



## **Vazo™ 67 Polymerization Initiator**

Version 3.0 (replaces: Version 2.0)

Revision Date 27.10.2015

Ref. 130000000273

This Safety Data Sheet adheres to the standards and regulatory requirements of Finland and may not meet the regulatory requirements in other countries.

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

#### **1.1. Product identifier**

Product name : Vazo™ 67 Polymerization Initiator  
Registration number : 01-2119970183-38-0000  
Identification number : CAS-No. 13472-08-7 EC-No. 236-740-8

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

Use of the Substance/Mixture : Transported isolated intermediate used under strictly controlled conditions., For industrial use only.  
Polymerization initiator, For industrial use only.  
For further information see Annex - Exposure scenario., For industrial use only.

#### **1.3. Details of the supplier of the safety data sheet**

Company : Chemours Netherlands B.V.  
Baanhoekweg 22  
NL-3313 LA Dordrecht  
Netherlands  
Telephone : +31-(0)-78-630-1011  
Telefax : +31-78-6163737  
E-mail address : sds-support@chemours.com

#### **1.4. Emergency telephone number**

Emergency telephone number : +(44)-870-8200418

### **SECTION 2: Hazards identification**

#### **2.1. Classification of the substance or mixture**

Self-reactive substances and mixtures, Type D H242: Heating may cause a fire.  
Acute toxicity, Category 4 H302: Harmful if swallowed.

#### **2.2. Label elements**



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### Danger

H242  
H302

Heating may cause a fire.  
Harmful if swallowed.

EUH044

Risk of explosion if heated under confinement.

P243  
P264  
P270  
P280  
P301 + P310  
P330  
P370 + P380  
P411

Take precautionary measures against static discharge.  
Wash face, hands and any exposed skin thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Wear protective gloves/ protective clothing/ eye protection/ face protection.  
IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.  
Rinse mouth.  
In case of fire: Evacuate area.  
Store at temperatures not exceeding 24°C/75°F.

### 2.3. Other hazards

Non-classified vPvB substance  
Non-classified PBT substance  
Dust may form explosive mixture in air.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Registration number	Classification according to Regulation (EU) 1272/2008 (CLP)	Concentration (% w/w)
<b>2,2'-Azobis(2-methylbutyronitrile) (CAS-No.13472-08-7) (EC-No.236-740-8)</b>		
01-2119970183-38-0000	Self-react. D; H242 Acute Tox. 4; H302	>= 96 %

### 3.2. Mixtures

Not applicable



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The above products are compliant to REACH registration obligations; Registration number(s) may not be provided because substance(s) are exempted, not yet registered under REACH or are registered under another regulatory process (biocide uses, plant protection products), etc.

For the full text of the H-Statements mentioned in this Section, see Section 16.

### **SECTION 4: First aid measures**

#### **4.1. Description of first aid measures**

- |                |   |   |
|----------------|---|---|
| General advice | : | When symptoms persist or in all cases of doubt seek medical advice.   |
| Inhalation     | : | Oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.  |
| Skin contact   | : | The material is not likely to be hazardous by skin contact, but cleaning the skin after use is advisable. Wash off with soap and water. Wash contaminated clothing before re-use. |
| Eye contact    | : | Remove contact lenses. Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing. Consult a physician.                                      |
| Ingestion      | : | Call a physician immediately. Never give anything by mouth to an unconscious person.  |

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

- |          |   |   |
|----------|---|---|
| Symptoms | : | Eye contact may provoke the following symptoms:; Dust may cause:; mechanical irritation with tearing, pain or visual impairment |
|          | : | Ingestion may provoke the following symptoms:; Tremors, Incoordination, Lethargy, Central nervous system effects                |

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

- |           |   |                        |
|-----------|---|------------------------|
| Treatment | : | Treat symptomatically. |
|-----------|---|------------------------|

### **SECTION 5: Firefighting measures**

#### **5.1. Extinguishing media**

- |                              |   |   |
|------------------------------|---|---|
| Suitable extinguishing media | : | Water spray, Dry chemical, Carbon dioxide (CO2) |
|------------------------------|---|---|

#### **5.2. Special hazards arising from the substance or mixture**

- |                                      |   |   |
|--------------------------------------|---|---|
| Specific hazards during firefighting | : | Dust may form explosive mixture in air. Fire or intense heat may cause violent rupture of packages. |
|                                      | : | Hazardous decomposition products Highly toxic fumes   |
|                                      | : | (see also section 10)   |



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### **5.3. Advice for firefighters**

Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.

