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

1.1 Product identifier

POLYHARD 100 PART A

(HARDENER)

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

Use:
Hardener for POLYHARD 100

1.3 Details of the supplier of the safety data sheet

NCI CHEMICAL INDUSTRY LTD 8
IPPONAKTOS STREET - NICOSIA 1016
CYPRUS

Tel: +22430805
e-mail: ncichemicals@cytanet.com.cy

1.4 Emergency telephone number

In case of emergency: +22430805

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008
Acute toxicity, Inhalative, Category 4 (H332)
Skin irritation, Category 2 (H315)
Eye irritation, Category 2 (H319)
Sensitization of the respiratory airways, Category 1 (H334)
Sensitization of the skin, Category 1 (H317)
Carcinogenicity, Category 2 (H351)
Specific target organ toxicity (single exposure), Category 3 (H335)
Specific target organ toxicity (repeated exposure), Category 2 (H373)

Directive 67/548/EEC or 1999/45/EC
Harmful by inhalation. Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Limited evidence of a carcinogenic effect.
May cause sensitization by inhalation and skin contact.
Irritating to eyes, respiratory system and skin.

2.2 Label elements

Danger

Regulation (EC) No 1272/2008

Hazardous components which must be listed on the label
Diphenylmethanediisocyanate-prepolymer
CAS-No.39420-98-9

Diphenylmethane-2,4'-diisocyanate
Index-No.: 615-005-00-9
diphenylmethane-4,4'-diisocyanate
Index-No.: 615-005-00-9

Hazard statements:
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H332 Harmful if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary statements:
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves/ eye protection/ face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
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.

Directive 67/548/EEC or 1999/45/EC
Labelling as required by the Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4), in accordance with EC Directives: Xn Harmful

Diphenylmethanediisocyanate-prepolymer

Diphenylmethane-2,4'-diisocyanate
EC-Label EC-No.: 227-534-9

diphenylmethane-4,4'-diisocyanate
EC-Label EC-No.: 202-966-0

R-phrase(s)

R20	Harmful by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R40	Limited evidence of a carcinogenic effect.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.

S-phrase(s)

S23	Do not breathe vapour.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37	Wear suitable protective clothing and gloves.
S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

2.3 Other hazards

No information available.

SECTION 3: Composition/information on ingredients

Type of product: Substance

3.1 **Substances**

polyisocyanate-prepolymer based on diphenylmethane diisocyanate

Hazardous components

Diphenylmethanediisocyanate-prepolymer |
(Concentration [wt.-%]: ca. 59 CAS-No.:
39420-98-9
Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Sens. Resp. 1 H334 Skin Sens. 1 H317 STOT SE 3 H335 STOT RE 2 Inhalative H373 Classification (67/548/EEC): Xn R20 -R48/20 Xn R42/43 Xi R36/37/38

Diphenylmethane-2,4'-diisocyanate |
(Concentration [wt.-%]: ca. 23 Index-No.:
615-005-00-9 EC-No.: 227-534-9
REACH Registration Number: 01-2119480143-45-0000, 01-2119480143-45-0001, 01-2119480143-45-0002
CAS-No.: 5873-54-1
Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Sens. Resp. 1 H334 Skin Sens. 1 H317 Care. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373 Specific threshold concentration (GHS):

Sens. Resp. 1	H334	>= 0.1 %
Skin Irrit. 2	H315	>= 5 %
STOT SE 3	H335	>= 5 %
Eye Irrit. 2	H319	>= 5 %

Classification (67/548/EEC): Carc.Cat.3 R40 Xn R20 -R48/20 Xi R36/37/38 R42/43 Specific threshold concentration

Xn	R42	**0.1 -< 1 % 1 - < 5 %**
Xn	R40, R42/43	R42/43 5 - < 10 %
Xn	R36/37/38, R40	R42/43, R48/20 10-<25%
Xn	R36/37/38, R40	R40, R42/43, R48/20 >= 25 %
Xn	R20, R36/37/38	>
Xi	R36/37/38	= 5 %
	R42	>=0.1%

diphenylmethane-4,4'-diisocyanate
(Concentration [wt.-%]: ca. 17
Index-No.: 615-005-00-9 EC-No.:
202-966-0
REACH Registration Number: 01-2119457014-47-0006, 01-2119457014-47-0007, 01-2119457014-47-0008, 01-2119457014-47-0009 CAS-No.: 101-68-8
Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Sens. Resp. 1 H334 Skin Sens. 1 H317 Care. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373 Specific threshold concentration (GHS):

