identifier

Chemical name: **Dicyclohexylamine**  
Registration no.: **01-2119493354-33-0000**  
CAS number: **101-83-7**  
ES (EINECS) number: **202-980-7**  
Index number: **612-066-00-3**  
Other names of the substance: **Dodecahydrodiphenylamine**

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

Uses of the substance: **Used especially in rubber industry and for production of anticorrosion agents (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**  
**Toxicological information centre, Na Bojišti 1, 128 08 Prague 2**  
**Non-stop telephone: +420 224 919 293 or 224 915 402, fax +420 224 914 570**

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

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

**Acute Tox. 3; H301 Toxic if swallowed.**

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

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

**Aquatic Acute 1; H400 Very toxic to aquatic life.**

**Aquatic Chronic 1; H410 Very toxic to aquatic life with long lasting effects.**

The most important human health adverse effects during use of the substance or mixture:

**Toxic if swallowed and in contact with skin. Vapours irritate and damage eyes, airways and skin and may cause oedema of larynx and lungs. Liquid is very irritating to eyes and skin.**

The most important adverse effects to environment during use of the substance/mixture:

**Dangerous for the environment, very toxic for aquatic organisms.**

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

### 2.2 Label elements

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

#### Symbols:



Signal word: **DANGER**

#### H phrases:

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

H314 Causes severe skin burns and eye damage.

H410 Very toxic to aquatic life with long lasting effects.

#### P phrases:

P273 Avoid release to the environment.

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

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 Store locked up.

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

### 2.3 Other hazards

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

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

Chemical name	<b>Dicyclohexylamine</b>
Index number	<b>612-066-00-3</b>
EC No.	<b>202-980-7</b>
CAS No.	<b>101-83-7</b>
Substance content (% w.)	<b>min. 98.5</b>
Synonyms	<b>Dicyclohexanamine, Dodecahydrodiphenylamine</b>

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

### 3.2 Mixtures

**This is a chemical substance.**

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

**Inhalation:** Remove the victim to fresh air, unloose clothing or change him, if clothing is contaminated. If necessary, rinse oral cavity and nasal cavity with water. Protect the victim against chill and call medical help!

**Skin:** Remove immediately contaminated clothing (remove watches, rings, if they are in places of contact with skin), do not pull contaminated clothing over face! Rinse affected skin area under stream of warm water, if possible (30-35 °C), for 10 to 30 minutes and make sure that flowing water does not get into contact with those parts of body that were not contaminated. Do not use a brush, soap or neutralising agents! Cover the affected area with a sterile dressing, do not use any ointments or pharmaceutical products. Protect the victim against chill. Call a physician immediately!

**Eyes:** Rinse eyes immediately and thoroughly under stream of water for 10 to 30 minutes in the direction from the inner to the outer ocular angle (to prevent running of water in the other, non-affected eye, mouth and nose). Never use any neutralising solutions! If the victim keeps his eyelid tightly closed, use reasonable degree of force to open it. If the victim wears contact lenses, remove them immediately. The victim must always consult an ophthalmologist!

**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 alleviate 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 mucous membranes more difficult and activated carbon has no positive effect in case of acids and lye*). Do not give anything to eat. Do not administer anything by mouth if the victim is unconscious or has convulsions. Call a physician immediately!

#### 4.2 Most important symptoms and effects, both acute and delayed

Vapours irritate and damage eyes, airways and skin and may cause oedema of larynx and lungs. Dangerous concentration develops under action of heat and in case of fire. Liquid is very irritating to eyes and skin.

Contact with the substance may manifest itself by burning of eyes, nasal and palate mucous membranes, headache, nausea, breathlessness or even by loss of consciousness.

#### 4.3 Indication of any immediate medical attention and special treatment needed

**Symptomatic treatment.** In case of contact with eye, immediately wash thoroughly with water. Call an ophthalmologist immediately! Beware of oedema of glottis. In case of irritation of airways, let inhale each 10 minutes 5 doses from an aerosol dispenser with dexamethasone (Auxison dos. Aerosol) until problems disappear. Antibiotic prophylaxis is necessary in case of damage of airways and lungs! In case of very heavy inhalation exposition with high concentration of vapours and in case heating up, beware of pulmonary oedema with latency (poor in symptoms) of up to two days. For prophylaxis, even in case of lack of symptoms, immediately administer by inhalation 5 doses from an aerosol dispenser with dexamethasone (Auxison dos. Aerosol) each 10 minutes approximately 3 times. In case of minor symptoms, 5 doses each 10 minutes until symptoms disappear, use at least one entire pack. Possibly add Hydrocortisone intravenously, 250 mg immediately, in total 1000 mg the first day. Decrease the dose the second and the third day. Strict rest in bed. Infection prophylaxis. Oxygen as needed, human albumin 20%. In case of irritating cough, administer Codeine.