Further information : Evacuate personnel to safe areas. Keep containers and surroundings cool with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

## **SECTION 6: Accidental release measures**

### **6.1. Personal precautions, protective equipment and emergency procedures**

Personal precautions : Wear personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

### **6.2. Environmental precautions**

Environmental precautions : Prevent product from entering drains.

### **6.3. Methods and materials for containment and cleaning up**

Methods for cleaning up : Use only non-sparking tools. Shovel into suitable container for disposal. Avoid dust formation. After cleaning, flush away traces with water.

Other information : Pick up and arrange disposal without creating dust. Dispose of in accordance with local regulations.

### **6.4. Reference to other sections**

For personal protection see section 8., For disposal instructions see section 13.

## **SECTION 7: Handling and storage**

### **7.1. Precautions for safe handling**

Advice on safe handling : Avoid dust formation. Do not breathe dust. Avoid contact with skin and eyes. Do not smoke.

Advice on protection against fire and explosion : Avoid shock and friction. Take measures to prevent the build up of electrostatic charge. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition - No smoking.

### **7.2. Conditions for safe storage, including any incompatibilities**

Requirements for storage areas and containers : Keep away from heat. Keep away from sources of ignition - No smoking. Keep in a cool place away from oxidizing agents. Keep in a cool place away from



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reducing agents.

Storage temperature : < 24 °C

### **7.3. Specific end use(s)**

no data available

## **SECTION 8: Exposure controls/personal protection**

### **8.1. Control parameters**

If sub-section is empty then no values are applicable.

#### **Derived No Effect Level (DNEL)**

- 2,2'-Azobis(2-methylbutyronitrile)
  - : Type of Application (Use): Workers  
Exposure routes: Inhalation  
Health Effect: Long-term - systemic effects  
Value: 0,35 mg/m<sup>3</sup>
  - : Type of Application (Use): Workers  
Exposure routes: Skin contact  
Health Effect: Long-term exposure  
Value: 485,4 mg/m<sup>3</sup>

#### **Predicted No Effect Concentration (PNEC)**

- 2,2'-Azobis(2-methylbutyronitrile)
  - : Value: 0,052 mg/l  
Compartment: Fresh water
  - : Value: 0,005 mg/l  
Compartment: Marine water
  - : Value: 0,519 mg/l  
Compartment: Intermittent use/release
  - : Value: 0,84 mg/kg  
Compartment: Fresh water sediment
  - : Value: 0,084 mg/kg  
Compartment: Fresh water sediment
  - : Value: 117 mg/l  
Compartment: Sewage treatment plants
  - : Value: 0,14 mg/kg  
Compartment: Soil



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### **8.2. Exposure controls**

- Engineering measures : Provide appropriate exhaust ventilation at places where dust is formed.  
Provide local ventilation if processing is carried out at high temperatures.
- Eye protection : Safety glasses with side-shields  
Eye protection complying with EN 166.
- Hand protection : Material: Impervious gloves  
The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.  
:  
Neoprene vinyl Nitrile rubber butyl-rubber  
:  
For further information see Annex - Exposure scenario.
- Skin and body protection : Lightweight protective clothing
- Hygiene measures : Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
- Respiratory protection : Provide adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Recommended Filter type: Half mask with combination filter A2/P2 (EN 141)  
  
Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. Observe respirator use limitations specified by the manufacturer. A respiratory protection program that meets country requirements must be followed whenever workplace conditions warrant respirator use.  
  
For further information see Annex - Exposure scenario.

