SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
Regulation (EC) No. 1907/2006 and Regulation (EC) No. 1272/2008

Revision date 10-Apr-2024 **Revision Number** 1

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

1.1. Product identifier

Product Name GENOMER* 3365

Unique Formula Identifier (UFI) U450-Q03A-800A-RJFN

Synonyms Modified polyetherpolyol acrylate

Pure substance/mixture Mixture

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

Application of the substance/ the mixture
Resin for radically curable inks, coatings, adhesives, fillers, etc.

Recommended use No information available

Uses advised against No information available

Other information For industrial use only

1.3. Details of the supplier of the safety data sheet

Supplier
RAHN AG
Dörflistrasse 120
8050 Zürich
Switzerland

For further information, please contact

Contact Point	Regulatory Affairs Department
E-mail address	SDSENC@rahn-group.com
Non-Emergency Telephone Number	+41 44 315 42 00

1.4. Emergency telephone number

Emergency Telephone +41 44 251 51 51 (Tox Info Suisse / 24h / Contract: 250303)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No 1272/2008

Serious eye damage/eye irritation	Category 2 - (H319)
Skin sensitisation	Category 1 - (H317)
Chronic aquatic toxicity	Category 3 - (H412)

2.2. Label elements

Contains Propylidynetrimethanol, ethoxylated, esters with acrylic acid

Signal word
Warning

Hazard statements
H317 - May cause an allergic skin reaction
H319 - Causes serious eye irritation
H412 - Harmful to aquatic life with long lasting effects

Precautionary Statements - EU (§28, 1272/2008)
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention
P337 + P313 - If eye irritation persists: Get medical advice/attention
P362 + P364 - Take off contaminated clothing and wash it before reuse
P501 - Dispose of contents/container in accordance with local, regional, national, and international regulations as applicable

2.3. Other hazards

No information available.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical name	CAS No	REACH registration number	EC No	Classification according to Regulation (EC) No. 1272/2008 [CLP]	Specific concentration limit (SCL)	M-Factor	M-Factor (long-term)
Propylidynetrimethanol, ethoxylated, esters with acrylic acid 50 - 90 %	28961-43-5	01-2119489900-30-XXXX	500-066-5	Skin Sens. 1 (H317) Eye Irrit. 2 (H319) Aquatic Chronic 3 (H412)		-	-

Full text of H- and EUH-phrases: see section 16

Acute Toxicity Estimate
See chapter 11.1

This product does not contain candidate substances of very high concern at a concentration >=0.1% (Regulation (EC) No. 1907/2006 (REACH), Article 59)

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice Show this safety data sheet to the doctor in attendance.

Inhalation Remove to fresh air.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Keep eye wide open while rinsing. Do not rub affected area. Get medical attention if irritation develops and persists.

Skin contact Avoid contact with UV and sunlight. Wash with soap and water. May cause an allergic skin reaction. In the case of skin irritation or allergic reactions see a doctor.

Ingestion Rinse mouth. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a doctor.

Self-protection of the first aider Avoid contact with skin, eyes or clothing. Wear personal protective clothing (see section 8).

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

Symptoms Itching. Rashes. Hives. May cause redness and tearing of the eyes. Burning sensation.

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

Note to doctors May cause sensitisation in susceptible persons. Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Small Fire Dry chemical, CO2 or water spray.
Large Fire Alcohol resistant foam. Water spray.

Unsuitable extinguishing media Full water jet.

5.2. Special hazards arising from the substance or mixture

Specific hazards arising from the chemical Product is or contains a sensitiser. May cause sensitisation by skin contact.

5.3. Advice for firefighters

Special protective equipment and precautions for fire-fighters Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other information Refer to protective measures listed in Sections 7 and 8.

For emergency responders Use personal protection recommended in Section 8.

6.2. Environmental precautions

Environmental precautions Do not flush into surface water or sanitary sewer system. See Section 12 for additional Ecological Information.

6.3. Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Take up mechanically, placing in appropriate containers for disposal.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

6.4. Reference to other sections

Reference to other sections See section 7 for more information. See section 8 for more information. See section 13 for more information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact

with skin, eyes or clothing. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash it before reuse.

General hygiene considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Storage Conditions Do not store at temperatures above 40 °C (104 °F). Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children. Store locked up. Keep away from heat. Protect from sunlight. Store in a well-ventilated place.