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## TECHNICAL DICYCLOHEXYLAMINE

### SECTION 5: Firefighting measures

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#### 5.1 Extinguishing media

Suitable extinguishing media: **big fire – foam for polar liquids**  
**small fire – dry powder, CO<sub>2</sub>, sand**

Unsuitable extinguishing media: **not determined**

5.2 Special hazards arising from the substance or mixture: **Flammable liquid. In case of strong heating up, formation of corrosive and explosive mixtures with air. Combustion or heating up cause decomposition with formation of toxic and corrosive nitrogen gases.**

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

### SECTION 6: Accidental release measures

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

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

6.3 Methods and material for containment and cleaning up: **Cover with an absorbent material (Vapex, Vermiculite) 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

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7.1 Precautions for safe handling: **Delivered in rail or truck tanks or in steel barrels or in tank containers or in IBC containers. 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 40 °C.**

**Do not store together with foodstuffs, oxidising agents, acids, acyl chlorides and acid anhydrides and chloroformate.**

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

### SECTION 8: Exposure controls/personal protection

---

#### 8.1 Control parameters

**Czech Republic: Not established.**

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

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

Acute exposure (systemic effects) - inhalation:

**not established**

Acute exposure (systemic effects) - dermal:

**not established**

Acute exposure (local effects) - inhalation:

**not established**

Acute exposure (local effects) – dermal:

**not established**

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

Prolonged exposure (systemic effects) – dermal:	<b>0.1 mg/kg of weight/day</b>
Prolonged exposure (systemic effects) – inhalation:	<b>0.353 mg/m<sup>3</sup></b>
Prolonged exposure (local effects) – dermal:	<b>not established</b>
Prolonged exposure (local effects) – inhalation:	<b>not established</b>

### 8.2 Exposure controls

**Use in a closed area, ensure exhaustion of vapours, use personal protective equipment.**

Occupational exposure controls

Engineering controls: **Ensure ventilation. Check measurement of dicyclohexylamine 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)**

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:	<b>Colourless liquid</b>
Odour:	<b>strong fishy</b>
Odour threshold:	<b>not established</b>
pH:	<b>not established</b>
Melting point/freezing point (°C):	<b>-0.1</b>
Initial boiling point (at 98,7 hPa in °C):	<b>253.8</b>
Flash point (at 1013 hPa in °C):	<b>105</b>
Evaporation rate:	<b>not established</b>
Flammability (solid, gas):	<b>the product is liquid</b>
Upper/lower flammability or explosive limits (% vol.):	<b>6.9/0.9</b>
Vapour pressure (Pa at 25 °C):	<b>7.5207</b>
Vapour density:	<b>not established</b>
Relative density (at 25 °C):	<b>0.9104</b>
Solubility (in g/l at 25 °C):	<b>0.8</b>
Partition coefficient: n-octanol/water (log p <sub>ow</sub> at 25 °C and pH 6,7):	<b>2.724</b>
Auto-ignition temperature (at 1013 hPa in °C):	<b>255</b>

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## TECHNICAL DICYCLOHEXYLAMINE

Decomposition temperature:	<b>not established</b>
Viscosity (mPa.s at 20 °C):	<b>7.4</b>
Explosive properties:	<b>none</b>
Oxidising properties:	<b>none</b>

### 9.2 Other information

Dissociation constant (at 25 °C):	<b>10.39</b>
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## SECTION 10: Stability and reactivity

10.1 Reactivity: **The substance is not reactive under normal temperatures.**

10.2 Chemical stability: **Stable under normal conditions. The highest admissible temperature for storing is 40 °C.**

10.3 Possibility of hazardous reactions: **In case of heavy heating up, the substance forms corrosive and explosive mixtures heavier than air that stay at ground. The substance reacts with acids, acyl chlorides, acid anhydrides, chloroformate and oxidising agents.**

10.4 Conditions to avoid: **Possibility of ignition in contact with hot surfaces, sparks or open fire.**

10.5 Incompatible materials: **The substance reacts with acids, acyl chlorides, acid anhydrides, chloroformate and oxidising agents. Avoid contact with food.**