## **SECTION 9: Physical and chemical properties**

### **9.1. Information on basic physical and chemical properties**

- Form : solid, crystalline
- Colour : white
- Odour : none
- pH : neutral



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Melting point/freezing point	: 49,4 °C at 1 013 hPa Do not attempt to verify melting point; decomposition can be violent.
Boiling point	: Not applicable
Flash point	: Not applicable
Flammability (solid, gas)	: Not applicable
Ignition temperature	: 185 °C
Thermal decomposition	: Decomposes on heating. : Heating can release hazardous gases. : The product is a self-reactive substance or mixture classified as type D.
Self-Accelerating decomposition temperature (SADT)	: 45 °C
Auto-ignition temperature	: Not applicable
Oxidizing properties	: The product is not oxidizing. : The product is not oxidizing.
Explosive properties	: Risk of explosion if heated under confinement. Method: Directive 67/548/EEC, Annex V, A.14
Lower explosion limit/ lower flammability limit	: 0,03 - 0,04 vol%
Upper explosion limit/ upper flammability limit	: no data available
Vapour pressure	: 0,00354 hPa at 25 °C, Method: US EPA Test Guideline OPPTS 830.7950
Relative density	: 1,058 at 20 °C
Bulk density	: 400 kg/m <sup>3</sup>
Water solubility	: < 10 g/l : 392 mg/l at 20 °C
Partition coefficient: n-octanol/water	: log Pow: 2,07 at 20 °C, Method: US EPA Test Guideline OPPTS 830.7550

### **9.2. Other information**



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no data available

### **SECTION 10: Stability and reactivity**

- 10.1. Reactivity** : Decomposes on heating.
- 10.2. Chemical stability** : Decomposes on heating., Pressure build-up.
- 10.3. Possibility of hazardous reactions** : Heating can release hazardous gases. Pressure build-up.
- 10.4. Conditions to avoid** : Decomposes on heating. Heating can release hazardous gases.
- 10.5. Incompatible materials** : Strong oxidizing agents  
Reducing agents
- 10.6. Hazardous decomposition products** : Hydrogen cyanide (hydrocyanic acid)  
Nitrogen

### **SECTION 11: Toxicological information**

#### **11.1. Information on toxicological effects**

##### Acute oral toxicity

- 2,2'-Azobis(2-methylbutyronitrile)  
LD50 / Rat : 337 mg/kg  
Method: OECD Test Guideline 401

##### Acute inhalation toxicity

- 2,2'-Azobis(2-methylbutyronitrile)  
LC50 / 4 h Rat : > 8,9 mg/l  
Method: OECD Test Guideline 403

##### Acute dermal toxicity

- 2,2'-Azobis(2-methylbutyronitrile)  
LD50 / Rat : > 2 000 mg/kg  
Method: OECD Test Guideline 402  
Information given is based on data obtained from similar substances.

##### Skin irritation

- 2,2'-Azobis(2-methylbutyronitrile)  
Rabbit





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Classification: No skin irritation  
Result: No skin irritation  
Method: OECD Test Guideline 404

### Eye irritation

- 2,2'-Azobis(2-methylbutyronitrile)  
Rabbit  
Classification: No eye irritation  
Result: No eye irritation  
Method: OECD Test Guideline 405

### Sensitisation

- 2,2'-Azobis(2-methylbutyronitrile)  
Guinea pig  
Classification: Does not cause skin sensitisation.  
Result: Does not cause skin sensitisation.  
Method: OECD Test Guideline 406

### Repeated dose toxicity

- 2,2'-Azobis(2-methylbutyronitrile)  
Ingestion Rat  
Exposure time: 42 d  
NOAEL: 50 mg/kg  
LOAEL: > 50 mg/kg  
Method: see user defined free text  
No toxicologically significant effects were found., Information given is based on data obtained from similar substances.

### Mutagenicity assessment

- 2,2'-Azobis(2-methylbutyronitrile)  
Tests on bacterial or mammalian cell cultures did not show mutagenic effects. Evidence suggests this substance does not cause genetic damage in animals. Information given is based on data obtained from similar substances.

### Toxicity to reproduction assessment

- 2,2'-Azobis(2-methylbutyronitrile)  
No toxicity to reproduction Evidence suggests the substance is not a reproductive toxin in animals. Information given is based on data obtained from similar substances.

### Assessment teratogenicity

- 2,2'-Azobis(2-methylbutyronitrile)  
Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity. Information given is based on data obtained from similar substances.



