Lapiz Europe Limited eSDS

Prepared in accordance with Annex II of the REACH Regulation (EC) 1907/2006, Regulation (EC) 1272/2008 and Regulation (EC) 453/2010

Extended - SAFETY DATA SHEET

Product: MALEIC ANHYDRIDE
Registration No: 01 - 2119472428 - 31 - 0008

Revision: 01 Date: 04 / 08 / 2011 Pages: 1 / 24

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

1.1 Product identifier:

Product name	:	MALEIC ANHYDRIDE
EC Number	:	203-571-6
CAS Number	:	108-31-6

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

Uses:

Use as a monomer for polymer production, and as an intermediate (SU3, SU8, SU11, SU12 and PC19, PC21 and PC32)

The following Exposure Scenarios have been prepared:

ES1: Use of MAN as a monomer in polymer production

ES2: Use of MAN as Industrial use as an intermediate

1.3 Details of the supplier

Name	:	Lapiz Europe Limited as Only Representative for OPTIMISTIC ORGANIC SDN BHD
Address	:	No: 204-206 Talbot House, Imperial Drive Rayners Lane, Harrow, Middlesex, HA2 7HH. Tel:0208 429 5227; 0208 429 4455.

E-mail of competent person responsible for SDS in the MS or in the EU:vnirmal.gandhi@lapizdigital.com

Extended - SAFETY DATA SHEET

Product: MALEIC ANHYDRIDE
Registration No: 01 - 2119472428 - 31 - 0008

non-Community manufacturer:

Name : **OPTIMISTIC ORGANIC SDN BHD**
Address : LOT NO 3351, TELUK KALONG INDUSTRIAL ESTATE, 24007, KEMAMAN, TERENGGANU Malaysia.
Telephone : + 006 - 098633029
Email : ranson@singnet.com.sg

1.4 Emergency Telephone Number

Lapiz Europe Limited as OR for OPTIMISTIC ORGANIC SDN BHD:

Contact Number : 0208 429 5227; 0208 429 4455;

OPTIMISTIC ORGANIC SDN BHD:

Contact Number : + 006 – 098633029

SECTIION 2: Hazard Identification

2.1 Classification of the substance or mixture

Classification of the substance according to Regulation (EC) No 1272/2008

For Physico-chemical properties	:	Not Classified
For health hazards	:	
1.Acute Toxicity oral	:	Category 4.
2.Skin corrosion/irritation	:	Category 1B.
3.Respiration sensitization	:	Category 1.
4.Skin sensitization	:	Category 1.
For environmental hazards	:	Not classified.

Classification of the substance according to Directive 67/548/EEC

Xn; R22 Harmful; Harmful if swallowed.

C ; R34 Corrosive Causes burns

R42/43 May cause sensitisation by inhalation and skin contact.

2.2 Label elements

Labelling of the substance according to Regulation (EC) No 1272/2008:

Hazard pictogram:

GHS07	GHS05	GHS08
		

Signal word : **Danger**

Hazard statements:

- H302: Harmful if swallowed.
- H314: Causes severe skin burns and eye damage.
- H317: May cause an allergic skin reaction.
- H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary statements :

P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331: If swallowed rinse mouth, do not induce vomiting.
P303+P361+P353: If on skin or hair, remove immediately all contaminated clothing. Rinse skin with water shower.
P305+P351+P338: If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so.
P332+P313: If skin irritation occurs get medical advice/attention

Labelling of the substance according to Directive No 67/548/EEC:

C-Corrosive

R-phrases:

R22 Harmful; Harmful if swallowed.
R34 Corrosive Causes burns
R42/43 May cause sensitisation by inhalation and skin contact.