10.6 Hazardous decomposition products: **Combustion or heating up cause decomposition with formation of toxic and corrosive nitrogen gases.**

## SECTION 11: Toxicological information

Information on toxicological effects

CLP evaluation:

11.1 Acute toxicity: **oral, dermal – category 3**

- LD<sub>50</sub> (oral, rat) = **200 mg.kg<sup>-1</sup>**
- LD<sub>50</sub> (derm., rabbit) = **200 - 316 mg.kg<sup>-1</sup>**
- LC<sub>50</sub> (inhal., rat – vapours) > **1.4 mg.l<sup>-1</sup>/6 hours**

11.2 Irritation

Dermal irritation (rabbit, 24 h): **category 1B**

Eye irritation (rabbit): **category 1B**

11.3 Sensitisation

Skin sensitisation (mouse, guinea pig): **not tested based on positive sensitisation test**

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

11.5 Carcinogenicity (rat, mouse): **not classified**

11.6 Reproductive toxicity (rat): **not classified**

**Developmental toxicity study in rat: NOAEL > 160 mg/kg/day**

11.7 Specific target organs toxicity – single exposure: **not classified**

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

11.8 Specific target organs toxicity - repeated exposure: **not classified**  
**Subchronic toxicity study in rat, oral.: without significant changes**  
**NOAEL= 10 mg/kg/day**

11.9 Aspiration hazard: **data not available**

### SECTION 12: Ecological information

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#### 12.1 Toxicity

##### 12.1.1 Aquatic toxicity

Acute for fish

*Danio rerio*: **LC<sub>50</sub> (96 h) = 62 mg/l**

*Oryzias latipes*: **LC<sub>50</sub> (96 h) = 12 mg/l (semistatic)**

Prolonged for fish: **data not available**

Acute for the invertebrated

*Daphnia*: **EC<sub>50</sub> (48 h) = 8 mg/l**

Prolonged for the invertebrated

*Daphnia*: **EC<sub>50</sub> (21 days) = 0,14 mg/l**

**LC<sub>50</sub> (21 days) = 1,3 mg/l**

**NOEC (21 days) = 0,016 mg/l**

**LOEC (21 days) = 0,049 mg/l**

Effective concentration for algae

*Desmodesmus subspicatus*: **LC<sub>50</sub> (72 h) = 0,38 mg/l**

**NOEC (72 h) = 0,016 mg/l**

**Classification conclusion: Acute danger for aquatic environment (see *Desmodesmus subspicatus*).**

##### 12.1.2 Sediment toxicity: **data not available**

##### 12.1.3 PNEC (Predicated No Effect Concentration)

PNEC aqua (freshwater): **1,6 µg/l**

PNEC aqua (marine water): **0,16 µg/l**

PNEC sediment: **0,0102 mg/kg of weight of dry sediment**

PNEC sewage treatment plant: **21 mg/l**

PNEC soil: **0,0124 mg/kg of weight of dry soil**

PNEC plants: **not established**

PNEC oral administration: **not established**

#### 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 aquatic organisms: BCF = 29,13 l/kg**

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## TECHNICAL DICYCLOHEXYLAMINE

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

Stability: **Partially soluble in water.**

Adsorption: **Possible in soil, adsorption coefficient value: Koc = 273 l/kg.**

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 03 05 or 16 05 08.**

Disposal of contaminated packaging: **It is recommended to burn contaminated packaging under waste code 15 01 10 in the waste incineration plant.**

### SECTION 14: Transport information

Land transport (ADR/RID)

Marine transport (IMPG)

Air transport (ICAO/IA TA)

14.1 UN number:	<b>2565</b>
14.2 UN proper shipping name:	<b>DICYCLOHEXYLAMINE</b>
14.3 Transport hazard class(es):	<b>8, C7</b>
Hazard identification number (Kemler code):	<b>80</b>
14.4 Packing group:	<b>III</b>
14.5 Environmental hazards:	<b>yes</b>
Marine pollutant:	<b>yes</b>
14.6 Special precautions for user:	<b>not included in "Segregation Groups"</b>
EMS:	<b>F-A, S-B</b>
14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code	<b>irrelevant</b>

### 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



# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

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 chemical safety report for dicyclohexylamine - 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.**

### SECTION 16: Other information

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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
EC50:	Median effective concentration EC50 – used in toxicity tests. Median effective concentration EC50 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
LC50:	Lethal concentration, 50 % (lethal concentration) is used for toxicity tests
LD50:	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, bio-accumulative 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