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### **SECTION 12: Ecological information**

#### **12.1. Toxicity**

Toxicity to fish

- 2,2'-Azobis(2-methylbutyronitrile)  
LC50 / 96 h / Danio rerio (zebra fish): 580 mg/l  
Method: OECD Test Guideline 203  
Information given is based on data obtained from similar substances.

Toxicity to aquatic plants

- 2,2'-Azobis(2-methylbutyronitrile)  
EC50 / 72 h / Pseudokirchneriella subcapitata (green algae): 67 mg/l  
Method: OECD Test Guideline 201  
  
NOEC / 72 h / Pseudokirchneriella subcapitata (green algae): 12,5 mg/l  
Method: OECD Test Guideline 201

Toxicity to aquatic invertebrates

- 2,2'-Azobis(2-methylbutyronitrile)  
EC50 / 48 h / Daphnia magna (Water flea): 51,9 mg/l  
Method: OECD Test Guideline 202

Chronic toxicity to aquatic Invertebrates

- 2,2'-Azobis(2-methylbutyronitrile)  
NOEC / 21 d / Daphnia magna (Water flea): 2,2 mg/l  
Method: OECD Test Guideline 202  
Information given is based on data obtained from similar substances.

#### **12.2. Persistence and degradability**

Biodegradability

- 2,2'-Azobis(2-methylbutyronitrile)  
Method: OECD Test Guideline 301D  
Not biodegradable

#### **12.3. Bioaccumulative potential**

no data available

#### **12.4. Mobility in soil**

no data available



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### **12.5. Results of PBT and vPvB assessment**

PBT and vPvB assessment

Non-classified vPvB substance / Non-classified PBT substance

### **12.6. Other adverse effects**

no data available

## **SECTION 13: Disposal considerations**

### **13.1. Waste treatment methods**

Product : Dispose of as hazardous waste in compliance with local and national regulations. Do not dispose of waste into sewer. For further information see Annex - Exposure scenario.

Contaminated packaging : Dispose of contents/ container to an approved incineration plant.

## **SECTION 14: Transport information**

### **ADR**

- 14.1. UN number: 3236  
14.2. UN proper shipping name: SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED (2,2'-Azodi(2-methylbutyronitrile))  
14.3. Transport hazard class(es): 4.1  
14.4. Packing group: Not applicable  
14.5. Environmental hazards: For further information see Section 12.  
14.6. Special precautions for user:  
Tunnel restriction code: (D)  
Control temperature 35 °C  
Emergency temperature 40 °C

### **IATA\_C**

- 14.1. UN number: 3236  
14.2. UN proper shipping name: Self-reactive solid type D, temperature controlled (2,2'-Azodi(2-methylbutyronitrile))  
14.3. Transport hazard class(es): 4.1  
14.4. Packing group: Not applicable  
14.5. Environmental hazards : For further information see Section 12.  
14.6. Special precautions for user:  
Control temperature 35 °C  
Emergency temperature 40 °C  
IATA prohibits air cargo transport.

### **IMDG**

- 14.1. UN number: 3236  
14.2. UN proper shipping name: SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED (2,2'-Azodi(2-methylbutyronitrile))



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- |                                     |   |
|-------------------------------------|---|
| 14.3. Transport hazard class(es):   | 4.1                                     |
| 14.4. Packing group:                | Not applicable                          |
| 14.5. Environmental hazards :       | For further information see Section 12. |
| 14.6. Special precautions for user: |   |
| Control temperature                 | 35 °C                                   |
| Emergency temperature               | 40 °C                                   |

- 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**  
Not applicable

### **SECTION 15: Regulatory information**

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

Other regulations : Take note of Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

#### **15.2. Chemical Safety Assessment**

A Chemical Safety Assessment has been carried out for this substance.

### **SECTION 16: Other information**

#### **Full text of H-Statements referred to under section 3.**

H242	Heating may cause a fire.
H302	Harmful if swallowed.

