Safety data sheet

1. Identification of the substance/mixture and of the company/undertaking

Product identifier

Pyranol

Chemical name: tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixed isomers (cis and trans)
INDEX-Number: 603-101-00-3
CAS Number: 63500-71-0

REACH registration number: 01-2119455547-30-0000

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

Relevant identified uses: Chemical

For the detailed identified uses of the product see appendix of the safety data sheet.

Details of the supplier of the safety data sheet

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Nutrition and Health

Telephone: +49 621 60-48434
E-mail address: EN-Masterdata@basf.com

Emergency telephone number

International emergency number:
Telephone: +49 180 2273-112

2. Hazards Identification

Label elements

According to Regulation (EC) No 1272/2008 [CLP]

Globally Harmonized System, EU (GHS)

Pictogram:

Signal Word:
Warning

Hazard Statement:

H319	Causes serious eye irritation.

Precautionary Statements (Prevention):

P280d	Wear eye/face protection.
P264	Wash with plenty of water and soap thoroughly after handling.

Precautionary Statements (Response):

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 + P311	If eye irritation persists: Call a POISON CENTER or doctor/physician.

According to Directive 67/548/EEC or 1999/45/EC

as in Annex VI REGULATION (EC) No 1272/2008

Hazard symbol(s)

Xi	Irritant.

R-phrase(s)

R36	Irritating to eyes.

S-phrase(s)

S25	Avoid contact with eyes.
S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39	Wear eye/face protection.

Classification of the substance or mixture

According to Regulation (EC) No 1272/2008 [CLP]

Eye Dam./Irrit. 2

According to Directive 67/548/EEC or 1999/45/EC

Possible Hazards:
Irritating to eyes.

For the classifications not written out in full in this section the full text can be found in section 16.

Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

Other Hazards (GHS):
If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

3. Composition/Information on Ingredients

Substances

Chemical nature

Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of isomers
CAS Number: 63500-71-0
EC-Number: 405-040-6
INDEX-Number: 603-101-00-3

For the classifications not written out in full in this section, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, the full text is listed in section 16.

4. First-Aid Measures

Description of first aid measures

Remove contaminated clothing.

If inhaled:
Keep patient calm, remove to fresh air.

On skin contact:
Wash thoroughly with soap and water.

On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

Indication of any immediate medical attention and special treatment needed

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media
Suitable extinguishing media:
carbon dioxide, dry powder, foam, water spray

Special hazards arising from the substance or mixture

Burning produces harmful and toxic fumes.

Advice for fire-fighters
Special protective equipment:
Wear a self-contained breathing apparatus.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures
Avoid contact with the skin, eyes and clothing. Ensure adequate ventilation. Wear respiratory protection if ventilation is inadequate. Sources of ignition should be kept well clear.

Environmental precautions
Do not empty into drains.

Methods and material for containment and cleaning up
For small amounts: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.
For large amounts: Dike spillage. Sweep/shovel up. Dispose of absorbed material in accordance with regulations.

Reference to other sections
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

7. Handling and Storage

Precautions for safe handling
Avoid contact with skin and eyes. Ensure thorough ventilation of stores and work areas.

Protection against fire and explosion:
Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges.

Conditions for safe storage, including any incompatibilities

Suitable materials for containers: Stove-lacquer RDL 50, High density polyethylene (HDPE), Low density polyethylene (LDPE)
Further information on storage conditions: Keep container tightly closed and in a well-ventilated place. Protect from the effects of light.

Storage stability:

Low storage temperature can cause increasing viscosity of substance/product.