Sens. Resp.	H334	>=0.1 %
Eye Irrit. 2	H319	**>= 5 °,**
Skin Irrit. 2	H315	*>=5 1*
STOT SE 3	H335	**>=5°.**

Classification '67/548/EEC): .Cat.3 R40 Xn R20 -R48/20 Xi R42/43
Specific threshold concentration

Xn	R42		0.1 - < 1 %
Xn	R40, R42/43		1 - < 5 %
Xn	R36/37/38, R40,	R42/43	5 - < 10 %
Xn	R36/37/38, R40,	R42/43, R48/20	10-<25%
Xn	R20, R36/37/38,	R40, R42/43, R48/20	>= 25 %
Xi	R36/37/38		>= 5 %
	R42		>= 0.1 %

The polymer or the polymers including their impurities are exempted from the provisions on registration according to article 2(9) of the REACH Regulation (EC) No 1907/2006, hence no exposure scenarios are provided. The necessary information about operational conditions and Risk Management Measures (RMM) can be found in chapter 8 of this SDS.

Candidate List of Substances of Very High Concern for Authorisation
This product does not contain substances of very high concern (Regulation (EC) No 1907/2006 (REACH), Article 57).

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Soiled, soaked clothing and shoes must be immediately removed, decontaminated and disposed of.

If inhaled: Take the person into the fresh air and keep him warm, let him rest; if there is difficulty in breathing, medical advice is required.

In case of skin contact: In the event of contact with the skin, preferably wash with a cleanser based on polyethylene glycol or with plenty of warm water and soap. Consult a doctor in the event of a skin reaction.

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact an ophthalmologist.

If swallowed: DO NOT induce the patient to vomit, medical advice is required.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: The product irritates the respiratory tract and may trigger sensitisation of the skin and respiratory tract. Treatment of acute irritation or bronchial constriction is primarily symptomatic. Extended medical treatment may be required depending on the degree of exposure and the severity of the symptoms.

4.3 Indication of any immediate medical attention and special treatment needed

Therapeutic measures: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Carbon dioxide (CO2), Foam, extinguishing powder, in cases of larger fires, water spray should be used.

Unsuitable extinguishing media: High volume water jet

5.2 Special hazards arising from the substance or mixture

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen, isocyanate vapors and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if possible, removed from the danger area.

5.3 Advice for fire-fighters

During fire-fighting respirator with independent air-supply and airtight garment is required.

Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Put on protective equipment (see section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

6.2 Environment related measures

Do not allow to escape into waterways, wastewater or soil.

6.3 Methods and material for containment and cleaning up

Remove mechanically; cover the remainder with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand). After approx. one hour transfer to waste container and do not seal (evolution of CO2!). Keep damp in a safe ventilated area for several days.

Spill area can be decontaminated with the following recommended decontamination solution:

Decontamination solution 1: 8-10% sodium carbonate and 2% of liquid soap in water

Decontamination solution 2: Liquid/yellow soap (potassium soap with -15% anionic tenside): 20ml; Water:700ml; Polyethylenglycol (PEG 400): 350ml

6.4 Reference to other sections

For further disposal measures see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide sufficient air exchange and/or exhaust in work rooms. Exhaust ventilation necessary if product is sprayed. The threshold limit values noted in Chapter 8 must be monitored.

In all areas where isocyanate aerosols and/or vapor concentrations are produced in elevated concentrations, exhaust ventilation must be provided in such a way that the workplace exposure limits (WEL) is not exceeded. The air should be drawn away from the personnel handling the product

The personal protective measures described in Chapter 8 must be observed. The precautions required in the handling of isocyanates must be taken. Avoid contact with skin and eyes and the inhalation of vapor.

Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work and use skin-protecting ointment. Keep working clothes separately. Take off all contaminated clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed and dry. Further information on the storage conditions which must be observed to preserve quality can be found in our product information sheet.

Storage class (TRGS 510): 10: Combustible liquids

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

UK Workplace Exposure Limits (WEL), per EH40 document (Health & Safety Executive). If no UK value exists, EU exposure limits given where available.

8.1 Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks

Diphenylmethane-2,4'-diisocyanate	5873-54-1	EH40WEL	STEL	0.07 mg/m3		, measured as NCO
Diphenylmethane-2,4'-diisocyanate	5873-54-1	EH40WEL	TWA	0.02 mg/m3		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40WEL	TWA	0.02 mg/m3		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40WEL	STEL	0.07 mg/m3		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40WEL	STEL	0.07 mg/m3		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40WEL	TWA	0.02 mg/m3		, measured as NCO

Exposition assessment value (EBW) perTGRS 430:Polyisocyanate content (MDI oligomers and/or prepolymers) 54 %. Use an exposition assessment value of 0,05 mg/m^3.