7.3. Specific end use(s)

Risk Management Methods (RMM) The information required is contained in this Material Safety Data Sheet.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure Limits This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Biological occupational exposure limits This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.

Derived No Effect Level (DNEL) No information available.
Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Hand protection Gloves should be replaced regularly and if there is any sign of damage to the glove material. Wear suitable gloves. Nitrile rubber.

Skin and body protection Wear suitable protective clothing.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

General hygiene considerations Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product.

Environmental exposure controls No information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state	Liquid
Colour	colourless
Odour	Amine-like

Property	Values	Remarks • Method
Melting point / freezing point	No data available	

Boiling point / boiling range	No data available	
Flammability (solid, gas)	No data available	
Flammability Limit in Air		
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Flash point	> 100 °C	
Autoignition temperature	No information available	Product is not self-igniting.
Decomposition temperature	No data available	
pH	No data available	
pH (as aqueous solution)	No data available	
Kinematic viscosity	No data available	
Dynamic viscosity	100 - 200 mPas @ 25°C	
Water solubility	No data available	
Solubility(ies)	No data available	
Partition coefficient	No data available	
Vapour pressure	No data available	
Relative density		
Bulk density	No data available	
Liquid Density	No data available	
Vapour density	No data available	
Particle characteristics		
Particle Size	No information available	
Particle Size Distribution	No information available	
Surface tension	No data available	

9.2. Other information

9.2.1. Information with regards to physical hazard classes
Not applicable

9.2.2. Other safety characteristics
No information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity No information available.

10.2. Chemical stability

Stability Stable under normal conditions.

Explosion data

Sensitivity to mechanical impact	None.
Sensitivity to static discharge	None.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions No known hazardous reactions.

10.4. Conditions to avoid

Conditions to avoid Keep away from sources of ignition - No smoking. Polymerization occurs when exposed to white light, ultraviolet light or heat. UV-radiation/sunlight.

10.5. Incompatible materials

Incompatible materials Avoid contact with radical forming initiators, peroxides, strong alkalis or reactive metals to prevent exothermic polymerization.

10.6. Hazardous decomposition products

Hazardous decomposition products None known based on information supplied.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Information on likely routes of exposure

Product Information

Inhalation May cause irritation of respiratory tract.

Eye contact Causes serious eye irritation. May cause redness, itching, and pain.

Skin contact May cause sensitisation by skin contact. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. May cause irritation. Prolonged contact may cause redness and irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Itching. Rashes. Hives. May cause redness and tearing of the eyes.

Acute toxicity

Numerical measures of toxicity

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral) 3,089.60 mg/kg
ATEmix (dermal) 20,380.80 mg/kg

0 % of the mixture consists of ingredient(s) of unknown acute oral toxicity.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 401: Acute Oral Toxicity
Species	Rat
Exposure route	gavage
Results	LD50 > 2000 mg/kg bw

Method	Not Specified
Species	Rabbit
Exposure route	Dermal
Results	LD50 > 13'200 mg/kg bw

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Propylidynetrimethanol, ethoxylated, esters with acrylic acid	> 2000 mg/kg bw (Rat)	> 13'200 mg/kg bw (Rabbit)	-

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation Based on available data, the classification criteria are not met.

Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 404: Acute Dermal Irritation/Corrosion
Species	Rabbit
Exposure route	Dermal
Effective dose	0.5 mL
Exposure time	4 hours
Results	Non-irritant

Serious eye damage/eye irritation Causes serious eye irritation.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 405: Acute Eye Irritation/Corrosion
Species	Rabbit
Exposure route	Eye
Effective dose	0.1 mL
Results	Irritant

Respiratory or skin sensitisation May cause an allergic skin reaction.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 406: Skin Sensitisation
Species	Guinea pig
Exposure route	Dermal
Results	Sensitising

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 474: Mammalian Erythrocyte Micronucleus Test
Species	in vivo
Results	Not mutagenic

Method	OECD Test No. 476: In vitro Mammalian Cell Gene Mutation Test
Species	in vitro
Results	inconclusive

Method	OECD Test No. 471: Bacterial Reverse Mutation Test
Species	in vitro
Results	Not mutagenic

Carcinogenicity Based on available data, the classification criteria are not met.

