

Product name	Nutrinova® Potassium Sorbate Granules***		EU/EN
MSDS number	81001	Revision Date	Aug.31.2015***
Revision Number	7***.01	Issuing date	Aug.31.2015***

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

1.1. Product identifier

Product name
Nutrinova® Potassium Sorbate Granules***

REACH Registration Number
01-2119950315-41-0000

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

Identified uses
Food additive, Cosmetics, Pharmaceutical***

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 & Co. KG
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
Serious eye damage/eye irritation

Category
Category 2

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

H319 - Causes serious eye irritation

Precautionary Statements

P264 - Wash face, hands and any exposed skin thoroughly after handling
 P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 P337 + P313 - If eye irritation persists: Get medical advice/ attention

2.3 Other Hazards

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

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 %
Potassium (E,E)-hexa-2,4-dienoate	24634-61-5	246-376-1	none	100

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
Potassium (E,E)-hexa-2,4-dienoate	Serious eye damage / eye irritation - Category 2	H319

Remarks

For the full text of the H-statements mentioned in this Section, see Section 16***

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SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Get medical attention immediately if symptoms occur.
Skin	Wash off immediately with plenty of water. Get medical attention if irritation develops and persists.
Eyes	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
Ingestion	Do NOT induce vomiting.. Call a physician immediately.

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

Main symptoms	None known
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4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Carbon dioxide (CO₂), Water spray, Foam, Dry chemical

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

Wear self-contained breathing apparatus and protective suit.

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

Use mechanical handling equipment. 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

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Hygiene measures

Avoid contact with the skin and the eyes When using, do not eat, drink or smoke Wash hands before breaks and at the end of workday.***

Advice on safe handling

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

Incompatible products

Keep away from:., oxidizing agents

Protection - fire and explosion:

Take measures to prevent the build up of electrostatic charge. Keep away from sources of ignition - No smoking.

Reduce the release of the substance or mixture to the environment

See Section 8: Environmental exposure controls

Temperature class

T4

7.2. Conditions for safe storage, including any incompatibilities

Material storage

Keep in a dry, cool place. Protect against light.

Incompatible products

Keep away from:., oxidizing agents

Technical measures/Storage conditions

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

German storage class

11: Combustible solids

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.

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

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Acute - Local Effect

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

Long-term - Systemic Effects

Worker (oral):	not required
Worker (dermal):	40 mg/kg bw/d
Worker (inhalation):	17,63 mg/m ³
General Population (oral):	2 mg/kg bw/d
General Population (dermal):	20 mg/kg bw/d
General Population (inhalation):	52,17 mg/m ³

Long-term - Local Effects

Worker (oral):	not required
Worker (dermal):	0,17 mg/cm ²
Worker (inhalation):	26,08 mg/m ³
General Population (oral):	not required
General Population (dermal):	not required
General Population (inhalation):	not required

PNECs

Environment (water):	0,48 mg/l
Environment (air):	not required
Environment (soil):	1,67 mg/kg soil dw
Environment (sediment):	0,173 mg/kg sediment dw
Environment (STP):	10 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 dust.
Hygiene measures	Avoid contact with the skin and the eyes When using, do not eat, drink or smoke Wash hands before breaks and at the end of workday.***
Respiratory protection	respirator with P2 filter. Equipment should conform to EN 136 or EN 140 and EN 143.
Eye protection	Tightly fitting safety goggles Face-shield
Skin protection	protective suit
Hand protection	Chemicals resistant gloves

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Suitable material nitrile rubber
Type Tricotril (Company KCL) or comparable article;
or refer to glove manufacturer's recommendation
Evaluation according to EN 374: level 6
Material thickness approx. 1.5 mm
Break through time 480 min

Suitable material butyl-rubber
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

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 solid
Color white
Odor odorless

Flash point Not applicable
Autoignition Temperature 178 °C
Method A.16 (DI 92/69/EEC)
Melting point/range 250 °C***
Method OECD 102
Boiling point/range not applicable
Method OECD 103
Density 1.36 g/ml @ 20°C***
Method OECD 109

pH 7 @ 20°C @ 543 g/l
Vapor pressure 1.0 x 10⁻⁷ hPa @ 20°C***
1.0 x 10⁻⁷ hPa @ 50°C***
Method OECD 104

