

Product Name	Diocetyl maleate	EUIS/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**

<b>Hazards</b>	<b>Category</b>
Specific target organ systemic toxicity (repeated exposure)	Category 2
Chronic aquatic toxicity	Category 1

### 2.2. Label elements

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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 (CO<sub>2</sub>)

## **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 (CO<sub>2</sub>)

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

No exposure limits established

### DNELs

#### Acute - Systemic Effect

<b>Worker (oral):</b>	not required
<b>Worker (dermal):</b>	not required
<b>Worker (inhalation):</b>	not required
<b>General Population (oral):</b>	not required
<b>General Population (dermal):</b>	not required
<b>General Population (inhalation):</b>	not required

#### Acute - Local Effect

<b>Worker (oral):</b>	not required
<b>Worker (dermal):</b>	not required
<b>Worker (inhalation):</b>	not required
<b>General Population (oral):</b>	not required
<b>General Population (dermal):</b>	not required
<b>General Population (inhalation):</b>	not required

#### Long-term - Systemic Effects

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

**Long-term - Local Effects**

<b>Worker (oral):</b>	not required
<b>Worker (dermal):</b>	not required
<b>Worker (inhalation):</b>	not required
<b>General Population (oral):</b>	not required
<b>General Population (dermal):</b>	not required
<b>General Population (inhalation):</b>	not required

**PNECs**

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

**Break through time**      480 min

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

<b>Form</b>	liquid
<b>Color</b>	colourless
<b>Odor</b>	ester-like

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

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

**Evaporation Rate** Not determined

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

**(n-octanol/water)**

**Explosive Properties** not applicable based on consideration of the structure

**Oxidizing Properties** not applicable based on consideration of the structure

**Surface Tension** not determined

**Dissociation constant** not applicable based on consideration of the structure

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**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**

<b>Acute oral toxicity</b>	LD50: > 2000 mg/kg
Species	rat
Method	OECD 401
<b>Acute dermal toxicity</b>	LD50: 14000 mg/kg
Species	rabbit
<b>Skin corrosion/irritation</b>	slight irritant effect - does not require labelling
Species	rabbit
Method	OECD 404
<b>Serious eye damage/eye irritation</b>	No eye irritation
Species	rabbit eye
Method	OECD 405
<b>Skin Sensitization</b>	nonsensitizer
Species	guinea pig, female
Method	OECD 406
<b>in vitro Mutagenicity</b>	Ames Test: negative - with and without metabolic activation - Method: OECD 471
<b>in vivo Mutagenicity</b>	No evidence of in vitro mutagenicity
<b>Carcinogenic effects</b>	No evidence of carcinogenicity
<b>Reproductive toxicity</b>	No adverse reproductive / developmental effects at the highest dose tested
Routes of exposure	oral gavage
Species	rat
Method	OECD 422
	NOAEL: ~ 1000 mg/kg bw/day



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<b>Repeated exposure</b>	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

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

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

<b>Product information</b>	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.
<b>Uncleaned empty packaging</b>	Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.

## SECTION 14: Transport information

### ADR/RID

<b>UN/ID No.</b>	UN 3082
<b>Proper Shipping Name</b>	Environmentally hazardous substance, liquid, n.o.s.
<b>Hazard Inducer</b>	(Bis(2-ethylhexyl) maleate)
<b>Hazard Class</b>	9
<b>Classification Code</b>	M6

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**SECTION 14: Transport information**

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

<b>ADN</b>	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

<b>ICAO/IATA</b>	
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

<b>IMDG</b>	
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**

<b>Water Hazard Class (WGK):</b>	
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, Title 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](http://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

## Table of Contents

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)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**3.Exposure estimation and reference to its source**

**Environment**

**Environment**

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

<b>Protection target</b>	<b>Exposure estimate (based on: EUSES)</b>	<b>RCR</b>
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**

<b>Contributing scenario:</b>	<b>Inhalation</b>	<b>Dermal:</b>	<b>Combined routes:</b>	<b>Exposure Estimation Method:</b>
Use in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.142 mg/m <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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](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](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)

<b>Product (article) characteristic</b>	Not applicable
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	Avoid carrying out activities involving exposure for more than 8 hours
<b>Technical and organizational conditions and measures</b>	Not applicable
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	Not applicable
<b>Other conditions affecting workers exposure</b>	Indoor use Exposed skin surface assumed: One hand face only (240 cm <sup>2</sup> )
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	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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<b>Product (article) characteristic</b>	Not applicable
<b>Amount used (or contained in articles), frequency and duration of use/exposure</b>	Avoid carrying out activities involving exposure for more than 8 hours
<b>Technical and organizational conditions and measures</b>	Provide extract ventilation to points where emissions occur.
<b>Conditions and measures related to personal protection, hygiene and health evaluation</b>	Wear a respirator conforming to EN140 with Type A/P2 filter or better
<b>Other conditions affecting workers exposure</b>	Not applicable
<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	Not applicable

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

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

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

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

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<b>Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply</b>	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)

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

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

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



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

**3.Exposure estimation and reference to its source**

**Environment**

**Environment**

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

<b>Protection target</b>	<b>Exposure estimate (based on: EUSES)</b>	<b>RCR</b>
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.

<b>Contributing scenario:</b>	<b>Inhalation</b>	<b>Dermal:</b>	<b>Combined routes:</b>	<b>Exposure Estimation Method:</b>
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Use as laboratory reagent (PROC 15)	Exposure: 0.142 mg/m <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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 <sup>3</sup> 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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#### 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](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](http://echa.europa.eu/documents/10162/13634/du_en.pdf)).

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