8. Exposure Controls/Personal Protection

Control parameters

Components with workplace control parameters

none

PNEC
freshwater: 0.094 mg/l

marine water: 0.0094 mg/l

intermittent release: 0.94 mg/l

sediment (freshwater): 0.412 mg/kg

sediment (marine water): 0.0412 mg/kg

soil: 0.0902 mg/kg

STP: 10 mg/l

DNEL
worker:
Long-term exposure- systemic effects, Inhalation: 12.2 mg/m3

worker:
Long-term exposure- systemic effects, dermal: 3.47 mg/kg

consumer:
Long-term exposure- systemic effects, dermal: 2.08 mg/kg

consumer:
Long-term exposure- systemic effects, Inhalation: 3.62 mg/m3

consumer:
Long-term exposure- systemic effects, oral: 1.04 mg/kg

Exposure controls

Personal protective equipment

Respiratory protection:
Breathing protection if gases/vapours are formed. Gas filter for gases/vapours of organic compounds (boiling point >65 °C, e. g. EN 14387 Type A)

Hand protection:
Suitable chemical resistant safety gloves (EN 374) also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN 374): E.g. nitrile rubber (0.4 mm), chloroprene rubber (0.5 mm), butyl rubber (0.7 mm) and other

Supplementary note: The specifications are based on tests, literature data and information of glove manufacturers or are derived from similar substances by analogy. Due to many conditions (e.g. temperature) it must be considered, that the practical usage of a chemical-protective glove in practice may be much shorter than the permeation time determined through testing.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

General safety and hygiene measures
Handle in accordance with good industrial hygiene and safety practice.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	liquid	
Colour:	colourless	
Odour:	flowery	
Odour threshold:	< 100 ppm	
Melting point:	< -100 °C (1,013 hPa)	(OECD Guideline 102)
Boiling point:	226.9 °C (1,013.25 hPa)	(measured)
Flash point:	106 °C	(Directive 92/69/EEC, A.9, closed cup)
Flammability:	does not ignite	
Lower explosion limit:	0.81 %(V)	
Upper explosion limit:	5.16 %(V)	
Ignition temperature:	328 °C	(DIN EN 14522)
Vapour pressure:	0.01 hPa (20 °C)	(OECD Guideline 104)
	0.26 hPa (50 °C)	(OECD Guideline 104)
Density:	0.95 g/cm3 (20 °C, 1,013 hPa)	(OECD Guideline 109)
Relative density:	0.95 (20 °C, 1,013 hPa)	(OECD Guideline 109)
Solubility in water:	23.653 g/l (23 °C)	
Partitioning coefficient n-octanol/water (log Kow):	approx. 1.65 (23 °C; pH value: 6 - 7)	(Directive 84/449/EEC, A.8)
Self ignition:	Based on its structural properties the product is not classified as self-igniting.	Test type: Spontaneous self-ignition at room-temperature.
Viscosity, dynamic:	234 mPa.s (20 °C)	(OECD 114)

	39.8 mPa.s (40 °C)	(OECD 114)
Viscosity, kinematic:	247 mm2/s (20 °C)	(OECD 114)
	42.6 mm2/s (40 °C)	(OECD 114)
Explosion hazard:	not explosive	
Fire promoting properties:	not fire-propagating	

Other information

Self heating ability: It is not a substance capable of spontaneous heating.

pKA:
The substance does not dissociate.

Surface tension:
Based on chemical structure, surface activity is not to be expected.

Molar mass: 172.27 g/mol

10. Stability and Reactivity

Reactivity

Corrosion to metals: No corrosive effect on metal.

Formation of flammable gases: Remarks: Forms no flammable gases in the presence of water.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
No hazardous reactions when stored and handled according to instructions.

Conditions to avoid
Avoid heat.

Incompatible materials

Substances to avoid:
strong acids, oxidizing agents

Hazardous decomposition products

water
No hazardous decomposition products if stored and handled as prescribed/indicated.

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single ingestion. Virtually nontoxic after a single skin contact.

Experimental/calculated data:
LD50 rat (oral): > 2,000 mg/kg (OECD Guideline 401)

LD50 rabbit (dermal): > 2,000 mg/kg (OECD Guideline 402)

Irritation

Assessment of irritating effects:
Not irritating to the skin. Eye contact causes irritation.