S-phrases:

S2 – keep out of the reach of children
S22 - do not breathe dust
S26 - in case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/39 - wear suitable protective clothing, gloves and eye/face protection
S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the lable where possible)

2.3 Other hazards

This substance does not meet the criteria for PBT or vPvB

SECTION 3: Composition information on ingredients

3.1 Substance

Substance name:	MALEIC ANHYDRIDE
Chemical formula:	C4H2O3
Synonym:	2,5-Furandione, Cis- butenedioic Anhydride.
Concentration:	More than 99.5 % (W/W)
EC Number	203-571-6
CAS Number	108-31-6

Impurities
No impurities relevant for classification and labeling.

SECTION 4: First aid measures

4.1 Description of first aid measures

4.1.1 Inhalation : Remove to fresh air and keep at rest. Monitor respiratory function. If breathing is difficult, give oxygen. If necessary, give artificial respiration.

Skin Contact : Remove contaminated clothing and shoes. Wash with plenty of soap and Water

Eye Contact : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Ingestion : Rinse mouth of victim with plenty of water. Do NOT induce vomiting. Never give anything by mouth to an unconscious person

4.1.2 Seek Medical attention

Movement of the exposed individual from the area to fresh air is recommended

Personal protective equipment for first aid responders is recommended.

4.2 Most important symptoms and effects, both acute and delayed

By inhalation: Dust or fumes can cause irritation of the nose throat and respiratory tract. Symptoms of exposure may include runny nose, coughing and nose bleeds, depending on severity of exposure. Severe over-exposure can produce lung damage, choking unconsciousness or death.
By skin contact: Hazardous in case of skin contact (corrosive, permeator). The amount of tissue damage depends on length of contact. Skin contact can produce inflammation, irritations and possible burning. Skin inflammation is characterized by itching scaling, reddening, or, occasionally, blistering.
By eye contact: Eye contact can result in corneal damage or blindness. Inflammation of the eye is characterized by redness, watering and itching.
By ingestion: Product ingestion causes irritations and possible burning to mouth, throat and stomach.
Chronic effects: Chronic exposure by inhalation or skin contact can cause allergic sensitization causes liver and kidney effects in laboratory animals.

4.3 Indication of any immediate medical attention and special treatment needed

Seek medical attention if necessary

SECTION 5: Firefighting measures

5.1 Extinguishing media

Carbon dioxide (CO2) foam, dry powder, sand for small fires.
For large fires use water jet or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture

Combustible material.May form flammable/explosive Vapour-air mixture.

5.3 Advice for firefighters

Special precautions for fire-fighters: Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Protection of fire-fighters: The fire fighters should wear full protective equipment and self - contained breathing apparatus with full face piece operated in positive pressure mode.
Other information: Do not get water inside containers/bags. Water spray or fog carefully applied to surface of the burning material can be used to extinguish the fire. Use water spray to prevent dust formation, absorb heat, keep containers cool and protect fire-exposed materials. Cool containers with flooding quantities of water until well after fire is out. Use water spray to flush spills from ignition source.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personal

(a) Use protective gloves, safety goggles and protective clothing

(b) Remove ignition sources. Do not touch spilled material unless wearing protective clothing. Avoid contact with skin and eye

6.2 Environmental precautions

Prevent from entering into watercourses, seweage and confined areas.

6.3 Methods and material for containment and cleaning up

6.3.1 Collect with a clean shovel, put in clean and dry vessels and cover them. Remove them from the spilling area.

6.3.2 (a) Neutralize traces of residues or very little spills that remained over the soil with sodium carbonate or bicarbonate and water, or alkaline substances.

(b) Collect with a clean shovel, put in clean and dry vessels and cover them. Remove them from spilling area.

6.4 Reference to other sections

Avoid contact with skin and eyes.

Use protective gloves, safety goggles and protective clothing.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

7.1.1 Avoid inhalation, contact with skin and eyes. Do not handle near incompatible materials. Use proper personal protective equipment.

7.1.2 Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Wash hands before eating, drinks, smoking or going to the toilet. Take off all contaminated clothing and wash before reuse.

7.2 Conditions for safe storage, including any incompatibilities

Store away from alkaline materials, oxidizers and strong acids. Copper oxide, nitric acid and sulfuric acid, sodium nitrite.

