

Product Name	Diocetyl maleate		EUXS/EN
MSDS number	80485	Revision Date	Dec.06.2018
Revision Number	6.05	Issuing date	Dec.06.2018

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

1.1. Product identifier

Product Name
Diocetyl maleate

REACH Registration Number
01-2119524002-60-0000

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

Identified uses
Monomer, Reprographic agents (Toner)

Uses advised against
None known

1.3. Details of the supplier of the safety data sheet

Celanese Production Germany GmbH & Co. KG
Am Unisys-Park 1
65843 Sulzbach (Taunus)
Germany

Celanese Sales Germany GmbH
Am Unisys-Park 1
65843 Sulzbach (Taunus)
Germany

SDS Contact (email of responsible person)
HazCom@celanese.com

1.4. Emergency telephone number
CHEMTREC: +1 703 527 3887 (Collect calls accepted)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation 1272/2008/EC (CLP)

Basis for Classification This substance is classified based on Directive 1272/2008/EC and its amendments (CLP Regulation, GHS).

Classification

Hazards	Category
Specific target organ systemic toxicity (repeated exposure)	Category 2
Chronic aquatic toxicity	Category 1

2.2. Label elements

Safety data sheet according to regulation (EC) Nr. 1907/2006

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Symbol(s)



Signal Word

Warning

Hazard Statements

H373 - May cause damage to organs through prolonged or repeated exposure if swallowed
H410 - Very toxic to aquatic life with long lasting effects

Precautionary Statements

P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P273 - Avoid release to the environment
P314 - Get medical advice/ attention if you feel unwell
P391 - Collect spillage
P501 - Dispose of contents/container in accordance with local regulations.

2.3 Other Hazards

The substance does not meet the criteria for PBT / vPvB according to REACH, Annex XIII.

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SECTION 3: Composition/information on ingredients

3.1. Substances Details provided in the tables below

3.2. Mixtures not applicable

Components	CAS-No	EC-No.	Identification Number	Percent %
Bis(2-ethylhexyl)maleate	142-16-5	205-524-5	none	>= 98
Bis(2-ethylhexyl) fumarate	141-02-6	205-448-2	none	<= 5
2-Ethylhexan-1-ol	104-76-7	203-234-3	none	<= 2

Regulation (EC) No 1272/2008 on classification, labeling and packaging of substances and mixtures, Annex VI, Table 3.1

Components	1272/2008/EC (CLP)	Hazard Statements
Bis(2-ethylhexyl)maleate	STOT RE - Category 2 Chronic aquatic toxicity - Category 1	H373 H410
Bis(2-ethylhexyl) fumarate	STOT RE - Category 2 Chronic aquatic toxicity - Category 1	H373 H410
2-Ethylhexan-1-ol	Acute inhalation toxicity - Category 4 Skin corrosion / irritation - Category 2 Serious eye damage / eye irritation - Category 2 STOT SE - Category 3	H332 H315 H319 H335

SECTION 4: First aid measures

4.1. Description of first aid measures

General Information Remove contaminated, soaked clothing immediately and dispose of safely.

Inhalation Keep at rest. Aerate with fresh air. If symptoms persist, call a physician.

Skin Wash off immediately with soap and plenty of water. If symptoms persist, call a physician.

Eyes In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Ingestion Call a physician immediately. Do not induce vomiting without medical advice.

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

Main symptoms None known

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

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Suitable extinguishing media

Foam, Dry chemical, Carbon dioxide (CO₂)

Extinguishing media which must not be used for safety reasons

Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Under conditions giving incomplete combustion, hazardous gases produced may consist of

Carbon monoxide

Carbon dioxide (CO₂)

Combustion gases of organic materials must in principle be graded as inhalation poisons

5.3. Advice for firefighters

Special protective equipment for fire-fighters

self-contained breathing apparatus (EN 133).

Environmental precautions

Water used to fight fire runoff can cause environmental damage.. Dike and collect water used to fight fire..

Other Information

Cool containers / tanks with water spray..

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid contact with the skin and the eyes. Keep away from heat and sources of ignition. Provide adequate ventilation.

6.2. Environmental precautions

Prevent further leakage or spillage. Do not discharge into the drains/surface waters/groundwater.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Dispose of in accordance with local regulations.