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

vPvB: Very persistent and very bio-accumulative

### 16.3 A list of mentioned phrases:

H phrases:

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

**H311 Toxic in contact with skin.**

**H314 Causes severe skin burns and eye damage.**

**H400 Very toxic to aquatic life.**

**H410 Very toxic to aquatic life with long lasting effects.**

P phrases:

**P273 Avoid release to the environment.**

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

**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 Store locked up.**

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

### 16.4 Sources used

**Registration dossier for dicyclohexylamine.**

**Chemical Safety Report of dicyclohexylamine (Ekotoxikologické centrum Bratislava s.r.o.) from 02/2015.**

**| Safety data sheet – Technical Dicyclohexylamine, BC MCHZ, [version 9.0 from 09/2016](#).**

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

### 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 2011	Additional information from the registration dossier
3.0	31 August 2012	Update of the regulations valid in the Czech Republic
4.0	1 November 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
5.0	1 December 2012	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
6.0	1 February 2013	Update of Annex 1
7.0	16 March 2015	Update of SECTION 11 and Annex 1.
8.0	1 June 2015	Modification of Section 2 (deletion of classification under DSD) and other sections according to regulations 2015/830/EU
9.0	14 September 2016	Revision according to Commission Regulation (EU) no. 918/2016
10.0	1 November 2017	Modification of Section 7.

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

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

Version: English  
Date: 01.11.2017  
Safety Data Sheet  
Technical dicyclohexylamine

[www.borsodchem-cz.com](http://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:

**BorsodChem MCHZ, s.r.o.**  
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Telephone: +420 596 641 111  
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# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

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					
ES 1 Use as Intermediate	N/A			X			X	SU3, 9	PC19	PROC1, 2, 3, 8b, 9, 15	ERC6a,	NR
ES2 Formulation Heat transfer agents Lubricants and lubricant additives (as such and in mixture)	N/A		X				X	SU3, 9	N/A	PROC3, 4, 5, 8a, 8b, 9	ERC2	NR
ES3 Component in Metal working fluids Heat transfer agents (in mixture)	N/A			X			X	SU3, 15, 17	PC25	PROC2, 7, 8a, 8b, 9, 10, 13, 17, 18	ERC4, 7	NR
ES4 Component in Metal working fluids Heat transfer agents (in mixture)	N/A			X			X	SU22, 15, 17	PC25	PROC17, 18	ERC8a, 8d	NR
ES5 Use as Additive in Plastic/Lubricants and lubricant additives (in mixture)	N/A			X			X	SU3, 10	PC16, 17, 24, 25, 32	PROC1, 2, 3, 4, 6, 7, 8a, 8b, 9, 12, 14, 21, 24a, 24c	ERC 4, 5	NR

N/A – not available (confidential information)