Avoid static electricity discharges.

Keep in original container, in a cool dry, well ventilated place. Keep away from food. Store locked up, keep out of reach of children.

7.3 Specific end use(s)

Refer exposure scenario attached.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

OELS

Substance	Limit Value	Limit Value	Source
Maleic anhydride	1 mg/m3	3 mg/m3	EH40, 2007

DNELS								
	Worker				General Population			
	Long term local effects	Long term systemic effects	Short term local effects	Short term systemic effects	Long term local effects	Long term systemic effects	Short term local effects	Short term systemic effects
Human oral	Not derived	Not derived	Not derived	Not derived	Not derived	Not derived	Not derived	Not derived
Human dermal	0.04 mg/cm²	0.04 mg/kg bw/day	0.04 mg/cm²	0.04 mg/kg bw/day	Not derived	Not derived	Not derived	Not derived
Human inhalation	0.4 mg/m³	0.4 mg/m³	0.8 mg/m³	0.8 mg/m³	Not derived	Not derived	Not derived	Not derived

PNECS

PNEC	
PNEC aqua (freshwater):	0.04281 mg/L
PNEC aqua (marine water):	0.004281 mg/L
PNEC aqua (intermittent releases):	0.4281 mg/L
PNEC sediment (freshwater):	0.334 mg/kg sediment dw
PNEC sediment (marine water):	0.0334 mg/kg sediment dw
PNEC soil:	0.0415 mg/kg soil dw
PNEC STP:	44.6 mg/L

8.2 Exposure Controls

8.2.1 Appropriate engineering controls

The best production is to enclose operation and/or provide local exhaust ventilation at the side of chemical release. It is recommended safety shower and eye bath available near work side. Compressed air lines used for respiratory protection should be provided with purifiers.

8.2.2 Wear adequate and proper personal protective equipment.

8.2.2.1 Do not eat, drink or smoke while using this product. Wash hands before eating, drinking, smoking, or going to the toilet. Take off all contaminated clothing and wash before reuse.

8.2.2.2 (a) Eye/face protection

Use protective safety goggles.

(b) Skin Protection:

- Use Latex or PVC gloves. Overalls of single canvas with long sleeves and hood.
- Use safety leather shoes with rubber impermeable sole, with protective clothing to the body.

(C) Respiratory protection:

Full face piece respirator for organic vapors. In cases of high potential of exposure use a supplied-air respirator, full facepiece, operated in positive-pressure mode.

8.2.3 Environmental Exposure Controls

Refer exposure scenario

SECTION 9 Physical and chemical properties

9.1 Information on basic physical and chemical properties

(a) Appearance	:	Briquettes
(b) Odour	:	Pungent
(c) Odour threshold	:	0.32 (ppm)
(d) pH	:	Hydrolyses to maleic acid
(e) Melting/freezing point	:	53-58 °C
(f) Boiling point	:	202 °C
(g) Flash point	:	Not Applicable – Solid
(h) Evaporation Rate	:	No data
(i) Flammability	:	Not Classified as flammable
(j) Upper/Lower flammability limited	:	Not applicable
(k) Vapor pressure	:	0.16 mm Hg at 20 Deg C
(l) Vapor density	:	No Data
(m) Relative Density	:	1.48 g/cm³ at 20°C
(n) Solubility in water	:	400 at 20°C
(o) Solubility in other solvents	:	No Data
(p) Partition Co-efficient	:	-2.61 as Maleic acid
(q) Auto-ignition temperature	:	NA
(r) Decomposition temperature	:	No decomposition reported below boiling point
(s) Viscosity	:	Not applicable
(t) Explosive properties	:	Not classified as explosive
(u) Oxidising properties	:	Not classified as oxidising

9.2 Other information

None

SECTION 10: Stability and reactivity

10.1 Reactivity

Reacts slowly with water to form Maleic Acid

10.2 Chemical Stability

Stable under normal conditions of storage and handling polymerization will not occur

10.3 Possibility of hazardous reactions

None

10.4 Conditions to avoid

Avoid extreme heat. Avoid moisture.