Water solubility 1.95 g/l @ 20°C @ pH 4.0
Method OECD 105

Solubility in other solvents 30.5 g/l @ 20°C, Methanol, p-Xylene
Method OECD 105

Partition coefficient (n-octanol/water) 1.72 @ 20°C (pH: 6.5)
Method OECD 117

Explosive Properties not applicable based on consideration of the structure

Oxidizing Properties not applicable based on consideration of the structure

Surface Tension 72 mN/m @ 20°C***

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Concentration	1000 mg/l
Method	OECD 115
Dissociation constant	pKa: 4.69 ± 0.03 @ 20°C
Method	OECD 112
Granulometry	L10: 5 µm L90: 1140.0 µm
Method	OECD 110

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

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical Stability

Thermal decomposition can take place above 210°C.

10.3. Possibility of hazardous reactions

No hazards to be especially mentioned.

10.4. Conditions to avoid

Avoid dust formation.

10.5. Incompatible Materials

Keep away from:., oxidizing agents

10.6. Hazardous decomposition products

No hazardous decomposition products are known

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Potassium (E,E)-hexa-2,4-dienoate

Acute oral toxicity

LD50: > 10000 mg/kg, rat
(Reference substance: Sorbic acid)
rat

Species

Acute dermal toxicity

LD50: > 2000 mg/kg, rat
(Reference substance: Sorbic acid)

Species

Method

rat
OECD 402

Acute inhalation toxicity

LC50 (4h): > 5.15 mg/l

Species

Method

rat
OECD 403

Skin corrosion/irritation

Not irritating

Species

Method

rabbit
OECD 404

Serious eye damage/eye irritation

irritant

Species

Method

rabbit eye
OECD 405

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Skin Sensitization	nonsensitizer (Reference substance: Sorbic acid)
Species	guinea pig
Method	Similar to: EEC 96/54, B.6
in vitro Mutagenicity	Ames Test: negative - with and without metabolic activation - Method: Similar to EC B.13/B.14 Chromosome aberration test: weak positive - without metabolic activation - Method: similar to EC B.10 (2000/32/EEC)
in vivo Mutagenicity	Mammalian Erythrocyte Micronucleus Test in mice: negative - Method: OECD 474 (Reference substance: Sorbic acid)
Carcinogenic effects	No evidence of carcinogenicity
Routes of exposure	Oral
Species	mice
Routes of exposure	oral gavage
Species	rat
Method	OECD 416 NOAEL (P-generation): 3000 mg/kg/day; NOAEL (reproductive): 3000 mg/kg/day; NOAEL (offspring): 1000 mg/kg/day
Type of study	Two-generation study
Developmental effects	No developmental or reproductive effects
Routes of exposure	oral gavage
Species	rat
Method	EC method B.31 (88/302/EEC) NOAEL (parental): 340 mg/kg/day; NOAEL (embryonic/teratogenic effects): 340 mg/kg/day
Type of study	Teratology study
Repeated exposure	No consistent differences between treated and control groups, although there were some statistically significant differences in the high dose males and/or females (Reference substance: Sorbic acid)
Routes of exposure	oral gavage
Species	rat
Type of study	NOAEL: 750 mg/kg bw/day 2 years

SECTION 12: Ecological information

Potassium (E,E)-hexa-2,4-dienoate

Acute fish toxicity	LC50: > 1000 mg/l (96h)
Species:	Oncorhynchus mykiss (rainbow trout)
Method	OECD 203
Acute daphnia toxicity	EC50: 982 mg/l (48h)
Species:	Daphnia magna
Method	OECD 202
Toxicity to bacteria	EC50 (3h): > 100 mg/l (Reference substance: Sorbic acid)
Species:	in activated sludge
Method	OECD 209

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SECTION 12: Ecological information

Biodegradation	Readily biodegradable (Reference substance: Sorbic acid)
Method	OECD 301 D
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	Not regulated
ADN	Not regulated
ICAO/IATA	Not restricted
IMDG	Not regulated

SECTION 15: Regulatory information

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

Directive 1996/82/EC	Annex I, part 1 No 29 No 9i
Water Hazard Class (WGK):	
WGK Class	1
WGK Reg. No.	5071
WGK Source	Classification according to VwVwS, Annex 3