The product may contain traces of phenylisocyanate.

Derived No Effect Level (DNEL) or Derived Minimal Effect Level (DMEL)

Diphenylmethane-2,4'-diisocyanate

Value type	Route of exposure	Health Effects	Value	Remarks
Worker (short-term)				
DNEL	Dermal	- systemic effects	50 mg/kg body weight/day	
DNEL	Inhalation	- systemic effects	0.1 mg/m^3 air	
DNEL	Dermal	- local effects	28.7 mg/cm^2	
DNEL	Inhalation	- local effects	0.1 mg/m^3 air	
Worker (long-term)				
DNEL	Dermal	- systemic effects		No quantitative risk assessment possible.
DNEL	Inhalation	- systemic effects	0.05 mg/m^3 air	
DNEL	Dermal	- local effects		No quantitative risk assessment possible.
DNEL	Inhalation	- local effects	0.05 mg/m^3 air	
General population (short-term)				
DNEL	Dermal	- systemic effects	25 mg/kg body weight/day	
DNEL	Inhalation	- systemic effects	0.05 mg/m^3 air	
DNEL	Oral	- systemic effects	20 mg/kg body weight/day	
DNEL	Dermal	- local effects	17.2 mg/cm^2	
DNEL	Inhalation	- local effects	0.05 mg/m^3 air	
General population (long-term)				
DNEL	Dermal	- systemic effects		No quantitative risk assessment possible.
DNEL	Inhalation	- systemic effects	0.025 mg/m^3 air	

DNEL	Oral	- systemic effects		No quantitative risk assessment possible.
DNEL	Dermal	- local effects		No quantitative risk assessment possible.
DNEL	Inhalation	- local effects	0.025 mg/m^3 air	

diphenylmethane-4,4'-diisocyanate

Value type	Route of exposure	Health Effects	Value	Remarks
Worker (short-term)				
DNEL	Dermal	- systemic effects	50 mg/kg body weight/day	
DNEL	Inhalation	- systemic effects	0.1 mg/m^3 air	
DNEL	Dermal	- local effects	28.7 mg/cm^2	
DNEL	Inhalation	- local effects	0.1 mg/m^3 air	
Worker (long-term)				
DNEL	Dermal	- systemic effects		No quantitative risk assessment possible.
DNEL	Inhalation	- systemic effects	0.05 mg/m^3 air	
DNEL	Dermal	- local effects		No quantitative risk assessment possible.
DNEL	Inhalation	- local effects	0.05 mg/m^3 air	
General population (short-term)				
DNEL	Dermal	- systemic effects	25 mg/kg body weight/day	
DNEL	Inhalation	- systemic effects	0.05 mg/m^3 air	
DNEL	Oral	- systemic effects	20 mg/kg body weight/day	
DNEL	Dermal	- local effects	17.2 mg/cm^2	
DNEL	Inhalation	- local effects	0.05 mg/m^3 air	
General population (long-term)				
DNEL	Dermal	- systemic effects		No quantitative risk assessment possible.
DNEL	Inhalation	- systemic effects	0.025 mg/m^3 air	
DNEL	Oral	- systemic effects		No quantitative risk assessment possible.
DNEL	Dermal	- local effects		No quantitative risk assessment possible.
DNEL	Inhalation	- local effects	0.025 mg/m^3 air	

Predicted No Effect Concentration (PNEC)

Diphenylmethane-2,4'-diisocyanate

Compartment	Value	Remarks
Freshwater	> 1 mg/l	
Marine water	> 0.1 mg/l	
Sediment		Not relevant
Soil	> 1 mg/kg dry weight	

STP (sewage-treatment plant)	> 1 mg/l	
Oral		Not relevant

diphenylmethane-4,4'-diisocyanate

Compartment	Value	Remarks
Freshwater	> 1 mg/l	
Marine water	> 0.1 mg/l	
Sediment		Not relevant
Soil	> 1 mg/kg dry weight	
STP (sewage-treatment plant)	> 1 mg/l	
Oral		Not relevant

8.2 Exposure controls

Respiratory protection
Respiratory protection required in insufficiently ventilated working areas and during spraying. An air-fed mask, or for short periods of work, a combination of charcoal filter and particulate filter is recommended.

In case of hypersensitivity of the respiratory tract (e.g. asthmatics and those who suffer from chronic bronchitis) it is inadvisable to work with the product.