Reproductive toxicity Based on available data, the classification criteria are not met.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	Read Across from result of OECD 414 study with CAS 42978-66-5
Species	Rat
Exposure Route	Oral / Dermal
Exposure time	max. 52 days
Results	NOAEL = 750 mg/kg bw/day (Fertility) NOAEL = 1000 mg/kg bw/day (Teratogenicity)

Method	Read Across from result of OECD 443 study with CAS 42978-66-5
Species	Rat
Exposure Route	Oral gavage
Exposure time	max. 90 days
Results	NOAEL = > 100 mg/kg bw/day

STOT - single exposure Based on available data, the classification criteria are not met.

STOT - repeated exposure Based on available data, the classification criteria are not met.

Component Information	
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)	
Method	OECD Test No. 408: Repeated Dose 90-Day Oral Toxicity Study in Rodents
Species	Rat
Exposure route	Oral gavage
Exposure time	90 days
Results	NOAEL = 150 mg/kg bw/day (local) NOAEL = 375 mg/kg bw/day (systemic)

Aspiration hazard Based on available data, the classification criteria are not met.

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Endocrine disrupting properties No information available.

11.2.2. Other information

Other adverse effects No information available.

SECTION 12: Ecological information

12.1. Toxicity

Ecotoxicity Harmful to aquatic life with long lasting effects.

Unknown aquatic toxicity Contains 0 % of components with unknown hazards to the aquatic environment.

Chemical name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Propylidynetrimethanol, ethoxylated, esters with acrylic acid	EC50(72h) = 2.2 mg/L (OECD 201)	LC50(96h) = 1.95mg/L (OECD 203)	EC50(3h) > 1000 mg/L	EC50(48h) = 70.7 mg/L (OECD 202)

12.2. Persistence and degradability

Persistence and degradability No information available.

Component Information			
Propylidynetrimethanol, ethoxylated, esters with acrylic acid (28961-43-5)			
Method	Exposure time	Value	Results
OECD Test No. 301B: Ready Biodegradability: CO2 Evolution Test (TG 301 B)	28 days	Biodegradation : 60% (after 28 days)	Readily biodegradable

12.3. Bioaccumulative potential

Bioaccumulation

Component Information

Chemical name	Partition coefficient
Propylidynetrimethanol, ethoxylated, esters with acrylic acid	Log Pow = 2.89

12.4. Mobility in soil

Mobility in soil No information available.

12.5. Results of PBT and vPvB assessment

PBT and vPvB assessment

Chemical name	PBT and vPvB assessment
Propylidynetrimethanol, ethoxylated, esters with acrylic acid	The substance is not PBT / vPvB

12.6. Other adverse effects

Endocrine disrupting properties No information available.

12.7. Other adverse effects
No information available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste from residues/unused products Can be landfilled or incinerated, when in compliance with local regulations.

Contaminated packaging Packaging may be reused or recycled after cleaning.

Waste codes / waste designations according to EWC / AVV 08 01 99.

Other information Do not allow product to reach sewage system.

SECTION 14: Transport information

IATA

14.1 UN number or ID number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	

IMDG

14.1 UN number or ID number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing group	Not regulated
14.5 Marine pollutant	Not applicable
Environmental hazards	Not applicable
14.6 Special precautions for user	
14.7 Maritime transport in bulk according to IMO instruments	No information available

ADR

14.1 UN number or ID number	Not regulated
14.2 UN proper shipping name	Not regulated
14.3 Transport hazard class(es)	Not regulated
14.4 Packing group	Not regulated
14.5 Environmental hazards	Not applicable
14.6 Special precautions for user	

SECTION 15: Regulatory information

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

National regulations

Germany
Water hazard class (WGK) Water endangering class = 2 (self classification)

European Union

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.

Authorisations and/or restrictions on use:

This product does not contain substances subject to restriction (Regulation (EC) No. 1907/2006 (REACH), Annex XVII) in concentrations at or above 0.1%. This product does not contain substances subject to authorisation (Regulation (EC) No. 1907/2006 (REACH), Annex XIV) in concentrations at or above 0.1%.

Persistent Organic Pollutants

Not applicable

Ozone-depleting substances (ODS) regulation (EC) 1005/2009

Not applicable

Chemical Weapons Convention (CWC)

This product does not contain any chemicals regulated under the Chemical Weapons Convention.