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International Inventories

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 does not meet the criteria

Restrictions - Reach Regulation, Titel VIII

This substance is not subject to restriction requirements

SECTION 16: Other information

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)

Potassium Sorbate is exempt from REACH registration when it is used in food, medicinal products, plant protection because it is regulated by other specific legislations

This substance has been registered for all relevant applications

See section 8: DNELs and PNECs

Table of Contents

Exposure Scenario	Text
1. Exposure Scenario	Formulation;
2. Exposure Scenario	Formulation of cosmetic products
3. Exposure Scenario	Industrial use as a processing aid SU 9 ; SU 10
4. Exposure Scenario	Industrial use as a processing aid SU 9 ; SU 10
5. Exposure Scenario	Industrial use as a processing aid SU 9 ; SU 10
6. Exposure Scenario	Workers (industrial/professional)
7. Exposure Scenario	Consumer use of cosmetic products

1. Exposure Scenario

1. Title of Exposure Scenario Formulation;

Environment Formulation (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)

Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (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)

Roller application or brushing (PROC 10)

Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Formulation (ERC 2)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Daily amount per site. <=3.5 tonnes/day. Annual amount per site <=700.0 tonnes/year
Technical and organizational conditions and measures	Not applicable

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Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment. 87.3 %. Assumed domestic sewage treatment plant flow. >= 2000 m³/d
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Receiving surface water flow rate. >=18000 m³/d
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply beyond the REACH CSA	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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)

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Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 80.0 % Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures

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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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2.7 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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (3 to 5 air changes per hour). Use in semi-closed process with opportunity for exposure Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.10 Control of worker exposure Manual roller application or brushing (PROC 10)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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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MSDS number	81001	Revision Date	Aug.31.2015***
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Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374 during the activities where skin contact is possible.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.11 Control of worker exposure Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	70	
Air	87.5	
Soil	0.35	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater	0.444 mg/L	0.926
Freshwater (sediment)	1.601 mg/kg dw	0.925
Marine water (pelagic)	0.044 mg/L	0.926
Marine water (sediment)	0.16 mg/kg dw	0.925
Sewage treatment plant	4.43 mg/L	0.443
Agricultural soil	0.006 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	0.013 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	1.906 mg/kg bw/day	0.953

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:
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Use in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.1 mg/m ³ RCR: <0.01	Exposure: 0.034 mg/kg bw/d RCR: <0.01	RCR: < 0.01	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 1.37 mg/kg bw/d RCR: 0.034	RCR: 0.318	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.69 mg/kg bw/d RCR: 0.017	RCR: 0.301	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.739	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 14 mg/m ³ RCR: 0.794	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.966	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Roller application or brushing (PROC 10)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 5.486 mg/kg bw/d RCR: 0.137	RCR: 0.704	Inhalation: Extended TRA workers Dermal: Extended TRA workers

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Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 3.43 mg/kg bw/d RCR: 0.086	RCR: 0.653	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	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 Formulation of cosmetic products

Environment Formulation of cosmetic products (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)
- Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (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)
- Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)
- Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Formulation of cosmetic products (ERC 2)

Product characteristics	Daily amount per site 3.5 tonnes/day Annual amount per site <=600.0 tonnes/year
Amounts used, frequency and duration of use (or from service life)	Not applicable
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 87.3% Assumed domestic sewage treatment plant flow >=2000 m³/d
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Receiving surface water flow rate >=18000 m³/d

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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)

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Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.5 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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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2.6 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	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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 dedicated facilities (PROC 8b)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure 80.0 Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator providing a minimum efficiency of 90.0% Refer to protective measures listed in sections 7 and 8
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (3 to 5 air changes per hour). Use in semi-closed process with opportunity for exposure Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.9 Control of worker exposure Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 80.0% Basic (professional) exposure controls assumed

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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 a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	70	
Air	87.5	
Soil	0.35	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater	0.444 mg/L	0.926

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Freshwater (sediment)	1.601 mg/kg dw	0.925
Marine water (pelagic)	0.044 mg/L	0.926
Marine water (sediment)	0.16 mg/kg dw	0.925
Sewage treatment plant	4.43 mg/L	0.443
Agricultural soil	0.005 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	0.011 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	1.634 mg/kg bw/day	0.817