Hand protection
Suitable materials for safety gloves; EN 374:
Polychloroprene - CR: thickness >=0,5mm; breakthrough time >=480min.
Nitrile rubber - NBR: thickness >=0,35mm; breakthrough time >=480min. Butyl rubber- MR: thickness >=0,5mm; breakthrough time >=480min. Fluorinated rubber - FKM: thickness >=0,4mm; breakthrough time >=480min.
Recommendation: contaminated gloves should be disposed of.

Eye protection
Wear eye/face protection.

Skin and body protection
Wear suitable protective clothing.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	liquid	
Colour:	clear	
Odour:	slight inherent odour	
Odour Threshold:	not established	
pH:	not applicable	
Pour point:	ca. -27 °C	ISO 3016
Boiling point/boiling range:	> 300 "Cat 1,013 hPa	DIN 53171
Flash point:	ca. 223 "Cat 1,013 hPa	DIN EN ISO 2719
Evaporation rate:	not established not	
Flammability (solid, gas):	applicable	
Burning number:	not applicable ca. 9 hPa	
Vapour pressure:	at 20 °C ca. 22 hPa at	EGA4
	50 °C ca. 26 hPa at 55	EGA4
	°C not established	EGA4
Vapour density:		

Density:	ca. 1.12g/cm^{3}at 20 °C	DIN 51757
Miscibility with water:	immiscible at 15 °C not	
Surface tension:	established not	
Partition coefficient (n-octanol/water):	established	
Auto-ignition temperature:	not applicable	
Ignition temperature:	ca. 480 °C	DIN 51794
Decomposition temperature:	not established	
Viscosity, dynamic:	ca. 800 mPa.s at 23 °C	DIN EN ISO 3219/A.3
Explosive properties:	not established not	
Dust explosion class:	applicable not	
Oxidising properties:	established	

9.2 Other information

The indicated values do not necessarily correspond to the product specification. Please refer to the technical information sheet for specification data.

SECTION 10: Stability and reactivity

10.1 Reactivity

This information is not available.

10.2 Chemical stability

Polymerises at about 200 °C with evolution of CO2.

10.3 Possibility of hazardous reactions

Exothermic reaction with amines and alcohols; reacts with water forming CO2; in closed containers, risk of bursting owing to increase of pressure.

10.4 Conditions to avoid

This information is not available.

10.5 Incompatible materials

This information is not available.

10.6 Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

Toxicological studies on the product are not yet available.

Please find below the toxicological data available to us for the components (hazardous components).

11.1 Information on toxicological effects

Acute toxicity, oral
Diphenylmethanediisocyanate-prepolymer LD50 rat, male/female: > 2,000 mg/kg Method: Directive 84/449/EEC, B.1 Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate LD50 rat, male/female: > 2,000 mg/kg Method: Directive 84/449/EEC, B.1 Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate LD50 rat, male/female: > 2,000 mg/kg Method: Directive 84/449/EEC, B.1 Toxicological studies of a comparable product.

Acute toxicity, dermal
Diphenylmethanediisocyanate-prepolymer
LD50 rabbit, male/female: > 9,400 mg/kg
Method: OECD Test Guideline 402 Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate LD50 rabbit, male/female: > 9,400 mg/kg Method: OECD Test Guideline 402 Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate LD50 rabbit, male/female: > 9,400 mg/kg Method: OECD Test Guideline 402 Studies of a comparable product.

Acute toxicity, inhalation
ATEmix(inhaL): 1.5mg/l, 4 h
Test atmosphere: dust/mist
Method: Calculation method

Diphenylmethanediisocyanate-prepolymer

Assessment: Harmful by inhalation.
Studies of a comparable product.

Converted acute toxicity point estimate 1.5 mg/l
Test atmosphere: dust/mist Method: Expert judgement

Diphenylmethane-2,4'-diisocyanate
LC50 rat, male: 0.387 mg/l, 4 h
Test atmosphere: dust/mist
The substance was tested in a form (i.e. specific particle size distribution) that is different from the forms in which the substance is placed on the market and in which it can reasonably be expected to be used. Therefore, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful by inhalation.

Converted acute toxicity point estimate 1.5 mg/l
Test atmosphere: dust/mist Method: Expert judgement

diphenylmethane-4,4'-diisocyanate
LC50 rat, male: 0.368 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
The substance was tested in a form (i.e. specific particle size distribution) that is different from the forms in which the substance is placed on the market and in which it can reasonably be expected to be used. Therefore, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful by inhalation.

Converted acute toxicity point estimate 1.5 mg/l
Test atmosphere: dust/mist Method: Expert judgement

Primary skin irritation
Diphenylmethanediisocyanate-prepolymer
Classification: Causes skin irritation.