6.4. Reference to other sections

Consult trained personnel. Consider the information for "Personal Protection" in chapter 8 of this Safety Data Sheet.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Hygiene measures

When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Advice on safe handling

Provide sufficient air exchange and/or exhaust in work rooms.

Incompatible products

No hazards to be especially mentioned

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Protection - fire and explosion:

Keep away from sources of ignition - No smoking. Take necessary action to avoid static electricity discharge. Ground and bond containers when transferring material. In case of fire, emergency cooling with water spray should be available.

Reduce the release of the substance or mixture to the environment

See Section 8: Environmental exposure controls

Temperature class

T3

7.2. Conditions for safe storage, including any incompatibilities

Material storage

Keep in a dry, cool and well-ventilated place.

Incompatible products

No hazards to be especially mentioned

Technical measures/Storage conditions

Keep tightly closed in a dry, cool and well-ventilated place. Handle an open container with care.

German storage class

10: Combustible liquids not listed in class 3A or 3B

7.3. Specific end use(s)

None known

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

EC Exposure Limit Values

No exposure limits established.

National occupational exposure limits

Components	MAC
2-Ethylhexan-1-ol	50 mg/m ³

DNELs

Acute - Systemic Effect

Worker (oral):	not required
Worker (dermal):	not required
Worker (inhalation):	not required
General Population (oral):	not required
General Population (dermal):	not required
General Population (inhalation):	not required

Acute - Local Effect

Worker (oral):	not required
Worker (dermal):	not required
Worker (inhalation):	not required
General Population (oral):	not required
General Population (dermal):	not required
General Population (inhalation):	not required

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Long-term - Systemic Effects

Worker (oral):	not required
Worker (dermal):	2.5 mg/kg bw/d
Worker (inhalation):	7 mg/m ³
General Population (oral):	not required
General Population (dermal):	not required
General Population (inhalation):	not required

Long-term - Local Effects

Worker (oral):	not required
Worker (dermal):	not required
Worker (inhalation):	not required
General Population (oral):	not required
General Population (dermal):	not required
General Population (inhalation):	not required

PNECs

Environment (water):	0.00104 mg/l
Environment (air):	not required
Environment (soil):	3.19 mg/kg soil dw
Environment (sediment):	15.95 mg/kg sediment dw
Environment (STP):	100 mg/l

8.2. Exposure controls

Engineering measures General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Personal protective equipment

General advice Avoid contact with skin and eyes. Do not breathe vapors or spray mist. Use only in an area equipped with a safety shower. Hold eye wash fountain available.

Hygiene measures When using, do not eat, drink or smoke. Take off all contaminated clothing immediately. Wash hands before breaks and immediately after handling the product.

Respiratory protection If aerosols or vapors are present, respiratory protection is required (gas filter A) .

Eye protection Tightly fitting safety goggles. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.. Equipment should conform to EN 166.

Skin protection impervious clothing

Hand protection Chemicals resistant gloves

Suitable material Butyl-rubber
Reference substance Di-(2-ethylhexyl)-phthalate
Type Butoject (Company KCL) or comparable article;
 or refer to glove manufacturer's recommendation

Evaluation according to EN 374: level 6

Material thickness Approx. 0.3 mm

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Break through time	480 min
Suitable material	butyl-rubber
Reference substance Type	Di-(2-ethylhexyl)-phthalate Butoject (Company KCL) or comparable article; or refer to glove manufacturer's recommendation
Evaluation	according to EN 374: level 6
Material thickness	approx. 0.7 mm
Break through time	480 min

Environmental exposure controls

Do not discharge into the drains/surface waters/groundwater

Environmental Precautions

Should not be released into the environment

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Form	liquid
Color	colourless
Odor	ester-like

Odor Threshold	not determined
Molecular Weight	340.56 g/mol
Flash point	185°C
Method	closed cup
Autoignition Temperature	260 °C
Method	EU A.15
Decomposition Temperature	Not determined
Lower explosion limit	not applicable
Upper explosion limit	not applicable
Flammability (solids)	not applicable
Melting point/range	-60°C
Boiling point/range	156°C @ 9 hPa
Density	0.94 g/ml @ 20°C
pH	Not determined
Viscosity	8.29 mPa*s @ 20°C
Method	calculated