#### **Abbreviations and acronyms**

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute toxicity estimate
CAS-No.	Chemical Abstracts Service number
CLP	Classification, Labelling and Packaging
EbC50	Concentration at which 50% reduction of biomass is observed
EC50	Median effective concentration
EN	European Norm
EPA	Environmental Protection Agency
ErC50	Concentration at which a 50% inhibition of growth rate is observed
EyC50	Concentration at which 50 % inhibition of yield is observed
IATA_C	International Air Transport Association (Cargo)
IBC	International Bulk Chemical Code
ICAO	International Civil Aviation Organization
ISO	International Standard Organization
IMDG	International Maritime Dangerous Goods
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LOEC	Lowest Observed Effect Concentration
LOEL	Lowest observed effect level



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MARPOL	International Convention for the Prevention of Marine Pollution from Ships
n.o.s.	Not Otherwise Specified
NOAEC	No Observed Adverse Effect Concentration
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organisation for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides and Toxic Substances
PBT	Persistent, Bioaccumulative and Toxic
STEL	Short term exposure limit
TWA	Time Weighted Average (TWA):
vPvB	very Persistent and very Bioaccumulative

### **Further information**

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Significant change from previous version is denoted with a double bar.

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### **Annex - Exposure scenario**

The exposure scenario provides specific information on how hazardous substances (as such or in a mixture) are to be managed and controlled. It considers specific conditions of use, in order to ensure that a use should be safe to humans and the environment. Identified risk management measures are to be implemented unless the downstream user is able to ensure safe use in a diverging way.

ES1 - Industrial use, Free radical initiators, Polymerisation (bulk and batch)

#### **Exposure scenario 1:**

##### **1. Short title of Exposure Scenario: Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Main User Group	: <b>SU 3:</b> Industrial uses: Uses of substances as such or in preparations at industrial sites
Sector of End Use	: <b>SU 3:</b> Industrial Manufacturing (all) : <b>SU9:</b> Manufacture of fine chemicals : <b>SU12:</b> Manufacture of plastics products, including compounding and conversion
Product Category	: <b>PC19:</b> Intermediate
CS1	: Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a) Industrial use, Free radical initiators, Polymerisation (bulk and batch)
CS2	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).
CS3	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with LEV (Local Exhaust Ventilation).
CS4	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).
CS5	: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment)., Transfer with LEV (Local Exhaust Ventilation).



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- |      |  |
|------|--|
| CS6  | : Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer via enclosed lines.  |
| CS7  | : Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Mixing  |
| CS8  | : Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5) Industrial use, Free radical initiators, Polymerisation (bulk and batch)      |
| CS9  | : Use in closed, continuous process with occasional controlled exposure (PROC2) Industrial use, Free radical initiators, Polymerisation (bulk and batch)   |
| CS10 | : Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Small user  |
| CS11 | : Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), sampling |
| CS12 | : Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch)  |
| CS13 | : Use as laboratory reagent (PROC15) Industrial use, Free radical initiators, Polymerisation (bulk and batch)  |
| CS14 | : Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Large user  |

### **2. Conditions of use affecting exposure**

**2.1 Control of environmental exposure for: CS1 - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

#### **Product characteristics**

Covers the percentage of the substance in the product up to 100 % (unless stated differently).

#### **Amount used**

Annual site tonnage : 150 ton(s)/year  
(tonnes/year)

Annual amount per site : 75 ton(s)/year

Daily amount per site : 1875 kg/day

#### **Frequency and duration of use**



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Continuous use/release : Continuous use

### **Other given operational conditions affecting environmental exposure**

Flow rate of receiving surface : 18 000 m<sup>3</sup>/d  
water

Limit release rate to waste : 0,75 kg/day  
water to (kg/day):

### **Technical and organisational conditions and measures**

Air : Two stage dust filter

Air : Air cyclones for dust collection

### **Conditions and measures related to municipal sewage treatment plant**

Type of Sewage Treatment : Assumed domestic sewage treatment plant flow  
Plant

Flow rate of sewage treatment : 2 000 m<sup>3</sup>/d  
plant effluent

Remarks : Sludge assumed to be spread to agricultural land.

### **Conditions and measures related to external treatment of waste**

Disposal methods : Hazardous Waste Incineration

Remarks : This substance is consumed during use and no waste of the substance is  
generated.

**2.2 Control of worker exposure for: CS2 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).**

### **Product characteristics**

Concentration of the : Covers the percentage of the substance in the product up to 100 % (unless  
Substance in Mixture/Article stated differently).