International Inventories

TSCA	All components of this product are included on the TSCA Chemical Inventory or are not required to be listed on the TSCA Chemical Inventory.
DSL/NDSL	All components of this product are included on the Domestic Substances List (DSL) or are not required to be listed on the DSL.
REACH	Registered, non EU customers please contact RAHN before importing the product into the EU

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
REACH - Registration, Evaluation, Authorization and Restriction of Chemicals

15.2. Chemical safety assessment

Chemical Safety Report	A Chemical Safety Assessment has not been carried out

SECTION 16: Other information

Key or legend to abbreviations and acronyms used in the safety data sheet

Full text of H-Statements referred to under section 3

H317 - May cause an allergic skin reaction
H319 - Causes serious eye irritation
H412 - Harmful to aquatic life with long lasting effects

Prepared By	Regulatory Affairs ENC
Revision Note	No information available.
Revision date	10-Apr-2024

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

Disclaimer

The data are based on the current state of our knowledge, and are intended to describe the product with regard to the requirements of safety. The data should not be taken to imply any guarantee of a particular or general specification. It is the responsibility of the user of the product to ensure to his satisfaction that the product is suitable for the intended purpose and method to use. We do not accept responsibility for any harm caused by the use of this information. Furthermore nothing contained herein shall be construed as a recommendation to use any product in conflict with existing patents covering any material or its use. In all cases, our general conditions of sale apply.

End of Safety Data Sheet

Annex to the Safety Data Sheet

Exposure Scenarios for

Propylidynetrimethanol, ethoxylated, esters with acrylic acid

Synonym:	**TMPEOTA**
EC Number:	**500-066-5**
CAS Number:	**28961-43-5**

Revision date: **25 February 2022**

1. Exposure scenario: Formulation or re-packing - Industrial manufacture of coatings/paints/inks/adhesives formulations. F-1

Environment contributing scenario(s):		
CS 1	Formulation into mixture.	ERC 2
Worker contributing scenario(s):		
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC 1
CS 3	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours.	PROC 2
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours.	PROC 3
CS 5	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour.	PROC 3
CS 6	Mixing or blending in batch processes. Duration of activity: < 8 hours.	PROC 5
CS 7	Mixing or blending in batch processes. Duration of activity: < 1 hour.	PROC 5
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: 8 hours.	PROC 8a
CS 9	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 1 hour.	PROC 8a
CS 10	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 min.	PROC 8a
CS 11	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 4 hours. LEV.	PROC 8b
CS 12	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 4 hours. No LEV.	PROC 8b
CS 13	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 8 hours.	PROC 9
CS 14	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 4 hours.	PROC 9
CS 15	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 1 hour.	PROC 9
CS 16	Use as laboratory reagent. Duration of activity: < 8 hours.	PROC 15
CS 17	Use as laboratory reagent. Duration of activity: < 1 hour.	PROC 15
CS 18	Maintenance. Modelled using PROC 8a.	PROC 8a, PROC 28

1.1. Env CS 1: Formulation into mixture. (ERC 2)

1.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: <= 50 tonnes/day

• Annual use amount at site: <= 1.5E4 tonnes/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 87.50%]
• Discharge rate of STP: >= 2E3 m3/day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/day

1.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.21. Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor	**Release factor before on site RMM:** 0% **Release factor after on site RMM:** 0% **Local release rate:** 0 kg/day **Explanation:** The release factor is based on ESD #22, and CEPE SpERCs 2.1a, 2.1b, 2.4a, 2.4b. No water is used in the manufacture of the solvent-based coating. According to ESD 22 (p49), any potential releases to water will only take place during cleaning operations. No waste to the workshop surfaces will take place as the substance is a non-volatile liquid, and as the processes involved are contained and closed, so no dusts, mists and aerosols containing the substance will be formed. Solvents used for the cleaning of equipment are collected and are not discharged of to waste water. Technical onsite conditions and measures to reduce or limit discharges: Contained processes, no cleaning solvents are discharged of to waste water.
Air	Estimated release factor	**Release factor before on site RMM:** 2E-4% **Release factor after on site RMM:** 2E-4% **Local release rate:** 0.1 kg/day **Explanation:** The release factor is based on a conservative calculation of the release to air assuming TMPeoTA-saturated air and assuming that 99% of the plant volume is air and 1% is liquid TMPeoTA. An equivalent calculation of the release to air for a substance with a vapor pressure of 1000 Pa justifies that this approach is conservative. Please note that this is modified compared to the current CSR. Technical onsite conditions and measures to reduce or limit discharges: Contained processes.
Non agricultural soil	Estimated release factor	**Release factor after on site RMM:** 0% **Explanation:** The release factor is based on ESD #22 (table 4.4, 4.7), and CEPE SpERCs 2.1a, 2.1b, 2.4a, 2.4b. No direct releases to soil will take place. Technical onsite conditions and measures to reduce or limit discharges. Contained processes, no cleaning solvents are