Vapor pressure	0.00022 Pa @ 20°C 0.0096 Pa @ 50°C
Vapor density	11.7 (Air=1)

Evaporation Rate Not determined

Water solubility	< 36 µg/l @ 20°C
Solubility in other solvents	Not determined
Partition coefficient (n-octanol/water)	~ 7.24 (measured)

Explosive Properties not applicable based on consideration of the structure

Oxidizing Properties not applicable based on consideration of the structure

Surface Tension not determined

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Dissociation constant not applicable based on consideration of the structure

9.2. Other information The product was not tested for properties not listed on the SDS

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions of handling, use and transportation..

10.2. Chemical Stability

No decomposition if used as directed. If heated to thermal decomposition the following decomposition products may occur depending on the conditions: carbon oxides.

10.3. Possibility of hazardous reactions

None anticipated.

10.4. Conditions to avoid

Avoid any source of ignition.. Avoid contact with heat, sparks, open flame, and static discharge..

10.5. Incompatible Materials

None known

10.6. Hazardous decomposition products

No hazardous decomposition products are known

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Bis(2-ethylhexyl)maleate

Acute oral toxicity

LD50: > 2000 mg/kg
 Species rat

Method OECD 401

Acute dermal toxicity

LD50: 14000 mg/kg

Species rabbit

Skin corrosion/irritation

slight irritant effect - does not require labelling

Species rabbit

Method OECD 404

Serious eye damage/eye irritation

No eye irritation

Species rabbit eye

Method OECD 405

Skin Sensitization

nonsensitizer

Species guinea pig, female

Method OECD 406

in vitro Mutagenicity

Ames Test: negative - with and without metabolic

activation - Method: OECD 471

in vivo Mutagenicity

No evidence of in vitro mutagenicity

Carcinogenic effects

No evidence of carcinogenicity

Reproductive toxicity

No adverse reproductive / developmental effects at the

highest dose tested

Routes of exposure oral gavage

Species rat

Method OECD 422

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Repeated exposure	NOAEL: ~ 1000 mg/kg bw/day Chronic progressive nephropathy and mineralization in the kidneys (Reference substance: Dibutyl maleate)
Routes of exposure	oral gavage
Species	rats
Method	OECD 408
Type of study	LOAEL: 30 mg/kg/d 90-day oral subchronic toxicity study

SECTION 12: Ecological information

Bis(2-ethylhexyl)maleate

Acute fish toxicity	LC50: > 100 mg/l (96h)
Species:	Danio rerio (Zebra fish)
Method	OECD 203
Acute daphnia toxicity	EC50: 59.5 mg/l (48h)
Species:	Daphnia magna
Method	OECD 202
Toxicity to aquatic plants	EC50: > 0.619 mg/l (72h)
Species:	Pseudokirchneriella subcapitata
Method	OECD 201
Toxicity to bacteria	EC50: > 1000 mg/l (3h)
Species:	in activated sludge
Method	OECD 209
Biodegradation	degradable
Species:	activated sludge
Method	OECD 301 F
Mobility in soil	KOC: 153400 l/kg
Other potential hazards	The substance does not meet the criteria for PBT / vPvB according to REACH, Annex XIII

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product information	Disposal required in compliance with all waste management related state and local regulations. The choice of the appropriate method of disposal depends on the product composition by the time of disposal as well as the local statutes and possibilities for disposal.
Uncleaned empty packaging	Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

SECTION 14: Transport information

ADR/RID

UN/ID No.	UN 3082
Proper Shipping Name	Environmentally hazardous substance, liquid, n.o.s.
Hazard Inducer	(Bis(2-ethylhexyl) maleate)
Hazard Class	9

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SECTION 14: Transport information

Classification Code	M6
Packing group	III
Environmentally hazardous	yes
Tunnel Restriction Code	(E)
Hazard Label(s)	9 + Fish and tree
Hazard Number	90

ADN	ADN: Container and Tanker
UN/ID No.	UN 3082
Proper Shipping Name	Environmentally hazardous substance, liquid, n.o.s.
Hazard Inducer	(Bis(2-ethylhexyl) maleate)
Hazard Class	9
Classification Code	M6
Packing group	III
Environmentally hazardous	yes
Hazard Labels	9 + Fish and tree