Physical Form (at time of use) : solid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day





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### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 10 m<sup>3</sup>

Remarks : Assumes activities are at ambient temperature (unless stated differently).

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Wear respiratory protection. (Effectiveness: 95 %)

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.3 Control of worker exposure for: CS3 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with LEV (Local Exhaust Ventilation).**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : solid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use



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Minimum room size : 10 m3

Remarks : Assumes activities are at ambient temperature (unless stated differently).

### **Technical and organisational conditions and measures**

Local exhaust ventilation

Ensure operatives are trained to minimise exposures.

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.4 Control of worker exposure for: CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : solid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 10 m3

Remarks : Assumes activities are at ambient temperature (unless stated differently).

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.



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### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Wear respiratory protection. (Effectiveness: 95 %)

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.5 Control of worker exposure for: CS5 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment)., Transfer with LEV (Local Exhaust Ventilation).**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : solid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 4 hours/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 10 m<sup>3</sup>

Remarks : Assumes activities are at ambient temperature (unless stated differently).

### **Technical and organisational conditions and measures**

Local exhaust ventilation

Ensure operatives are trained to minimise exposures.

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.



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Wear respiratory protection. (Effectiveness: 90 %)

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.6 Control of worker exposure for: CS6 - Use in closed process, no likelihood of exposure (PROC1)  
Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer via enclosed lines.**

#### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

Physical Form (at time of use) : solid

#### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 4 hours/day

#### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Minimum room size : 10 m<sup>3</sup>

Remarks : Assumes activities are at ambient temperature (unless stated differently).

#### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.

#### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.7 Control of worker exposure for: CS7 - Use in closed process, no likelihood of exposure (PROC1)  
Industrial use, Free radical initiators, Polymerisation (bulk and batch), Mixing**

#### **Product characteristics**



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Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 4 hours/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 30 m<sup>3</sup>

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines

Vessel Opening : < 0,3 m<sup>2</sup>

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.

Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.8 Control of worker exposure for: CS8 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid



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### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 100 m<sup>3</sup>

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines

Vessel Opening : < 0,3 m<sup>2</sup>

### **Technical and organisational conditions and measures**

Local exhaust ventilation (Effectiveness: 50 %)

Ensure operatives are trained to minimise exposures. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.9 Control of worker exposure for: CS9 - Use in closed, continuous process with occasional controlled exposure (PROC2) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

### **Amount used - Frequency and duration of use**



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Not required for TRA worker assessments.

Frequency of use : 4 hours/day

### **Other operational conditions affecting workers exposure**

Breathing volume : 10 m3

Body weight : 70 kg

Minimum room size : 30 m3

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines  
: Medium containment with receiving vessel docked or sealed to the source vessel to prevent direct contact with the product.

Vessel Opening : < 0,3 m2

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.10 Control of worker exposure for: CS10 - Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Small user**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day



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### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Minimum room size : 30 m<sup>3</sup>

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines

: Low containment using loose lids on vessels.

Vessel Opening : < 0,3 m<sup>2</sup>

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

**2.11 Control of worker exposure for: CS11 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), sampling**

### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 15 minutes/day

### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Minimum room size : 30 m<sup>3</sup>





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Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines

Mass transfer rate : 0,1 L/min

: Reduce contact between product and air

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

### **2.12 Control of worker exposure for: CS12 - Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

#### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

#### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 6 hours/day

#### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 30 m<sup>3</sup>

Temperature : 150 °C

Remarks : Regular inspection and maintenance of equipment and machines



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: Medium containment with receiving vessel docked or sealed to the source vessel to prevent direct contact with the product.

Vessel Opening : < 0,1 m2

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

### **2.13 Control of worker exposure for: CS13 - Use as laboratory reagent (PROC15) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

#### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

#### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 30 minutes/day

#### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 30 m3

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines

Mass transfer rate : 1 L/min, Submerged loading.

: Reduce contact between product and air



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### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures.

### **Conditions and measures related to personal protection, hygiene and health evaluation**

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

### **2.14 Control of worker exposure for: CS14 - Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Large user**

#### **Product characteristics**

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 50%.

Physical Form (at time of use) : liquid

#### **Amount used - Frequency and duration of use**

Not required for TRA worker assessments.