10.5 Incompatible materials

Alkaline materials, oxidizers and strong acids. Copper oxide, nitric acid and sulfuric acid, sodium nitrite.

10.6 Hazardous decomposition products

Carbon dioxide and carbon monoxide. Reacts slowly with water to form Maleic Acid

SECTION 11: Toxicological Information

11.1.1 Substances

11.1.1.1

(a) Acute toxicity	:	LD_{50} (oral, rats): 1090 mg/kg
	:	LC50 (inhalation, rats): >4.35 mg/L
	:	LC50 (dermal, rats):2620mg/kg
(b) Skin corrosion/irritation	:	Corrosive.
(c) Respiratory or skin sensitisation	:	Sensitizing
(d) Germ cell mutagenicity	:	Not mutagenic
(e)Repeated dose toxicity	:	Oral: NOEL= 40 mg/kg/day (90days in male rat)
		Oral: NOEL= 100 mg/kg/day (90days in female rat)
(f) Carcinogenecity	:	Non carcinogenic
(g) Reproductive toxicity	:	oral, rat, 2-gen: NOAEL (fertility) = 55 mg/kg

11.1.1.2

Hazard Class	Result	Conclusion
Acute Toxicity	LD_{50} (oral, rats): 1090 mg/kg LC50 (inhalation, rats): >4.3 mg/L LC50 (dermal, rats):2620mg/kg	Oral: LD50 (rat): 1090 mg/kg bw (male) according to OECD Guideline 403,therefore a classification according to Reg. 1272/2008 as Acute Toxicity categ 4-H302 is justified. Dermal: LD50 (rabbit) 2620 mg/kg bw Inhalation: LC50 (rat) > 4.3 mg/m^3 air (male/female).
Skin corrosion/irritation	Corrosive.	Skin irritation / corrosion: irritating; therefore a classification according to Reg. 1272/2008 as Skin Irritant categ. 2-H315 is justified.
Respiratory or skin sensitisation	Sensitizing	Skin: sensitizing and it is classified as skin Sens. 1, H317 Respiratory: sensitizing to respiratory system and it is classified as Resp. Sens. 1, H334
Repeated dose toxicity	Oral: NOEL= 40 mg/kg/day (90days in male rat) Oral: NOEL= 100 mg/kg/day (90days in female rat)	Inhalation: 1 month, rat, vapour, 6 hrs/day; 5 days per week: LOAEC (systemic) 0.01 mg/L air due to changes in the organ weights/reduced body weight, LOAEC (local) 0.01 mg/L air due to local effects in the respiratory tract (similar to OECD Guideline 412, TSCAT OTS 0206655, 1979). Dermal: No data available.
Reproductive toxicity	NOAEL, rat: 55mg/kg	Experimental result

11.1.3

See section 11.1.1.1

11.1.4

See section 11.1.1.1

11.1.5

See section 11.1.1.1

11.1.7

11.1.8

Information was obtained from 401 (79%) workers. Thirty four (8.8%) had new work related respiratory symptoms that occurred for the first time while working with acid anhydrides and 12 (3.2%) were sensitised, with an immediate skin prick test reaction to AA-HSA conjugates

SECTION 12: Ecological Information

Aquatic Toxicity

Short-term toxicity to fish
Salmo gairdneri (new name: Oncorhynchus mykiss)/fresh water/ static LC50 (96 hrs): 75 mg/L test mat.
Long-term toxicity to fish

Justification: In Annex IX of Regulation (EC) No 1907/2006, it is laid down that chronic tests shall be proposed by the registrant if the chemical safety assessment indicates the need to investigate further the effects on fish.