ICAO/IATA	
UN-No.	UN 3082
Proper Shipping Name	Environmentally hazardous substance, liquid, n.o.s.
Hazard Inducer	(Bis(2-ethylhexyl) maleate)
Hazard Class	9
Packing group	III
Environmentally hazardous	yes
Hazard Labels	9 + Fish and tree

IMDG	
UN/ID No.	UN 3082
Proper Shipping Name	Environmentally hazardous substance, liquid, n.o.s.
Hazard Inducer	(Bis(2-ethylhexyl) maleate)
Hazard Class	9
Packing group	III
Marine pollutant	yes
Hazard Labels	9 + Fish and tree
EmS Code	F-A, S-F

SECTION 15: Regulatory information

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

Water Hazard Class (WGK):	
WGK Class	3
WGK Reg. No.	5059
WGK Source	Classification based on addendum 3, No. 3 (VwVwS)

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International Inventories

Listed on the chemical inventories of the following countries or qualifies for an exemption:

Australia (AICS)
Canada (DSL)
China (IECSC)
Europe (EINECS)
Japan (ENCS)
Japan (ISHL)
Korea (KECI)
New Zealand (NZIoC)
Philippines (PICCS)
United States (TSCA)

15.2 Chemical Safety Assessment

Chemical Safety Assessment is available

Authorization - Reach Regulation, Title VII

This substance is not subject to authorization requirements

Restrictions - Reach Regulation, Titel VIII

This substance is not subject to restriction requirements

SECTION 16: Other information

Hazard statements

H315 - Causes skin irritation
H319 - Causes serious eye irritation
H332 - Harmful if inhaled
H335 - May cause respiratory irritation
H373 - May cause damage to organs through prolonged or repeated exposure
H410 - Very toxic to aquatic life with long lasting effects

Other Information:

- Observe national and local legal requirements

Changes against the previous version are marked by ***

Training advice

Make sure that employees are aware of the hazards / risks as detailed on this Safety Data Sheet. When wearing a breathing apparatus, the need for appropriate training needs to be considered.

Sources of key data used to compile the datasheet

Information contained in this safety data sheet is based on Celanese owned data and public sources deemed valid or acceptable.. The absence of data elements required by ANSI or 1907/2006/EC indicates that no data meeting these requirements is available..

Further information

This information is based on our present state of knowledge. It shall describe our products regarding safety requirements and shall not be construed as a guarantee or statement of condition and/or quality. For more information, other material safety data sheets or technical data sheets please consult the Celanese homepage (www.celanese.com).

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Abbreviation and Acronym:

ADR = Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

CAS = Chemical Abstracts Service (division of the American Chemical Society)

CLP = Classification, Labelling and Packaging

DNEL = Derived No Effect Level

EINECS = European Inventory of Existing Commercial Chemical Substances

GHS = Globally Harmonized System of Classification and Labelling of Chemicals

IATA = International Air Transport Association

ICAO = International Civil Aviation Organization

IMDG = International Maritime Code for Dangerous Goods

LC50 = Lethal Concentration

LD50 = Lethal Dose

LOAEC = Low Observed Adverse Effect Concentration

LOAEL = Low Observed Adverse Effect Level

LOEL = Low Observed Effect Level

NOAEC = No Observed Adverse Effect Concentration

NOAEL = No Observed Adverse Effect Level

NOEC = No Observed Effect Concentration

NOEL = No Observed Effect Level

PBT = Persistent, Bioaccumulative and Toxic

PNEC = Predicted No Effect Concentration

RCR = Risk Characterization Ratio

RID = Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

STOT RE = Specific Target Organ Toxicity Repeated Exposure

STOT SE = Specific Target Organ Toxicity Single Exposure

STP = Sewage Treatment Plant

vPvB = very Persistent and very Bioaccumulative

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Annex: Exposure Scenario(s)

See section 8: DNELs and PNECs

For industrial use only.