NR – not relevant

# SAFETY DATA SHEET

## TECHNICAL DICYCLOHEXYLAMINE

### SUMMARY OF RISK MANAGEMENT MEASURES

Title	<b>Summary ES - Manufacture or use of Dicyclohexylamine (DCHA)</b>
Sector of Use	SU3, SU9, SU10, SU15, SU17, SU22
Process Category	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC12, PROC13, PROC14, PROC15, PROC17, PROC18, PROC21, PROC24a, PROC24c
Product Category	PC16, PC17, PC19, PC24, PC25, PC32
Article Category	n/a
Environmental Release Category	ERC1, ERC2, ERC4, ERC5, ERC6a, ERC7, ERC8a, ERC8d
Specific Environmental Release Category	CEPE SPERC 2.2a.v1 (CEPE 4), ESVOC SPERC 4.6a.v1 (ESVOC 13), ESVOC SPERC 8.6c.v1 (ESVOC 15), EFCC SPERC 5.1a.v1 (EFCC 6)
Processes, tasks, activities covered	<p>Covers the manufacture and use of dicyclohexylamine in closed processes where exposure to dicyclohexylamine is contained, or where exposure (inhalation or dermal) to dicyclohexylamine may occur during sampling, maintenance or equipment breakage.</p> <p>Covers further processing (use) of dicyclohexylamine to form a number of different products during which dicyclohexylamine predominantly contained but there may be some exposure during sampling, maintenance and equipment breakage.</p> <p>Covers the same processing (use) of dicyclohexylamine in batch or other processes where, due to the nature of the process design opportunity for exposure to dicyclohexylamine may occur but with exposure to dicyclohexylamine controlled by operational conditions or risk management measures.</p> <p>Covers the transfer of dicyclohexylamine by charging/discharging from/to small or large containers at dedicated or non-dedicated facilities, with exposure to dicyclohexylamine controlled by operational conditions or risk management measures.</p> <p>Covers use of dicyclohexylamine as laboratory reagent at small scale laboratories with exposure to dicyclohexylamine controlled by operational conditions or risk management measures.</p> <p>Covers industrial and professional use of dicyclohexylamine as component in metal working fluids. Included are industrial spraying, transfer of DCHA by charging/discharging from/to small or large containers at dedicated or non-dedicated facilities, roller application or brushing, treatment of articles by dipping and pouring, lubrication and greasing at high energy conditions.</p> <p>Covers the industrial activities associated with industrial use of dicyclohexylamine as additive in plastic/lubricants. Included are uses in closed processes, use in processes, where opportunity for exposure arises, calendering operations, industrial spraying, use of blowing agents in manufacture of foam, production of mixtures by tableting, compression, extrusion and pelletisation, transfer of DCHA by charging/discharging from/to small or large containers at dedicated or non-dedicated facilities, manipulation of DCHA bound in materials and/or articles at low and high (mechanical) energy.</p>
	<b>Operational conditions and risk management measures</b>
	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Liquid
Vapour pressure	Low volatility
Concentration of substance in product	For ES2: Covers percentage substance in the product up to 100 % and up to 50 %. For ES3 and ES4: Covers percentage substance in the product up to 10 %. For ES5: Covers percentage substance in the product up to 5 %.

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## TECHNICAL DICYCLOHEXYLAMINE

Amounts used	n/a
<b>Operational conditions</b>	
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2].
Human factors not influenced by risk management	None identified for this scenario.
Other Operational Conditions affecting worker exposure	<p>The procedures in the manufacture or use of dicyclohexylamine are not designed to contain emissions, workers exposure to dicyclohexylamine must be prevented by use of local exhaust ventilation and good work practices. These may include:</p> <ul style="list-style-type: none"> <li>• keeping equipment under slightly increased pressure,</li> <li>• control of staff entry to work area,</li> <li>• ensuring all equipment is well maintained,</li> <li>• permits to work for maintenance work,</li> <li>• regular cleaning of equipment and work area,</li> <li>• systems in place to ensure correct use of RMMs and that OCs are being followed, training for staff on good practice,</li> <li>• procedures and training for emergency decontamination and disposal,</li> <li>• good standards of personal hygiene,</li> <li>• recording of any 'near miss' situations.</li> </ul>

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
General exposures (ES1, ES5)	1 - Use in closed process, no likelihood of exposure	<p>Handle substance within a closed system [E47].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Use suitable eye protection and gloves [PPE14].</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p>
General exposures (ES1)	2 - Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	<p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p>
General exposures (ES3, ES5)	2 - Use in closed, continuous process with occasional controlled exposure	<p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and</p>

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		<p>other openings [E82].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p>
General exposures (ES1)	3 - Use in closed, batch process (synthesis or formulation)	<p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p> <p>Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].</p>
General exposures (ES2)	3 - Use in closed, batch process (synthesis or formulation)	<p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Use suitable eye protection and gloves [PPE14].</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p>
General exposures (ES5)	3 - Use in closed, batch process (synthesis or formulation)	<p>Handle substance within a predominantly closed system provided with extract ventilation [E49].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p>
General exposures (ES2)	4 - Use in batch and other process (synthesis) where opportunity for exposure arises	<p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Ensure samples are obtained under containment or extract ventilation [E76].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p>

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		Use suitable eye protection and gloves [PPE14]. Wear chemically resistant gloves (tested to type EN374) in combination with 'basic' employee training [PPE16]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29]. Wear suitable coveralls to prevent exposure to the skin [PPE27].
General exposures (ES5)	4 - Use in batch and other process (synthesis) where opportunity for exposure arises	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure samples are obtained under containment or extract ventilation [E76]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
Mixing operations (ES2)	5 - Mixing or blending in batch processes for formulation of preparations.	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure samples are obtained under containment or extract ventilation [E76]. Provide extract ventilation to material transfer points and other openings [E82]. Use suitable eye protection and gloves [PPE14]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29]. Wear suitable coveralls to prevent exposure to the skin [PPE27].
Calendering (ES5)	6 - Calendering operations	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
Spraying (ES3)	7 – Industrial spraying	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60]. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20 [E70]. Avoid carrying out operation for more than 4 hours [OC12]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Use suitable eye protection [PPE26]. Wear suitable coveralls to prevent exposure to the skin