Diphenylmethane-2,4'-diisocyanate
Species: rabbit
Result: irritating
Classification: Causes skin irritation.
Method: OECD Test Guideline 404
Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Species: rabbit
Result: irritating
Classification: Causes skin irritation.
Method: OECD Test Guideline 404
Toxicological studies of a comparable product.

Primary mucosae irritation
Diphenylmethanediisocyanate-prepolymer
Classification: Causes serious eye irritation.

Diphenylmethane-2,4'-diisocyanate
Species: rabbit
Result: non-irritant
Method: OECD Test Guideline 405
Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Species: rabbit
Result: non-irritant
Method: OECD Test Guideline 405
Toxicological studies of a comparable product.

Sensitisation
Diphenylmethanediisocyanate-prepolymer
Skin sensitization (local lymph node assay (LLNA)):
Species: mouse
Result: positive
Classification: May cause sensitization by skin contact.
Method: OECD Test Guideline 429
Studies of a comparable product.

Respiratory sensitization
Species: guinea pig
Result: positive
Classification: May cause sensitization by inhalation.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
Skin sensitisation according to Buehler (epicutaneous test):
Species guinea pig
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 406
Toxicological studies of a comparable product.

Skin sensitization (local lymph node assay (LLNA)):
Species: mouse
Result: positive
Classification: May cause sensitization by skin contact.
Method: OECD Test Guideline 429
Toxicological studies of a comparable product.

Respiratory sensitization
Species guinea pig
Result: positive
Classification: May cause sensitization by inhalation.
Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Skin sensitisation according to Buehler (epicutaneous test):
Species guinea pig
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 406

Skin sensitization (local lymph node assay (LLNA)):
Species: mouse
Result: positive
Classification: May cause sensitization by skin contact.
Method: OECD Test Guideline 429

Respiratory sensitization
Species guinea pig
Result: positive
Classification: May cause sensitization by inhalation.

Subacute, subchronic and prolonged toxicity
Diphenylmethanediisocyanate-prepolymer
NOAEL: 0,2 mg/m3
LOAEL (Lowest observable adverse effect level): 1 mg/m3
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0 , 2 - 1 - 6 mg/m3
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
NOAEL: 0,2 mg/m3
LOAEL (Lowest observable adverse effect level): 1 mg/m3
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0 , 2 - 1 - 6 mg/m3
Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
NOAEL: 0,2 mg/m3
LOAEL (Lowest observable adverse effect level): 1 mg/m3
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0 , 2 - 1 - 6 mg/m3

Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Carcinogenicity
Diphenylmethane-2,4'-diisocyanate
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0 , 2 - 1 - 6 mg/m3
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0 , 2 - 1 - 6 mg/m3
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.
Studies of a comparable product.

Reproductive toxicity/Fertility
Diphenylmethanediisocyanate-prepolymer
No data available.

Diphenylmethane-2,4'-diisocyanate No
data available.

diphenylmethane-4,4'-diisocyanate No
data available.

Reproductive toxicity/Teratogenicity
Diphenylmethanediisocyanate-prepolymer
NOAEL (teratogenicity): 12 mg/m^3
NOAEL (maternal): 4 mg/m^3
NOAEL (developmental toxicity): 4 mg/m^3
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 -12 mg/m3
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 1 5 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
NOAEL (developmental toxicity): 4 mg/m3
Did not showteratogenic effects in animal experiments.
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
NOAEL (teratogenicity): 12 mg/m^3
NOAEL (maternal): 4 mg/m^3
NOAEL (developmental toxicity): 4 mg/m^3
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 -12 mg/m3
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 1 5 p.c.))
Test period: 20 d

Test substance: as aerosol
Method: OECD Test Guideline 414
NOAEL (developmental toxicity): 4 mg/m3
Did not showteratogenic effects in animal experiments.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
NOAEL (teratogenicity): 12 mg/m^3
NOAEL (maternal): 4 mg/m^3
NOAEL (developmental toxicity): 4 mg/m^3
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 -12 mg/m3
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 1 5 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
NOAEL (developmental toxicity): 4 mg/m3
Did not showteratogenic effects in animal experiments.
Studies of a comparable product.

Genotoxicity in vitro
Diphenylmethanediisocyanate-prepolymer
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471
Toxicological studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

diphenylmethane-4,4'-diisocyanate
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471
Toxicological studies of a comparable product.

Genotoxicity in **vivo**
Diphenylmethanediisocyanate-prepolymer
Test type: Micronucleus test
Species: rat, male
Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)
Result: negative
Method: OECD Test Guideline 474
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
Test type: Micronucleus test
Species: rat, male
Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)
Result: negative
Method: OECD Test Guideline 474
Toxicological studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Test type: Micronucleus test
Species: rat, male
Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)
Result: negative
Method: OECD Test Guideline 474

STOT evaluation - one-time exposure
Diphenylmethanediisocyanate-prepolymer
Route of exposure: Inhalative Target
Organs: Respiratory Tract May cause
respiratory irritation.