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, continuous process with occasional controlled exposure (PROC 2)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 1.37 mg/kg bw/d RCR: 0.034	RCR: 0.318	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.69 mg/kg bw/d RCR: 0.017	RCR: 0.301	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed process, no likelihood of exposure (PROC 1)	Exposure: 0.1 mg/m ³ RCR: < 0.01	Exposure: 0.034 mg/kg bw/d RCR: < 0.01	RCR: <0.01	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	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: 10 mg/m ³ RCR: 0.567	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.91	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 14 mg/m ³ RCR: 0.794	Exposure: 6.86 mg/kg bw/d RCR: 0.966	RCR: 0.966	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 3.43 mg/kg bw/d RCR: 0.086	RCR: 0.653	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	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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3. Exposure Scenario

1. Title of Exposure Scenario Industrial use as a processing aid SU 9 ; SU 10

Environment Industrial use as a processing aid (ERC 4)

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)
- Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (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)
- Roller application or brushing (PROC 10)
- Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)
- Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure: Industrial use as a processing aid (ERC 4)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Daily amount per site <= 1.0 tonnes/day Annual amount per site <= 60.0 tonnes/year
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 87.3% Assumed domestic sewage treatment plant flow >= 2000 m³/d No application of sludge to soil
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Receiving surface water flow rate >= 18000 m³/d

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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply beyond the REACH CSA	Not applicable
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2.2 Control of worker exposure Use in closed process, no likelihood of exposure (PROC 1)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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 batch process (synthesis or formulation) (PROC 3)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Advanced (industrial) exposure controls assumed.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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 batch and other process (synthesis) where opportunity for exposure arises (PROC 4)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.5 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	Covers percentage substance in the product up to 100 % (unless stated differently)
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Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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 non-dedicated facilities (PROC 8a)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 95.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (3 to 5 air changes per hour). Use in semi-closed process with opportunity for exposure Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures

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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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2.9 Control of worker exposure Roller application or brushing (PROC 10)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves during the activities where skin contact is possible. Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.10 Control of worker exposure Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	50	Release factor - Waste water treatment
Air	50	Release factor -
Soil	50	

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Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	0.318 mg/L	0.662
Freshwater (sediment)	1.145 mg/kg dw	0.662
Marine water (sediment)	0.032 mg/L	0.662
Marine water (sediment)	0.114 mg/kg dw	0.662
Sewage treatment plant	3.165 mg/L	0.316
Agricultural soil	0.002 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	0.002 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	0.327 mg/kg bw/day	0.164

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: 0.01 mg/m ³ RCR: < 0.01	Exposure: 0.034 mg/kg bw/d RCR: < 0.01	RCR: < 0.01	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 1.37 mg/kg bw/d RCR: 0.034	RCR: 0.091	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 0.69 mg/kg bw/d RCR: 0.017	RCR: 0.074	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 2.5 mg/m ³ RCR: 0.142	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.313	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: 2.5 mg/m ³ RCR: 0.142	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.485	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 non-dedicated facilities (PROC 8a)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.626	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: 1.25 mg/m ³ RCR: 0.071	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.414	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 14 mg/m ³ RCR: 0.794	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.966	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Roller application or brushing (PROC 10)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 5.486 mg/kg bw/d RCR: 0.137	RCR: 0.194	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 3.43 mg/kg bw/d RCR: 0.086	RCR: 0.653	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	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).

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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4. Exposure Scenario

1. Title of Exposure Scenario Industrial use as a processing aid SU 9 ; SU 10

Environment Industrial use a processing aid (ERC 6a)

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)
- Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (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)
- Roller application or brushing (PROC 10)
- Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)
- Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Industrial use as a processing aid (ERC 6a)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Daily amount per site <= 3.0 tonnes/day Annual amount per site <= 60.0 tonnes/year
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 87.3% Assumed domestic sewage treatment plant flow >= 2000 m³/d No application of sludge to soil
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Receiving surface water flow rate >= 18000 m³/d

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
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Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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)

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Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 95.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.10 Control of worker exposure Roller application or brushing (PROC 10)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). All substance transfers closed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.11 Control of worker exposure Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)

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Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	60	
Air	150	
Soil	3	