Short-term toxicity to aquatic invertebrates

Daphnia magna/fresh water/static EC50 (48 h): 42.81 mg/L test mat.
Long-term toxicity to aquatic invertebrates
Daphnia magna/freshwater NOEC (21 d): 10 mg/L test mat.
Algae and aquatic plants
Pseudokirchnerella subcapitata (algae)/freshwater/static NOEC (72 h): 11.8 mg/L test mat.

Toxicity to sediment
Justification: Maleic anhydride is not supposed to be directly applied to sediment and an indirect exposure to sediment is unlikely since the substance is readily biodegradable.

Toxicity to soil macro-organisms
Justification: Maleic acid is not supposed to be directly applied to soil and an indirect exposure to soil via sewage sludge transfer is unlikely since the substance is readily biodegradable.

Resulting PNECs:

	Water	Sediment	Soil
PNEC	0.04281 mg/L	0.334 mg/kg sediment dw	0.0415 mg/kg soil dw

12.2 Persistence and degradability

Photo degradation in air

A calculation assuming a sensitizer-concentration (OH-radical) of 1000000 molecule/cm³ and a rate constant of 4.3E-11 cm³/molecule*sec predicted a half-life in the atmosphere of 4.5 hours (Grosjean and Williams, 1992, cited in OECD SIDS 2004). Taking into account a regular OH concentration of 500000 molecules/cm³ the half-life increases to 9 hours.

Photo degradation in water:

Photodegradation in water is not expected to be an important fate path in the aquatic environment as the substance hydrolyses rapidly forming maleic acid. Therefore, this endpoint is not considered in the assessment of the substance.

Hydrolysis:

In a study investigating the hydrolisation of maleic anhydride to maleic acid at pH 7 and 25.1°C a half life of 0.3 minutes at a hydrolysis rate constant of 3140 sec^{-1} was determined (Bunton et al. 1963). Maleic acid is expected to be the product of hydrolysis, for which hydrolysis is not expected to be an important fate path due to the lack of labile functional groups.

12.2.2. Biotic degradation:

Degradation rate in water:	4.7E-02 [d^{-1}][1]
Degradation rate in sediment:	2,31E-03 [d^{-1}][3]
Degradation rate in soil:	2,31E-02 [d^{-1}][2]
Degradation rate in air:	1.858 [d^{-1}][4]

12.3 Bioaccumulative potential:

In the presence of water, maleic anhydride rapidly hydrolyses forming maleic acid. Both substances have a low log Pow (maleic anhydride: -2.61, maleic acid: -0.48 and thus they are not expected to accumulate in organisms.

12.4 Mobility in soil :

Maleic anhydride is readily biodegradable in water and mobility is not expected to be of concern.

12.5 Results of PBT and VpVb assessment

Maleic anhydride hydrolyses in water to maleic acid which is soluble and is readily biodegradable. The log Kow is well below levels of concern. It is not expected to persist or bioaccumulate in the environment.

12.6 Other adverse effects : None

SECTION 13: Disposal considerations:

13.1 Waste treatment methods:

Prior to implementing land disposal of waste residue(including waste sludge), consult local legislation for adequate disposal methods.

Empty containers can retain product residues and shall be disposed in accordance with the provisions proposed for the product.

For more information refer Exposure scenario attached.

SECTION 14: Transport information:

14.1 UN number : 2215

14.2 UN proper shipping name : MALEIC ANHYDRIDE

14.3 **Transport hazard class** : 8

14.4 **Packaging group** : III

International regulations	Class	Number letter	Warning Sign	UN number
Road Transport ADR/RID	8	NA	Corrosive	2215

International regulations	Class	UN number	EmS number	Packaging group
Maritime transport IMDG	8	2215	NA	III

International regulations	**Class**	**UN number**	**Packaging group**
Air transport ICAO/IATA	**8**	**2215**	**III**

14.5 Environmental hazards : None

14.6 Special precautions for user: None

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code. - NA

SECTION 15: Regulatory information:

15.1

No specific regulations. Normal chemical safety and handling regulations will apply.