Diphenylmethane-2,4'-diisocyanate
Route of exposure: Inhalative Target
Organs: Respiratory Tract May cause
respiratory irritation.

diphenylmethane-4,4'-diisocyanate
Route of exposure: Inhalative Target
Organs: Respiratory Tract May cause
respiratory irritation.

STOT evaluation - repeated exposure
Diphenylmethanediisocyanate-prepolymer
Route of exposure: Inhalative
Target Organs: Respiratory Tract
May cause damage to organs through prolonged or repeated exposure.

Diphenylmethane-2,4'-diisocyanate
Route of exposure: Inhalative
Target Organs: Respiratory Tract
May cause damage to organs through prolonged or repeated exposure.

diphenylmethane-4,4'-diisocyanate
Route of exposure: Inhalative
Target Organs: Respiratory Tract
May cause damage to organs through prolonged or repeated exposure.

Aspiration toxicity

Diphenylmethanediisocyanate-prepolymer
No data available.

Diphenylmethane-2,4'-diisocyanate
Based on available data, the classification criteria are not met.

diphenylmethane-4,4'-diisocyanate
Based on available data, the classification criteria are not met.

CMR Assessment
Diphenylmethanediisocyanate-prepolymer
Mutagenicity: Based on available data, the classification criteria are not met. Teratogenicity: Based on available data, the classification criteria are not met. Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Diphenylmethane-2,4'-diisocyanate
Carcinogenicity: Suspected of causing cancer by inhalation (Care. 2).
Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.
Teratogenicity: Did not showteratogenic effects in animal experiments. Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

diphenylmethane-4,4'-diisocyanate
Carcinogenicity: Suspected of causing cancer by inhalation (Care. 2).
Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.
Teratogenicity: Did not showteratogenic effects in animal experiments. Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Toxicology Assessment
Diphenylmethane-2,4'-diisocyanate
Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.
Sensitization: May cause sensitization by inhalation and skin contact.

diphenylmethane-4,4'-diisocyanate
Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.
Sensitization: May cause sensitization by inhalation and skin contact.

Additional information
Diphenylmethane-2,4'-diisocyanate
Special properties/effects: Over-exposure entails the risk of concentration-dependent irritating effects on eyes, nose throat, and respiratory tract. Delayed appearance of the complaints and development of hypersensitivity (difficult breathing, coughing, asthma) are possible. Hypersensitive persons may suffer from these effects even at low isocyanate concentrations, including concentrations below the UK Workplace Exposure Limit (WEL). Prolonged contact with the skin may cause tanning and irritant effects.

diphenylmethane-4,4'-diisocyanate
Special properties/effects: Over-exposure entails the risk of concentration-dependent irritating effects on eyes, nose throat, and respiratory tract. Delayed appearance of the complaints and development of hypersensitivity (difficult breathing, coughing, asthma) are possible. Hypersensitive persons may suffer from these effects even at low isocyanate concentrations, including concentrations below the UK Workplace Exposure Limit (WEL). Prolonged contact with the skin may cause tanning and irritant effects.

SECTION 12: Ecological information

Ecotoxicological studies of the product are not available.

Do not allow to escape into waterways, wastewater or soil.

Please find below the toxicological data available to us for the components (hazardous components).

12.1 Toxicity

Acute Fish toxicity
Diphenylmethanediisocyanate-prepolymer
LC50> 1,000 mg/l
Test type: Acute Fish toxicity
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: OECD Test Guideline 203
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
LC50> 1,000 mg/l
Test type: Acute Fish toxicity
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: OECD Test Guideline 203
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
LC50> 1,000 mg/l
Test type: Acute Fish toxicity
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: OECD Test Guideline 203
Studies of a comparable product.

Acute toxicity for daphnia
Diphenylmethanediisocyanate-prepolymer
EC50> 1,000 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 24 h
Method: OECD Test Guideline 202
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
EC50> 1,000 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 24 h
Method: OECD Test Guideline 202
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
EC50> 1,000 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 24 h
Method: OECD Test Guideline 202
Studies of a comparable product.

Chronic toxicity to daphnia
Diphenylmethanediisocyanate-prepolymer
NOEC (Reproduction) > 10 mg/l Species: Daphnia magna (Water flea) Exposure duration: 21 d Method: OECD Test Guideline 202 Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate NOEC (Reproduction) > 10 mg/l Species: Daphnia magna (Water flea) Exposure duration: 21 d Method: OECD Test Guideline 202 Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate NOEC (Reproduction) > 10 mg/l Species: Daphnia magna (Water flea) Exposure duration: 21 d Method: OECD Test Guideline 202 Studies of a comparable product.