Experimental/calculated data:
Skin corrosion/irritation rabbit: non-irritant (OECD Guideline 404)

Serious eye damage/irritation rabbit: Irritant. (OECD Guideline 405)

Respiratory/Skin sensitization

Assessment of sensitization:
Skin sensitizing effects were not observed in animal studies.

Experimental/calculated data:
Guinea pig maximization test guinea pig: Non-sensitizing. (OECD Guideline 406)

Germ cell mutagenicity

Assessment of mutagenicity:
Results from a number of mutagenicity studies with microorganisms, mammalian cell culture and mammals are available. Taking into account all of the information, there is no indication that the substance is mutagenic.

Carcinogenicity

Assessment of carcinogenicity:
Not evaluated

Reproductive toxicity

Assessment of reproduction toxicity:
Study does not need to be conducted.

Developmental toxicity

Assessment of teratogenicity:
No data available concerning teratogenic effects.

Specific target organ toxicity (single exposure)

Assessment of STOT single:
Based on available Data, the classification criteria are not met.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
Adaptive effects were observed after repeated exposure in animal studies.

Aspiration hazard

No aspiration hazard expected.

12. Ecological Information

Toxicity

Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish:
LC50 (96 h) 354 mg/l, Oncorhynchus mykiss (OECD Guideline 203, static)
The details of the toxic effect relate to the nominal concentration.

Aquatic invertebrates:
EC50 (48 h) 320 mg/l, Daphnia magna (OECD Guideline 202, part 1, static)
The details of the toxic effect relate to the nominal concentration.

Aquatic plants:
EC50 (72 h) > 94 mg/l (growth rate), Scenedesmus subspicatus (OECD Guideline 201, static)

Chronic toxicity to fish:
Study scientifically not justified.

Chronic toxicity to aquatic invertebrates:
Study scientifically not justified.

Assessment of terrestrial toxicity:
Study scientifically not justified.

Persistence and degradability

Assessment biodegradation and elimination (H2O):
Not readily biodegradable (by OECD criteria). Poorly biodegradable.

Elimination information:
0 - 10 % CO2 formation relative to the theoretical value (28 d) (OECD 301B; ISO 9439; 92/69/EEC, C.4-C) (aerobic, activated sludge, domestic)

Assessment of stability in water:
According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Assessment bioaccumulation potential:

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Mobility in soil (and other compartments if available)

Assessment transport between environmental compartments:
The substance will not evaporate into the atmosphere from the water surface.
Adsorption to solid soil phase is not expected.

Results of PBT and vPvB assessment

According to Annex XIV of Regulation (EC) No.1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH): The product does not contain a substance fullfilling the PBT (persistent/bioaccumulative/toxic) criteria or the vPvB (very persistent/very bioaccumulative) criteria. Self classification

13. Disposal Considerations

Waste treatment methods

Observe national and local legal requirements.

14. Transport Information

Land transport

ADR

Not classified as a dangerous good under transport regulations

RID

Not classified as a dangerous good under transport regulations

Inland waterway transport
ADN

Not classified as a dangerous good under transport regulations

Sea transport
IMDG

Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO

Not classified as a dangerous good under transport regulations

15. Regulatory Information

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

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

16. Other Information

Any other intended applications should be discussed with the manufacturer. Corresponding occupational protection measurements must be followed.