Release	Release estimation method	Explanations
		discharged of to waste water

1.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.22. Exposure concentrations and risks for the environment and man via the environment

Protection target	Exposure concentration	Risk quantification
Fresh water	**Local PEC:** 3.68E-5 mg/L	RCR = 0.019
Sediment (freshwater)	**Local PEC:** 7.16E-4 mg/kg dw	RCR = 0.019
Marine water	**Local PEC:** 4.28E-6 mg/L	RCR = 0.022
Sediment (marine water)	**Local PEC:** 8.33E-5 mg/kg dw	RCR = 0.022
Sewage Treatment Plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 1.08E-3 mg/kg dw	RCR = 0.168

1.2. Worker CS 2: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

1.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.23. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.3. Worker CS 3: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours. (PROC 2)

1.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.24. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.137 mg/kg bw/day (TRA Workers)	RCR = 0.013
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.196

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.4. Worker CS 4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours. (PROC 3)

1.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	

	Method
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.25. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.061

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.5. Worker CS 5: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour. (PROC 3)

1.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.26. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.116

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing

and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.6. Worker CS 6: Mixing or blending in batch processes. Duration of activity: < 8 hours. (PROC 5)

1.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.27. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.2 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, acute	0.2 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.222

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.7. Worker CS 7: Mixing or blending in batch processes. Duration of activity: < 1 hour. (PROC 5)

1.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.28. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.2 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.2 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.8. Worker CS 8: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: 8 hours. (PROC 8a)

1.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0

	Method
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.29. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.9. Worker CS 9: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 1 hour. (PROC 8a)

1.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.1. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.30. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.353 mg/m³ (TRA Workers)	RCR = 0.037
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.167

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any

skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.10. Worker CS 10: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 min. (PROC 8a)

1.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.31. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.11. Worker CS 11: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 4 hours. LEV. (PROC 8b)

1.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 95%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.32. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.015 mg/m³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.158

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.12. Worker CS 12: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 4 hours. No LEV. (PROC 8b)

1.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.33. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.185

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.13. Worker CS 13: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 8 hours. (PROC 9)

1.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Enhanced general ventilation (5-10 air changes per hour) [Effectiveness Inhalation: 70%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.34. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.45 mg/m³ (TRA Workers)	RCR = 0.039
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.105

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.14. Worker CS 14: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 4 hours. (PROC 9)

1.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.35. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.12

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber

gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.15. Worker CS 15: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity: < 1 hour. (PROC 9)

1.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.36. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.248

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.16. Worker CS 16: Use as laboratory reagent. Duration of activity: < 8 hours. (PROC 15)

1.16.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.37. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.095

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.17. Worker CS 17: Use as laboratory reagent. Duration of activity: < 1 hour. (PROC 15)

1.17.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.38. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.186

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

1.18. Worker CS 18: Maintenance. Modelled using PROC 8a. (PROC 8a, PROC 28)

1.18.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0

	Method
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

1.18.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.39. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form

no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2. Exposure scenario: Use at industrial sites - Industrial use, resulting in inclusion into or onto a matrix. IW-1

Environment contributing scenario(s):		
CS 1	Use at industrial site leading to inclusion into/onto article	ERC 5
Worker contributing scenario(s):		
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC 1
CS 3	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC 2
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours.	PROC 3
CS 5	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour.	PROC 3
CS 6	Mixing or blending in batch processes. Duration of activity: < 8 hours.	PROC 5
CS 7	Mixing or blending in batch processes. Duration of activity: < 1 hour.	PROC 5
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 8 hours.	PROC 8a
CS 9	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes.	PROC 8a
CS 10	Transfer of substance or mixture (charging and discharging) at dedicated . Duration of activity: < 8 hours.	PROC 8b
CS 11	Transfer of substance or mixture (charging and discharging) at dedicated . Duration of activity: < 1 hour.	PROC 8b
CS 12	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 8 hours.	PROC 9
CS 13	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour.	PROC 9
CS 14	Roller application or brushing. Duration of activity: < 4 hours. LEV.	PROC 10
CS 15	Roller application or brushing. Duration of activity: < 4 hours. No LEV.	PROC 10
CS 16	Treatment of articles by dipping and pouring. Duration of activity < 8 hours	PROC 13
CS 17	Treatment of articles by dipping and pouring. Duration of activity < 1 hour.	PROC 13
CS 18	Use as laboratory reagent. Duration of activity: < 8 hours.	PROC 15
CS 19	Use as laboratory reagent. Duration of activity: < 1 hour	PROC 15
CS 20	Maintenance. Modelled using PROC 8a.	PROC 8a, PROC 28