Acute toxicity for algae
Diphenylmethanediisocyanate-prepolymer
ErC50> 1,640 mg/l
Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
ErC50> 1,640 mg/l Test type: Growth inhibition Species: scenedesmus subspicatus Exposure duration: 72 h

Method: OECD Test Guideline 201
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
ErC50> 1,640 mg/l
Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201
Studies of a comparable product.

Acute bacterial toxicity
Diphenylmethanediisocyanate-prepolymer
EC50> 100 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209
Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
EC50> 100 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
EC50> 100 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209
Studies of a comparable product.

Toxicity to soil dwelling organisms
Diphenylmethane-2,4'-diisocyanate
NOEC (mortality) > 1,000 mg/kg
Species: Eisenia fetida (earthworms)
Exposure duration: 14 d Method:
OECD Test Guideline 207 Studies of a
comparable product.

diphenylmethane-4,4'-diisocyanate
NOEC (mortality) > 1,000 mg/kg
Species: Eisenia fetida (earthworms)
Exposure duration: 14 d Method:
OECD Test Guideline 207 Studies of a
comparable product.

Toxicity to terrestrial plants
Diphenylmethane-2,4'-diisocyanate
NOEC (seedling emergence) > 1,000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1,000 mg/kg
Species: Avena sativa (oats) Exposure
duration: 14 d Method: OECD Test
Guideline 208 Studies of a comparable
product.

NOEC (seedling emergence) > 1,000 mg/kg
Species: Lactuca sativa (lettuce) Exposure duration: 14 d Method: OECD Test Guideline 208 Studies of a comparable product.

NOEC (Growth rate) > 1,000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d Method: OECD Test Guideline 208 Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
NOEC (seedling emergence) > 1,000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208
Studies of a comparable product.

NOEC (Growth rate) > 1,000 mg/kg
Species: Avena sativa (oats) Exposure duration: 14 d Method: OECD Test Guideline 208 Studies of a comparable product.

NOEC (seedling emergence) > 1,000 mg/kg
Species: Lactuca sativa (lettuce) Exposure duration: 14 d Method: OECD Test Guideline 208 Studies of a comparable product.

NOEC (Growth rate) > 1,000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d Method: OECD Test Guideline 208 Studies of a comparable product.

Ecotoxicology Assessment
Diphenylmethane-2,4'-diisocyanate
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: There is no evidence of a chronic aquatic toxicity.
Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.
Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

diphenylmethane-4,4'-diisocyanate
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: There is no evidence of a chronic aquatic toxicity.
Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.
Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

12.2 Persistence and degradability

Biodegradability
Diphenylmethanediisocyanate-prepolymer
Biodegradation: 0 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C Studies of a comparable product.

Diphenylmethane-2,4'-diisocyanate
Biodegradation: 0 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Biodegradation: 0 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C
Studies of a comparable product.

Stability in water
Diphenylmethane-2,4'-diisocyanate
Test type: Hydrolysis
Half life: 20 h at 25 °C
The substance hydrolyzes rapidly in water.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Test type: Hydrolysis
Half life: 20 h at 25 °C
The substance hydrolyzes rapidly in water.
Studies of a comparable product.

Photodegradation
Diphenylmethane-2,4'-diisocyanate
Test type: Phototransformation in air
sensitizer: OH-radicals
Concentration sensibilisator: 500,000 1/cm3
Rate constant: 1.16E-11 cm3/s
Half-life indirect photolysis: 0.92 d
Method: SRC - AOP (calculation)
After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

diphenylmethane-4,4'-diisocyanate
Test type: Phototransformation in air
sensitizer: OH-radicals
Concentration sensibilisator: 500,000 1/cm3
Rate constant: 1.16E-11 cm3/s
Half-life indirect photolysis: 0.92 d
Method: SRC -AOP (calculation)
After evaporation or exposure to the air, the product will be moderately degraded by photochemical processes.

Volatility (Henry's Law constant)
Diphenylmethane-2,4'-diisocyanate
Calculated value = 0.0229 Pa*m3/mol
The substance has to be scored as being slightly volatile from water.

diphenylmethane-4,4'-diisocyanate
Calculated value = 0.0229 Pa*m3/mol
The substance has to be scored as being slightly volatile from water.