Full text of the classifications, including the indication of danger, the hazard symbols, the R phrases, and the hazard statements, if mentioned in section 2 or 3:
Eye Dam./Irrit. Serious eye damage/eye irritation

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Annex: Exposure Scenarios

Index

1. Use in/as Formulation
SU10; ERC2; PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15

2. Formulation
SU10; ERC2; PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

3. Consumer applications
SU21; ERC8a, ERC8d; PC3, PC8, PC28, PC31, PC35, PC39

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1. Short title of exposure scenario

Use in/as Formulation
SU10; ERC2; PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC15

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC2: Formulation of preparations As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Contributing exposure scenario	
Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. PROC2: Use in closed, continuous process with occasional controlled exposure. PROC3: Use in closed batch process (synthesis or formulation). Use domain: industrial
Operational conditions	
Concentration of the substance	Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of isomers Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.01 hPa
Duration and Frequency of activity	240 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide basic employee training to prevent/minimize exposures.	
Local exhaust ventilation	Effectiveness: 90 %
Wear chemically resistant gloves in combination with ‘basic’ employee training.	Effectiveness: 90 %
Wear suitable working clothes. Use	

suitable eye protection.	
Exposure estimate and reference to its source	
PROC1	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	0.034 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.010
PROC1	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	0.014 mg/m³
Risk Characterization Ratio (RCR)	0.001
PROC2	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	0.137 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.040
PROC2	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	1.436 mg/m³
Risk Characterization Ratio (RCR)	0.118
PROC3	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	0.034 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.010
PROC3	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - combined, long-term - systemic
Exposure estimate	4.307 mg/m³
Risk Characterization Ratio (RCR)	0.353
Additional good practice advice	
Keep substance away from direct sunlight. Store substance in cool places. Store substance in dry places. Store substance in well ventilated places. Segregate substance from incompatible materials. Segregate substance from foods. When not in use, keep containers tightly closed.	
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC8a: Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC15: Use a laboratory reagent. Use domain: industrial
Operational conditions	
Concentration of the substance	Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of

	isomers Content: >= 0 % - <= 100 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.01 hPa
Duration and Frequency of activity	240 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide basic employee training to prevent/minimize exposures.	
Local exhaust ventilation	Effectiveness: 90 %
Wear chemically resistant gloves in combination with 'basic' employee training.	Effectiveness: 90 %
Wear suitable working clothes. Use suitable eye protection.	
Exposure estimate and reference to its source	
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	1.371 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.395
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	2.153 mg/m³
Risk Characterization Ratio (RCR)	0.177
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: Reduction factor for local exhaust ventilation (LEV) has not been used for the calculation of dermal exposure estimates.
	Worker - dermal, long-term - systemic
Exposure estimate	1.371 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.395
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	4.307 mg/m³
Risk Characterization Ratio (RCR)	0.353
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	0.686 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.198
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	0.646 mg/m³
Risk Characterization Ratio (RCR)	0.053
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version

	Worker - dermal, long-term - systemic
Exposure estimate	0.686 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.198
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	2.153 mg/m³
Risk Characterization Ratio (RCR)	0.177
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - dermal, long-term - systemic
Exposure estimate	0.034 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.010
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version
	Worker - inhalative, long-term - systemic
Exposure estimate	2.153 mg/m³
Risk Characterization Ratio (RCR)	0.177
Additional good practice advice	
Keep substance away from direct sunlight. Store substance in cool places. Store substance in dry places. Store substance in well ventilated places. Segregate substance from incompatible materials. Segregate substance from foods. When not in use, keep containers tightly closed.	
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

Contributing exposure scenario	
Use descriptors covered	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC8a: Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC15: Use a laboratory reagent. Use domain: industrial
Operational conditions	
Concentration of the substance	Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of isomers Content: >= 0 % - <= 2.5 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.01 hPa
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide basic employee training to prevent/minimize exposures.	
Wear suitable working clothes. Use suitable eye protection.	