Please contact Celanese in case you are interested in consumer applications at REACH@celanese.com

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Exposure Scenario	Text
1. Exposure Scenario	Formulation (SU 3) Formulation of inks and toners; PC18 - Ink and Toners
2. Exposure Scenario	Industrial end-use (SU 3) Industrial use as a monomer for the production of (co)polymers; Polymer industry; PC 0

1. Exposure Scenario

1. Title of Exposure Scenario

PC18 - Ink and Toners

Environment

Formulation of inks and toners (ERC 2)

Worker

Use in closed process, no likelihood of exposure (PROC 1)

Use in closed, continuous process with occasional controlled exposure (PROC 2)

Use in closed batch process (synthesis or formulation) (PROC 3)

Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Batch process (PROC 5)

Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Formulation of inks and toners (ERC 2)

2.2 Control of worker exposure Use in closed process, no likelihood of exposure (PROC 1)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Not applicable

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use. Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.3 Control of worker exposure Use in closed, continuous process with occasional controlled exposure (PROC 2)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.4 Control of worker exposure Use in closed batch process (synthesis or formulation) (PROC 3)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours

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Technical and organizational conditions and measures	Not applicable
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.5 Control of worker exposure Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.6 Control of worker exposure Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (PROC 5)

Product (article) characteristic	Not applicable
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Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.7 Control of worker exposure Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands (960 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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2.8 Control of worker exposure Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.9 Control of worker exposure Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better Wear a respirator providing a minimum efficiency of
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)

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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable
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2.10 Control of worker exposure Use as laboratory reagent (PROC 15)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur. Effectiveness
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

3.Exposure estimation and reference to its source

Environment

Environment

Release route	Release rate (kg/day)	Release estimation method
Water	0	ESVOC SpERC 4.10a.v1
Air	2.667	ESVOC SpERC 4.10a.v1
Soil	0	ESVOC SpERC 4.10a.v1

Protection target	Exposure estimate (based on: EUSES)	RCR
Terrestrial food chain (predator)	2.47 mg/kg ww	0.124
Freshwater (pelagic)	9.52E-8 mg/L	0
Freshwater (sediment)	0.001 mg/kg dw	0
Marine water (pelagic)	1.24E-8 mg/L	0
Marine water (sediment)	1.9E-4 mg/kg dw	0
Freshwater food chain (predators)	7.76E-4 mg/kg ww	0
Marine water food chain (predators)	1.01E-4 mg/kg ww	0

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Marine water food chain (top predators)	2.02E-4 mg/kg ww	0
Effluent	0 mg/L	0
Agricultural soil	0.079 mg/kg dw	0.025

Risk characterisation for man via the environment

Not required as an accumulation via the food chain is not expected

Worker exposure

Long-term, systemic

Contributing scenario:	Inhalation	Dermal:	Combined routes:	Exposure Estimation Method:
Use in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.069 mg/kg bw/d RCR: 0.163	RCR: 0.236	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.027 mg/kg bw/d RCR: 0.065	RCR: 0.072	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.069 mg/kg bw/d RCR: 0.163	RCR: 0.236	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.137 mg/kg bw/d RCR: 0.326	RCR: 0.334	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (PROC 5)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.069 mg/kg bw/d RCR: 0.163	RCR: 0.236	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.027 mg/kg bw/d RCR: 0.065	RCR: 0.072	Inhalation: Extended TRA workers Dermal: Extended TRA workers

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Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 0.004 mg/m ³ RCR: 0.002	Exposure: 0.137 mg/kg bw/d RCR: 0.326	RCR: 0.329	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.007 mg/kg bw/d RCR: 0.016	RCR: 0.089	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.137 mg/kg bw/d RCR: 0.326	RCR: 0.334	Inhalation: Extended TRA workers Dermal: Extended TRA workers

Acute systemic

Not required as no hazard identified

Local effects via inhalation route

Not required as no hazard identified

Local effects via dermal route

Not required as no hazard identified

4.Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

The Use Descriptors assigned based on the ECHA guidance on use descriptors R-12 represent the current understanding of the uses of our product

(http://echa.europa.eu/documents/10162/13632/information_requirements_r12_en.pdf).

Please carefully consider whether the listed Exposure Scenarios reflect your uses of Celanese's product. Different uses can be addressed in the same exposure scenario if the same operational conditions and risk management measures apply to all these uses. In addition, various types of activities can be expressed by one category for workers' exposure and one category for environmental exposure.