12.3 Bioaccumulative potential

Bioaccumulation
Diphenylmethane-2,4'-diisocyanate
Bioconcentration factor (BCF) 200
Species: Cyprinus carpio (Carp)
Exposure duration: 28 d
Concentration: 0.00008 mg/l
Test substance: 14C-labelled
Method: OECD Test Guideline 305 E
An accumulation in aquatic organisms is not to be expected.
Studies of a comparable product.

diphenylmethane-4,4'-diisocyanate
Bioconcentration factor (BCF) 200
Species: Cyprinus carpio (Carp)
Exposure duration: 28 d
Concentration: 0.00008 mg/l
Test substance: 14C-labelled
Method: OECD Test Guideline 305 E
An accumulation in aquatic organisms is not to be expected.

12.4 Mobility in soil

Distribution among environmental compartments
Diphenylmethane-2,4'-diisocyanate
Adsorption/Soil
not applicable

diphenylmethane-4,4'-diisocyanate
Adsorption/Soil
not applicable

Environmental distribution
Diphenylmethane-2,4'-diisocyanate no data available

diphenylmethane-4,4'-diisocyanate no data available

12.5 Results of PBT and vPvB assessment

Diphenylmethane-2,4'-diisocyanate
This substance does not meet the criteria for classification as PBT orvPvB.

diphenylmethane-4,4'-diisocyanate
This substance does not meet the criteria for classification as PBT orvPvB.

12.6 Other adverse effects

Isocyanate reacts with water at the interface forming CO2and asoiid insoluble product with high melting point (polyurea). This reaction is accelerated by surfactants (e.g. detergents) or by watersoluble solvents. Previous experience shows that polyurea is inert and non-degradable.

SECTION **13: Disposal considerations**

Dispose in accordance with applicable international, national and local laws, ordinances and statutes.

For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

13.1 Waste **treatment methods**

After final product withdrawal, all residues must be removed from containers (drip-free, powder-free or paste-free). Once the product residues adhering to the walls of the containers have been rendered harmless, the product and hazard labels must be invalidated. These containers can be returned for recycling to the

appropriate centres set up within the framework of the existing take-back scheme of the chemical industry. Containers must be recycled in compliance with national legislation and environmental regulations.

None disposal into waste water.

SECTION 14: Transport information

ADR/RID

14.1 UN number	Not dangerous goods
14.2 UN proper shipping name	Not dangerous goods
14.3 Transport hazard class(es)	Not dangerous goods
14.4 Packing group	Not dangerous goods
14.5 Environmental hazards	Not dangerous goods

ADN

14.1 UN number	Not dangerous goods
14.2 UN proper shipping name	Not dangerous goods
14.3 Transport hazard class(es)	Not dangerous goods
14.4 Packing group	Not dangerous goods
14.5 Environmental hazards	Not dangerous goods

This classification data does not apply to transportation by tanker. If required, additional information can be requested from the manufacturer.

IATA

14.1 UN number	Not dangerous goods
14.2 UN proper shipping name	Not dangerous goods
14.3 Transport hazard class(es)	Not dangerous goods
14.4 Packing group	Not dangerous goods
14.5 Environmental hazards	Not dangerous goods

IMDG

14.1 UN number	Not dangerous goods
14.2 UN proper shipping name	Not dangerous goods
14.3 Transport hazard class(es)	Not dangerous goods
14.4 Packing group	Not dangerous goods
14.5 Environmental hazards	Not dangerous goods

14.6 Special precautions for user

See section 6 - 8 .

Additional information	Not dangerous cargo. Keep dry. Avoid heat above +40 °C. Keep separated from foodstuffs. Keep away from cargo susceptible to odour.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

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

EU Directive 96/82 EC (Seveso II Directive)

Revision:	2003
Listed in regulation:	Directive 96/82/EC does not apply

Water contaminating class (Germany)

1 slightly water endangering
(in accordance with Annex 4 to the Directive on Water-Hazardous Substances)

Any existing national regulations on the handling of isocyanates must be observed.

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for:
Diphenylmethane-2,4'-diisocyanate
diphenylmethane-4,4'-diisocyanate

SECTION 16: Other information

Full text of hazardous (H) warnings referred to under sections 2, 3 and 10 of the CLP classification (1272/2008/CE).

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.

Full text of R-phrases referred to under sections 2, 3 and 10 of the EU classification (67/548/EEC,1999/45/EC).

R20	Harmful by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R40	Limited evidence of a carcinogenic effect.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.

ISOPA Guidelines for safe loading/unloading, transport and storage of TDI and MDI. ISOPA Order No.: PSC-0005-GUIDL

No registration number is given for this substance because the substance or its use are exempt from registration according to article 2 of the Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is planned fora later date.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Further information
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.