Risk Management Measures are based on qualitative risk characterisation.	
Exposure estimate and reference to its source	
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.343 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.099
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.343 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.099
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	1.794 mg/m³
Risk Characterization Ratio (RCR)	0.147
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach., ECETOC TRA modified version: Reduction factor for local exhaust ventilation (LEV) has not been used for the calculation of dermal exposure estimates.
	Worker - dermal, long-term - systemic
Exposure estimate	0.171 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.049
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic

Exposure estimate	0.171 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.049
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.009 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.002
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
Additional good practice advice	
Keep substance away from direct sunlight. Store substance in cool places. Store substance in dry places. Store substance in well ventilated places. Segregate substance from incompatible materials. Segregate substance from foods. When not in use, keep containers tightly closed.	
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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2. Short title of exposure scenario

Formulation
SU10; ERC2; PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC2: Formulation of preparations As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Contributing exposure scenario	
Use descriptors covered	PROC1: Use in closed process, no likelihood of exposure. PROC2: Use in closed, continuous process with occasional controlled exposure. PROC3: Use in closed batch process (synthesis or formulation). PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact). PROC8: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities. PROC9:

	Transfer of substance or preparation into small containers (dedicated filling line, including weighing). PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelettisation. PROC15: Use a laboratory reagent. Use domain: industrial
Operational conditions	
Concentration of the substance	Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of isomers Content: >= 0 % - <= 2.5 %
Physical state	Liquid, low fugacity
Vapour pressure of the substance during use	0.01 hPa
Duration and Frequency of activity	480 min 5 days per week
Indoor/Outdoor	Indoor
Risk Management Measures	
Provide basic employee training to prevent/minimize exposures.	
Wear suitable working clothes. Use suitable eye protection.	
Risk Management Measures are based on qualitative risk characterisation.	
Exposure estimate and reference to its source	
PROC1	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.009 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.003
PROC1	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.002 mg/m³
Risk Characterization Ratio (RCR)	0.0002
PROC2	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.034 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.010
PROC2	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.179 mg/m³

Risk Characterization Ratio (RCR)	0.015
PROC3	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.009 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.002
PROC3	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.538 mg/m³
Risk Characterization Ratio (RCR)	0.044
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.343 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.010
PROC5	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.343 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.099
PROC8a	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	1.794 mg/m³
Risk Characterization Ratio (RCR)	0.147
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.171 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.049
PROC8b	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.

	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.171 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.049
PROC9	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC14	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.086 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.025
PROC14	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - dermal, long-term - systemic
Exposure estimate	0.009 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.002
PROC15	
Assessment method	ECETOC TRA v2.0 Worker; modified version, ECETOC TRA modified version: The concentration of the substance has been considered using a linear approach.
	Worker - inhalative, long-term - systemic
Exposure estimate	0.897 mg/m³
Risk Characterization Ratio (RCR)	0.074
Additional good practice advice	
Keep substance away from direct sunlight. Store substance in cool places. Store substance in dry places. Store substance in well ventilated places. Segregate substance from incompatible materials. Segregate substance from foods. When not in use, keep containers tightly closed.	
Guidance to Downstream Users	
For scaling see: http://www.ecetoc.org/tra	

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3. Short title of exposure scenario

Consumer applications
SU21; ERC8a, ERC8d; PC3, PC8, PC28, PC31, PC35, PC39

Control of exposure and risk management measures

Contributing exposure scenario	
Use descriptors covered	ERC8a: Wide dispersive indoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Contributing exposure scenario	
Use descriptors covered	ERC8d: Wide dispersive outdoor use of processing aids in open systems As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Contributing exposure scenario	
Use descriptors covered	SU21: Consumer uses PC3: Air care products., PC8: Biocidal Products., PC28: Perfumes, Fragrances., PC31: Polishes and Wax Blends., PC35: Washing and Cleaning Products (including solvent based products)., PC39: Cosmetics, personal care products.
Operational conditions	
Concentration of the substance	Tetrahydro-2-isobutyl-4-methylpyran-4-ol, mixture of isomers Content: >= 0 % - <= 1 %
Exposure estimate and reference to its source	
	Consumer - combined, long-term - systemic
Exposure estimate	0.003 mg/kg bw/day
Risk Characterization Ratio (RCR)	0.003
	Worst case assumption based on statements of the International Fragrance Association

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