2.1. Env CS 1: Use at industrial site leading to inclusion into/onto article (ERC 5)

2.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: <= 50 tonnes/day
• Annual use amount at site: <= 1.5E4 tonnes/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 87.50%]
• Discharge rate of STP: >= 2E3 m3/day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/day

2.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.40. Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor	**Release factor before on site RMM:** 0% **Release factor after on site RMM:** 0% **Local release rate:** 0 kg/day **Explanation:** The release estimates are based on ESD#22, part 3 (figures 3.2, 5.2, 6.3, 6.5, 7.2) . The applications included are: furniture coatings, automotive equipment manufacture, coating of 2-piece beer/beverage cans, three-piece food/general line can and coil coating. Releases of TMPeoTA can only potentially take place in the initial coating phase. After curing, all TMPeoTA is expected to be converted in the polymer.
Air	Estimated release factor	**Release factor before on site RMM:** 0% **Release factor after on site RMM:** 0% **Local release rate:** 0 kg/day **Explanation:** The release estimates are based on ESD#22, part 3 (figures 3.2, 5.2, 6.3, 6.5, 7.2) . The applications included are: furniture coatings, automotive equipment manufacture, coating of 2-piece beer/beverage cans, three-piece food/general line can and coil coating. Releases of TMPeoTA can only potentially take place in the initial coating phase. After curing, all TMPeoTA is expected to be converted in the polymer.
Non agricultural soil	Estimated release factor	**Release factor after on site RMM:** 0% **Explanation:** The release estimates are based on ESD#22, part 3 (figures 3.2, 5.2, 6.3, 6.5, 7.2) . The applications included are: furniture coatings, automotive equipment manufacture, coating of 2-piece beer/beverage cans, three-piece food/general line can and coil coating. Releases of TMPeoTA can only potentially take place in the initial coating phase. After curing, all TMPeoTA is expected to be converted in the polymer.

2.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.41. Exposure concentrations and risks for the environment and man via the environment

Protection target	Exposure concentration	Risk quantification
Fresh water	**Local PEC:** 3.68E-5 mg/L	RCR = 0.019
Sediment (freshwater)	**Local PEC:** 7.16E-4 mg/kg dw	RCR = 0.019
Marine water	**Local PEC:** 4.28E-6 mg/L	RCR = 0.022
Sediment (marine water)	**Local PEC:** 8.33E-5 mg/kg dw	RCR = 0.022
Sewage Treatment Plant	**Local PEC:** 0 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 1.07E-3 mg/kg dw	RCR = 0.166

2.2. Worker CS 2: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.42. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.041 mg/m³ (TRA Workers)	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, systemic, long term	2.04E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-4 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-4 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60 °C is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.3. Worker CS 3: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 2)

2.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	

	Method
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.43. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.082 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.012 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.012 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.118

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.4. Worker CS 4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours. (PROC 3)

2.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.44. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.218 mg/m³ (TRA Workers)	RCR = 0.033
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.012 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.012 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.037

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.5. Worker CS 5: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour. (PROC 3)

2.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.45. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.436 mg/m³ (TRA Workers)	RCR = 0.066
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.012 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.012 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.07

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in

the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.6. Worker CS 6: Mixing or blending in batch processes. Duration of activity: < 8 hours. (PROC 5)

2.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.46. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.133

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.7. Worker CS 7: Mixing or blending in batch processes. Duration of activity: < 1 hour. (PROC 5)

2.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.47. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.8. Worker CS 8: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 8 hours. (PROC 8a)

2.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.48. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.9. Worker CS 9: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes. (PROC 8a)

2.9.1. Conditions of use

	Method
Product (article) characteristics	

	Method
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.1. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.49. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.

Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.10. Worker CS 10: Transfer of substance or mixture (charging and discharging) at dedicated . Duration of activity: < 8 hours. (PROC 8b)

2.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 95%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.50. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	1.015 mg/m³ (TRA Workers)	RCR = 0.027
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.106

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):

Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.11. Worker CS 11: Transfer of substance or mixture (charging and discharging) at dedicated . Duration of activity: < 1 hour. (PROC 8b)

2.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.51. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.12. Worker CS 12: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 8 hours. (PROC 9)

2.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C	TRA Workers 3.0

	Method
The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.	

2.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.52. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers)	RCR = 0.039
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.094

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.13. Worker CS 13: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour. (PROC 9)

2.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0

	Method
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.53. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers)	RCR = 0.039
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.149

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.14. Worker CS 14: Roller application or brushing. Duration of activity: < 4 hours. LEV. (PROC 10)

2.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.54. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.436 mg/m³ (TRA Workers)	RCR = 0.066
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers)	RCR = 0.157
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.223

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any

skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.15. Worker CS 15: Roller application or brushing. Duration of activity: < 4 hours. No LEV. (PROC 10)

2.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.55. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	2.436 mg/m³ (TRA Workers)	RCR = 0.066
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers)	RCR = 0.157
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.223

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.16. Worker CS 16: Treatment of articles by dipping and pouring. Duration of activity < 8 hours (PROC 13)

Dipping and pouring

2.16.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.56. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.17. Worker CS 17: Treatment of articles by dipping and pouring. Duration of activity < 1 hour. (PROC 13)

Dipping and pouring

2.17.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.57. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	8.12 mg/m³ (TRA Workers)	RCR = 0.219
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.298

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.18. Worker CS 18: Use as laboratory reagent. Duration of activity: < 8 hours. (PROC 15)

2.18.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	

	Method
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.18.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.58. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.057

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.19. Worker CS 19: Use as laboratory reagent. Duration of activity: < 1

hour (PROC 15)

2.19.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.11. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.59. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.112

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.

Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

2.20. Worker CS 20: Maintenance. Modelled using PROC 8a. (PROC 8a, PROC 28)

2.20.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

2.20.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.60. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3. Exposure scenario: Use at industrial sites - Industrial use, resulting in inclusion into or onto a matrix. IW-2

Environment contributing scenario(s):		
CS 1	Use at industrial site leading to inclusion into/onto article	ERC 6a
Worker contributing scenario(s):		
CS 2	closed process	PROC 1
CS 3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours.	PROC 3
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour.	PROC 3
CS 5	Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours.	PROC 4
CS 6	Chemical production where opportunity for exposure arises. Duration of activity: < 1 hour.	PROC 4
CS 7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 8 hours.	PROC 8a
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes.	PROC 8a
CS 9	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 8 hours.	PROC 8b
CS 10	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 1 hour.	PROC 8b
CS 11	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 8 hours.	PROC 9
CS 12	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour.	PROC 9
CS 13	Use as laboratory reagent. Duration of activity: < 8 hours.	PROC 15
CS 14	Use as laboratory reagent. Duration of activity: < 1 hour.	PROC 15
CS 15	Maintenance. Modelled PROC 8a.	PROC 8a, PROC 28

3.1. Env CS 1: Use at industrial site leading to inclusion into/onto article (ERC 6a)

3.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: <= 50 tonnes/day
• Annual use amount at site: <= 1.5E4 tonnes/year
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 87.50%]
• Discharge rate of STP: >= 2E3 m3/day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations

Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/day

3.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.61. Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor	**Release factor before on site RMM:** 4E-4% **Release factor after on site RMM:** 4E-4% **Local release rate:** 0.2 kg/day **Explanation:** Waste water containing major residues of the substance should be collected or treated before any discharge to the sewer. The daily emission into waste water must not exceed 0.1 kg/d. The manufacturer should ensure that this daily release is not exceeded. Possible RMMs are: local treatment of waste water before release to the sewer. Avoid cleaning with water at places where TMPTeoA may be present. Collection of water (e.g. water used for the purification processes) that may contain residues of TMPeoTA. The collected water should be handled as waste.
Air	Estimated release factor	**Release factor before on site RMM:** 0% **Release factor after on site RMM:** 0% **Local release rate:** 0 kg/day **Explanation:** A main category (MC) of Ic is assigned to the use. According to the A-table in the A/B-tables of European Chemicals Bureau (2003), table A1.1), a release factor of 0 to air can be applied if the vapor pressure is below 1 Pa, for this life cycle stage and main category
Non agricultural soil	ERC	**Release factor after on site RMM:** 0.1% **Explanation:** The release estimates are based on ESD#22, part 3 (figures 3.2, 5.2, 6.3, 6.5, 7.2) . The applications included are: furniture coatings, automotive equipment manufacture, coating of 2-piece beer/beverage cans, three-piece food/general line can and coil coating. Releases of TMPeoTA can only potentially take place in the initial coating phase. After curing, all TMPeoTA is expected to be converted in the polymer.