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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		[PPE27]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Spraying (ES5)	7 – Industrial spraying	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60]. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20 [E70]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Material transfers (ES2)	8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities.	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Use suitable eye protection and gloves [PPE14]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29] Wear suitable coveralls to prevent exposure to the skin [PPE27].
Material transfers (ES3, ES5)	8a - Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities.	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Material transfers (ES1)	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]. Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Material transfers (ES2)	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities.	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]. Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Use suitable eye protection and gloves [PPE14]. Wear chemically resistant gloves (tested to type EN374) in combination with 'basic' employee training [PPE16] Wear suitable coveralls to prevent exposure to the skin [PPE27].
Material transfers (ES3, ES5)	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities.	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51]. Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
Material transfers (ES1)	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 points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Avoid carrying out operation for more than 4 hours [OC12]. Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16]. Use suitable eye protection [PPE26]. Wear suitable coveralls to prevent exposure to the skin [PPE27]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Material transfers (ES2)	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 points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82].

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		<p>Use suitable eye protection and gloves [PPE14].</p> <p>Wear chemically resistant gloves (tested to type EN374) in combination with 'basic' employee training [PPE16]</p> <p>Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29]</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p>
Material transfers (ES3)	9 – Transfer of substance into small containers (dedicated filling line, including weighing)	<p>Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p> <p>Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].</p>
Material transfers (ES5)	9 – Transfer of substance into small containers (dedicated filling line, including weighing)	<p>Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].</p> <p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p>
Cleaning (ES3)	10 - Roller application or brushing	<p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with specific activity training [PPE17].</p> <p>Use suitable eye protection [PPE26].</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p> <p>Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].</p>
Manufacture of foam (ES5)	12 - Use of blowing agents in manufacture of foam	<p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p>

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
		Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
Dipping, pouring (ES3)	13 - Treatment of articles by dipping and pouring	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Tabletting, compression, extrusion, pelletisation (ES5)	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
Laboratory activities (ES1)	15 - Use as laboratory reagent	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].
Operation and lubrication of high energy open equipment (ES3)	17 – Lubrication at high energy conditions and in partly open process	Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60]. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20 [E70]. Avoid carrying out operation for more than 4 hours [OC12]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23]. Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
Operation and lubrication of high energy open equipment (ES4)	17 – Lubrication at high energy conditions and in partly open process	<p>Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60].</p> <p>Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of &gt;20 [E70].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].</p> <p>Use suitable eye protection [PPE26].</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p> <p>Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].</p>
Greasing (ES3)	18 – Greasing at high energy conditions	<p>Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60].</p> <p>Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of &gt;20 [E70].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p> <p>Wear a respirator conforming to EN140 with Type A/P2 filter or better [PPE29].</p>
Greasing (ES4)	18 – Greasing at high energy conditions	<p>Minimise exposure by enclosing the operation or equipment and provide extract ventilation at openings [E60].</p> <p>Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of &gt;20 [E70].</p> <p>Avoid carrying out operation for more than 4 hours [OC12].</p> <p>Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training [PPE16].</p> <p>Use suitable eye protection [PPE26].</p> <p>Wear suitable coveralls to prevent exposure to the skin [PPE27].</p> <p>Wear a full face respirator conforming to EN140 with Type A/P2 filter or better [PPE32].</p>
Low energy manipulation of substances bound in materials such as cutting, cold rolling (ES5)	21- Low energy manipulation of substances bound in materials and/or articles	<p>Provide extract ventilation to points where emissions occur [E54].</p> <p>Ensure material transfers are under containment or extract ventilation [E66].</p> <p>Provide extract ventilation to material transfer points and other openings [E82].</p> <p>Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].</p>

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## TECHNICAL DICYCLOHEXYLAMINE

Risk Management Measures		
Contributing Scenarios	Process Categories	Risk Management Measures
High (mechanical) energy work-up of substances bound in materials and/or articles (ES5)	24a- High (mechanical) energy work-up of substances bound in materials and/or articles - pt<mp - Low Fugacity	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].
High (mechanical) energy work-up of substances bound in materials and/or articles (ES5)	24c- High (mechanical) energy work-up of substances bound in materials and/or articles - pt>mp - High Fugacity	Provide extract ventilation to points where emissions occur [E54]. Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation to material transfer points and other openings [E82]. Wear suitable gloves (tested to EN374), coverall and eye protection [PPE23].

\* 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>