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Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	0.381 mg/L	0.794
Freshwater (sediment)	1.373 mg/kg dw	0.794
Marine water (pelagic)	0.038 mg/L	0.794
Marine water (sediment)	0.137 mg/kg dw	0.793
Sewage treatment plant	3.797 mg/L	0.38
Agricultural soil	0.002 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	0.002 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	0.326 mg/kg bw/day	0.163

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: 0.01 mg/m ³ RCR: < 0.01	Exposure: 0.034 mg/kg bw/d RCR: < 0.01	RCR: < 0.01	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 1.37 mg/kg bw/d RCR: 0.034	RCR: 0.091	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 0.69 mg/kg bw/d RCR: 0.017	RCR: 0.074	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 2.5 mg/m ³ RCR: 0.142	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.313	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: 2.5 mg/m ³ RCR: 0.142	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.485	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 non-dedicated facilities (PROC 8a)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.626	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: 1.25 mg/m ³ RCR: 0.071	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.414	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 2 mg/m ³ RCR: 0.113	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.285	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Roller application or brushing (PROC 10)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 5.486 mg/kg bw/d RCR: 0.137	RCR: 0.194	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 3.43 mg/kg bw/d RCR: 0.086	RCR: 0.653	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	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).

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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5. Exposure Scenario

1. Title of Exposure Scenario Industrial use as a processing aid SU 9 ; SU10

Environment Industrial use as a processing aid (ERC 6b)

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)
- Mixing or blending in batch processes for formulation of mixtures and articles (multistage and/or significant contact) (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)
- Roller application or brushing (PROC 10)
- Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)
- Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Industrial use as aprocessing aid (ERC 6b)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Daily amount per site <= 3.0 tonnes/day Annual amount per site <= 600.0 tonnes/year
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment 87.3% Assumed domestic sewage treatment plant flow >= 2000 m³/d No application of sludge to soil
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Receiving surface water flow rate >= 18000 m³/d

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Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply beyond the REACH CSA	Not applicable
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2.2 Control of worker exposure Use in closed process, no likelihood of exposure (PROC 1)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed process, no likelihood of exposure Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed, continuous process with occasional controlled exposure Advanced (industrial) exposure controls assumed.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in closed batch process (synthesis or formulation) Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)

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Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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	Covers percentage substance in the product up to 100 % (unless stated differently)
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Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 95.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Use in semi-closed process with opportunity for exposure Local exhaust ventilation - efficiency of at least 90.0% Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

2.10 Control of worker exposure Roller application or brushing (PROC 10)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves during the activities where skin contact is possible. Wear a respirator providing a minimum efficiency of 90.0% For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures

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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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2.11 Control of worker exposure Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)
Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Advanced (industrial) exposure controls assumed.

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Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	60	Release factor - Waste water treatment
Air	3	
Soil	0.75	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	0.381 mg/L	0.794
Freshwater (sediment)	1.373 mg/kg dw	0.794
Marine water (pelagic)	0.038 mg/L	0.794
Marine water (sediment)	0.137 mg/kg dw	0.793
Sewage treatment plant	3.797 mg/L	0.38
Agricultural soil	8.746E-4 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	4.57E-4 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	0.071 mg/kg bw/day	0.036

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: 0.01 mg/m ³ RCR: < 0.01	Exposure: 0.034 mg/kg bw/d RCR: < 0.01	RCR: < 0.01	Inhalation: Extended TRA workers Dermal: Extended TRA workers

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Use in closed, continuous process with occasional controlled exposure (PROC 2)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 1.37 mg/kg bw/d RCR: 0.034	RCR: 0.091	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in closed batch process (synthesis or formulation) (PROC 3)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 0.69 mg/kg bw/d RCR: 0.017	RCR: 0.074	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use in batch and other process (synthesis) where opportunity for exposure arises (PROC 4)	Exposure: 2.5 mg/m ³ RCR: 0.142	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.313	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: 2.5 mg/m ³ RCR: 0.142	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.485	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: 5 mg/m ³ RCR: 0.284	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.626	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: 1.25 mg/m ³ RCR: 0.071	Exposure: 13.71 mg/kg bw/d RCR: 0.343	RCR: 0.414	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC 9)	Exposure: 2 mg/m ³ RCR: 0.113	Exposure: 6.86 mg/kg bw/d RCR: 0.172	RCR: 0.285	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Roller application or brushing (PROC 10)	Exposure: 1 mg/m ³ RCR: 0.057	Exposure: 0.137 mg/kg bw/d RCR:	RCR: 0.194	Inhalation: Extended TRA workers Dermal: Extended TRA workers