Frequency of use : 1 hours/day

#### **Other operational conditions affecting workers exposure**

Body weight : 70 kg

Outdoor / Indoor : Indoor use

Minimum room size : 300 m<sup>3</sup>

Temperature : 25 °C

Remarks : Regular inspection and maintenance of equipment and machines  
: Low containment using loose lids on vessels.

Vessel Opening : < 0,3 m<sup>2</sup>

### **Technical and organisational conditions and measures**

Ensure operatives are trained to minimise exposures. Ensure that the task is being carried out outside the breathing zone of a worker (distance head-product greater than 1m).



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### **Conditions and measures related to personal protection, hygiene and health evaluation**

Refer to protective measures listed in sections 7 and 8.

### **Additional good practice advice beyond the REACH Chemical Safety Assessment**

Good housekeeping

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

#### **Environment**

#### **CS1 - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Compartment : Fresh water  
Risk characterization ratio : 0,7  
Method : ECETOC TRA v2.0 Environment

Compartment : Marine water  
Risk characterization ratio : 0,7  
Method : ECETOC TRA v2.0 Environment

Compartment : Fresh water sediment  
Risk characterization ratio : 0,7  
Method : ECETOC TRA v2.0 Environment

Compartment : Marine sediment  
Risk characterization ratio : 0,7  
Method : ECETOC TRA v2.0 Environment

Compartment : Agricultural soil (30 days)  
Risk characterization ratio : 0,9  
Method : ECETOC TRA v2.0 Environment

Compartment : Grassland  
Risk characterization ratio : 0,3  
Method : ECETOC TRA v2.0 Environment

Compartment : Sewage treatment plants  
Risk characterization ratio : 0,004  
Method : ECETOC TRA v2.0 Environment

#### **Workers**

**CS2 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (PROC8a) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).**



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Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,003  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

### **CS3 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with LEV (Local Exhaust Ventilation).**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,001  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

### **CS4 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment).**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,001  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,1  
Method : ECETOC TRA v2.0 Worker

### **CS5 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer with RPE (Respiratory Protective Equipment), Transfer with LEV (Local Exhaust Ventilation).**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,04



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Method : ECETOC TRA v2.0 Worker

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,001  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,04  
Method : ECETOC TRA v2.0 Worker

### **CS6 - Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Transfer via enclosed lines.**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,02  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,0007  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,02  
Method : ECETOC TRA v2.0 Worker

### **CS7 - Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Mixing**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,003  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,0007  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,004  
Method : Advanced Reach Tool (ART) 1.0

### **CS8 - Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) (PROC5) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,006  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,003  
Method : ECETOC TRA v2.0 Worker



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Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,009  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **CS9 - Use in closed, continuous process with occasional controlled exposure (PROC2) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,003  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,003  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,006  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **CS10 - Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Small user**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,007  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,0007  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,008  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **CS11 - Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (PROC8b) Industrial use, Free radical initiators, Polymerisation (bulk and batch), sampling**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,007  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,001  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,008  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0



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### **CS12 - Use in closed process, no likelihood of exposure (PROC1) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,003  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,0007  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,002  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **CS13 - Use as laboratory reagent (PROC15) Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,001  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,00007  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,003  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **CS14 - Use in closed batch process (synthesis or formulation) (PROC3) Industrial use, Free radical initiators, Polymerisation (bulk and batch), Large user**

Value type : Worker - inhalation - long-term, systemic  
Risk characterization ratio : 0,001  
Method : Advanced Reach Tool (ART) 1.0

Value type : Worker - dermal, long-term - systemic  
Risk characterization ratio : 0,0007  
Method : ECETOC TRA v2.0 Worker

Value type : Worker - total - long-term, systemic  
Risk characterization ratio : 0,002  
Method : ECETOC TRA v2.0 Worker Advanced Reach Tool (ART) 1.0

### **4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**





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**CS1 - Industrial use resulting in manufacture of another substance (use of intermediates) (ERC6a)  
Industrial use, Free radical initiators, Polymerisation (bulk and batch)**

For further information, please contact [sds-support@chemours.com](mailto:sds-support@chemours.com). The information within this CS is relevant for all CS within this chapter of the Exposure Scenario.