ECHA's "Guidance for Downstream Users" provides details how to decide whether or not your use is covered by the exposure scenarios and what to do if this is not the case

(http://echa.europa.eu/documents/10162/13634/du_en.pdf).

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2. Exposure Scenario

1. Title of Exposure Scenario Industrial end-use (SU 3) Industrial use as a monomer for the production of (co)polymers; Polymer industry; PC 0

Environment Industrial use as a monomer for the production of (co)polymers (ERC 6c)

Worker

- Use in closed process, no likelihood of exposure (PROC 1)
- Use in closed, continuous process with occasional controlled exposure (PROC 2)
- Use in closed batch process (synthesis or formulation) (PROC 3)
- Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)
- Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)
- Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Industrial use as a monomer for the production of (co)polymers (ERC 6c)

2.2 Control of worker exposure Use in closed process, no likelihood of exposure (PROC 1)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.3 Control of worker exposure 2.3 Control of worker exposure Use in closed, continuous process with occasional controlled exposure (PROC 2)

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Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better
Other conditions affecting workers exposure	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.4 Control of worker exposure Use in closed batch process (synthesis or formulation) (PROC 3)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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2.5 Control of worker exposure Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator conforming to EN140 with Type A/P2 filter or better
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.6 Control of worker exposure Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8a)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands (960 cm ²)

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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Provide extract ventilation to points where emissions occur
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2.7 Control of worker exposure Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: Two hands face (480 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.8 Control of worker exposure Use as laboratory reagent (PROC 15)

Product (article) characteristic	Not applicable
Amount used (or contained in articles), frequency and duration of use/exposure	Avoid carrying out activities involving exposure for more than 8 hours
Technical and organizational conditions and measures	Provide extract ventilation to points where emissions occur.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Exposed skin surface assumed: One hand face only (240 cm ²)
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

3.Exposure estimation and reference to its source

Environment

Environment

Release route	Release rate (kg/day)	Release estimation method
Water	0.007	
Air	1.34	
Soil	0	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	2.64E-5 mg/L	0.025
Freshwater (sediment)	0.405 mg/kg dw	0.025
Marine water (pelagic)	2.64E-6 mg/kg dw	0.025
Marine water (sediment)	0.041 mg/kg dw	0.025
Freshwater food chain (predators)	0.088 mg/kg ww	0.004
Marine water food chain (predators)	0.009 mg/kg ww	0
Marine water food chain (top predators)	0.004 mg/kg ww	0
Effluent	3.24E-4 mg/L	0
Agricultural soil	0.151 mg/kg dw	0.047
Terrestrial food chain (predator)	4.65 mg/kg ww	0.232

Risk characterisation for man via the environment

Not required as an accumulation via the food chain is not expected

Worker exposure

Long-term, systemic

A dermal DNEL was not derived as no respective hazard was observed. Thus, only the values for an inhalative exposure are given, and the calculation of a combined RCR value as a sum of inhalative and dermal exposure is not applicable.

Contributing scenario:	Inhalation	Dermal:	Combined routes:	Exposure Estimation Method:
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Use as laboratory reagent (PROC 15)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.007 mg/kg bw/d RCR: 0.016	RCR: 0.089	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.069 mg/kg bw/d RCR: 0.163	RCR: 0.236	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.027 mg/kg bw/d RCR: 0.065	RCR: 0.072	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.007 mg/kg bw/d RCR: 0.016	RCR: 0.089	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 0.014 mg/m ³ RCR: 0.007	Exposure: 0.137 mg/kg bw/d RCR: 0.326	RCR: 0.334	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC 8a)	Exposure: 0.142 mg/m ³ RCR: 0.073	Exposure: 0.027 mg/kg bw/d RCR: 0.065	RCR: 0.138	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC 8b)	Exposure: 0.043 mg/m ³ RCR: 0.022	Exposure: 0.137 mg/kg bw/d RCR: 0.326	RCR: 0.349	Inhalation: Extended TRA workers Dermal: Extended TRA workers

Acute systemic

Not required as no hazard identified

Local effects via inhalation route

Not required as no hazard identified

Local effects via dermal route

Not required as no hazard identified

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Environment Industrial use as a monomer for the production of (co)polymers (ERC 6c)