15.2: Chemical safety assessment

Yes

SECTION 16: Other information

Revision information: This is the first SDS produced in the new REACH format.

List of Abbreviations used in this SDS:

CAS Chemical Abstracts Service
CLP Classification, Labelling and Packaging Regulation (EC) no 1272/2008
DSD Dangerous Substances Directive 67/548/EEC
DPD Dangerous Preparations Directive 1999/45/EC
EC European Community/Commission
PBT Persistent, Bioaccumulative and Toxic
REACH Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) no 1907/2006
vPvB very Persistent, very Bioaccumulative

References: Full details of test reports can be viewed in the registration dossier, accessible through the ECHA CHEM website.

Training requirements for workers
No special training requirements.

The information provided in this safety data sheet is given in good faith and is correct to the best of our knowledge and information at the date of publication. It is designed only as guidance for safe handling, storage, transportation, use and disposal. No warranty is expressed (or) implied.

Annexes Included:

ES1: Use of MAN as a monomer in polymer production (flakes; low dustiness):

Sectors of Use:

SU3: Industrial uses: Uses of substances as such or in preparation at industrial sites

SU11: Manufacture of rubber products.

SU12: Manufacture of plastics products, including compounding and conversion

Product Category:

PC19: Intermediate

PC32: Polymer preparations and compounds

Process Categories:

PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15: Use as laboratory reagent

Environmental Release Category:

ERC1: Manufacture of substance
ERC6c: Industrial use of monomers in the production of plastics (polymers).

Description of activities and processes covered in the exposure scenario:

Control of workers exposure for PROC 1, 2, 3, 4, 8b and 15			
Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Product characteristics			
Physical state of the product	solid		
Concentration of substance in product	100	%	
Dustiness	low		
Amounts used			
			Not relevant in ECETOC TRA

Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm²)		Relevant for PROC 1, 3 and 15
	Palm of both hands (480 cm²)		Relevant for PROC 2, 4, and 8b
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Relevant for PROC 4: effectiveness 90%
			Relevant for PROC 8b: effectiveness 95%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves	Yes + basic training		Relevant for PROC 1, 2, 3 and 15: effectiveness 80%
	Yes + int. managm. supervision controls		Relevant for PROC 4 and 8b: effectiveness 98%

ES2: Use of MAN as Industrial use as an intermediate (flakes; low dustiness):

SU3: Industrial uses: Uses of substances as such or in preparation at industrial sites

SU8: Manufacture of bulk, large scale chemicals (including petroleum products)

PC19: Intermediate
PC21: Laboratory chemicals

PROC1: Use in closed process, no likelihood of exposure
PROC2: Use in closed, continuous process with occasional controlled exposure
PROC3: Use in closed batch process (synthesis or formulation)
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
PROC15: Use as laboratory reagent

ERC1: Manufacture of substance
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Description of activities and processes covered in the exposure scenario:

Control of workers exposure for PROC 1, 2, 3, 8b and 15			
Frequency and duration of use			
Duration of exposure	> 4	Hours/day	
Frequency of exposure	≤ 240	Days/year	
Product characteristics			
Physical state of the product	solid		
Concentration of substance in product	100	%	
Dustiness	low		
Amounts used			
			Not relevant in ECETOC TRA

Human factors not influenced by risk management			
Exposed body parts dermal	Palm of one hand (240 cm^2)		Relevant for PROC 1, 3 and 15
	Palm of both hands (480 cm^2)		Relevant for PROC 2 and 8b
Other given operational conditions affecting workers exposure			
Domain	Industrial		
Inside/outside	Inside		
Technical conditions and measures at process level (source) to prevent release			
None			
Conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes		Relevant for PROC 8b: effectiveness 95%
Organisational measures to prevent /limit releases, dispersion and exposure			
			Not relevant in ECETOC TRA
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves	Yes + basic training		Relevant for PROC 1, 2, 3 and 15: effectiveness 80%
	Yes + int. managm. supervision controls		Relevant for PROC 8b: effectiveness 98%