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Production of mixtures or articles by tableting, compression, extrusion, pelletization (PROC 14)	Exposure: 10 mg/m ³ RCR: 0.567	Exposure: 3.43 mg/kg bw/d RCR: 0.086	RCR: 0.653	Inhalation: Extended TRA workers Dermal: Extended TRA workers
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	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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6. Exposure Scenario

1. Title of Exposure scenario Workers (industrial/professional)

Environment Workers (industrial/professional) (ERC 8a)

Worker

Use as laboratory reagent (PROC 15)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Workers (industrial/professional) (ERC 8a)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Not applicable
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Not applicable
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply beyond the REACH CSA	Not applicable

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

Product (article) characteristic	Covers percentage substance in the product up to 100 % (unless stated differently)
Amount used (or contained in articles), frequency and duration of use/exposure	Covers daily exposures up to 8 hours (unless stated differently)

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Technical and organizational conditions and measures	Provide a good standard of general or controlled ventilation. (1 to 3 air changes per hour). Basic (professional) exposure controls assumed
Conditions and measures related to personal protection, hygiene and health evaluation	Not applicable
Other conditions affecting workers exposure	Indoor use Covers use at ambient temperatures
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

Release route	Release rate (kg/day)	Release estimation method
Water	0.165	
Air	0.165	
Soil	0	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	0.002 mg/L	< 0.01
Freshwater (sediment)	0.009 mg/kg dw	< 0.01
Marine water (pelagic)	2.364E-4 mg/L	< 0.01
Marine water (sediment)	8.514E-4 mg/kg dw	< 0.01
Sewage treatment plant	0.01 mg/L	< 0.01
Agricultural soil	7.11E-4 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	7.184E-10 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	1.889E-4 mg/kg bw/day	< 0.01

Worker exposure

Long-term, systemic

Contributing scenario:	Inhalation	Dermal:	Combined routes:	Exposure Estimation Method:
Use as laboratory reagent (PROC 15)	Exposure: 5 mg/m ³ RCR: 0.284	Exposure: 0.34 mg/kg bw/d RCR: < 0.01	RCR: 0.292	Inhalation: Extended TRA workers Dermal: Extended TRA workers

Acute systemic

Not required as no hazard identified

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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

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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

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7. Exposure Scenario

1. Title of Exposure Scenario Consumer use of cosmetic products

Environment Consumer use of cosmetic products (ERC 8a)

2. Conditions of use affecting exposure

2.1 Control of environmental exposure Consumer use of cosmetic products (ERC 8a)

Product characteristics	Not applicable
Amounts used, frequency and duration of use (or from service life)	Not applicable
Technical and organizational conditions and measures	Not applicable
Conditions and measures related to sewage treatment plant	Not applicable
Conditions and measures related to treatment of waste (including article waste)	Dispose of waste or used sacks/containers according to local regulations
Other conditions affecting environmental exposure	Not applicable
Additional good practice advice. Obligations according to Article 37(4) of REACH do not apply beyond the REACH CSA	Not applicable

3. Exposure estimation and reference to its source

Environment

Release route	Release rate (kg/day)	Release estimation method
Water	0.105	
Air	0.105	
Soil	0	

Protection target	Exposure estimate (based on: EUSES)	RCR
Freshwater (pelagic)	0.002 mg/L	< 0.01
Freshwater (sediment)	0.007 mg/kg dw	< 0.01
Marine water (pelagic)	1.981E-4 mg/L	< 0.01
Marine water (sediment)	7.135E-4 mg/kg dw	< 0.01

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Sewage treatment plant	0.007 mg/L	< 0.01
Agricultural soil	7.109E-4 mg/kg dw	< 0.01
Indirect exposure to humans via the environment - Inhalation	7.184E-10 mg/m ³	< 0.01
Indirect exposure to humans via the environment - Oral	1.888E-4 mg/kg bw/day	< 0.01

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

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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.

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