3.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.62. Exposure concentrations and risks for the environment and man via the environment

Protection target	Exposure concentration	Risk quantification
Fresh water	**Local PEC:** 1.29E-3 mg/L	RCR = 0.659
Sediment (freshwater)	**Local PEC:** 0.025 mg/kg dw	RCR = 0.658
Marine water	**Local PEC:** 1.29E-4 mg/L	RCR = 0.662
Sediment (marine water)	**Local PEC:** 2.51E-3 mg/kg dw	RCR = 0.661

Protection target	Exposure concentration	Risk quantification
Sewage Treatment Plant	**Local PEC:** 0.012 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 5.5E-3 mg/kg dw	RCR = 0.854

3.2. Worker CS 2: closed process (PROC 1)

3.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.63. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in

the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.3. Worker CS 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours. (PROC 3)

3.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.64. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.061

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.4. Worker CS 4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour. (PROC 3)

3.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	

	Method
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.65. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.116

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.5. Worker CS 5: Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours. (PROC 4)

3.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness	TRA Workers 3.0

	Method
Inhalation: 30%]	
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.66. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.6. Worker CS 6: Chemical production where opportunity for exposure arises. Duration of activity: < 1 hour. (PROC 4)

3.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.67. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.248

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it

needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.7. Worker CS 7: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 8 hours. (PROC 8a)

3.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.68. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.8. Worker CS 8: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes. (PROC 8a)

3.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.69. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.9. Worker CS 9: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 8 hours. (PROC 8b)

3.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 95%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.1. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.70. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.692 mg/m³ (TRA Workers)	RCR = 0.046
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.176

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.10. Worker CS 10: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 1 hour. (PROC 8b)

3.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.71. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.11. Worker CS 11: Transfer of substance or mixture into small

containers (dedicated filling line, including weighing). Duration of activity < 8 hours. (PROC 9)

3.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.72. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are

torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.12. Worker CS 12: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour. (PROC 9)

3.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.73. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-		RCR = 0.248

Route of exposure and type of effects	Exposure concentration	Risk quantification
term		

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.13. Worker CS 13: Use as laboratory reagent. Duration of activity: < 8 hours. (PROC 15)

3.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.74. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.095

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.14. Worker CS 14: Use as laboratory reagent. Duration of activity: < 1 hour. (PROC 15)

3.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0

	Method
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.75. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.186

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

3.15. Worker CS 15: Maintenance. Modelled PROC 8a. (PROC 8a, PROC 28)

3.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

3.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.76. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic

DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4. Exposure scenario: Use at industrial sites - Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers. IW-3

Environment contributing scenario(s):		
CS 1	Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article)	ERC 6d
Worker contributing scenario(s):		
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC 1
CS 3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. No LEV. Duration of activity: < 8 hours	PROC 3
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions.. With LEV. Duration of activity: < 8 hours	PROC 3
CS 5	Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours.	PROC 4
CS 6	Chemical production where opportunity for exposure arises. Duration of activity: < 15 minutes.	PROC 4
CS 7	Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours.	PROC 4
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 4 hours. LEV.	PROC 8a
CS 9	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes.	PROC 8a
CS 10	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 4 hours. No LEV.	PROC 8a
CS 11	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 8 hours.	PROC 8b
CS 12	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: 8 hours. No LEV.	PROC 8b
CS 13	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 15 minutes.	PROC 8b
CS 14	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 8 hours.	PROC 9
CS 15	Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour.	PROC 9
CS 16	Tabletting, compression, extrusion, pelletisation, granulation. Duration of activity < 8 hours,	PROC 14
CS 17	Tabletting, compression, extrusion, pelletisation, granulation. Duration of activity < 1 hour,	PROC 14
CS 18	Use as laboratory reagent. Duration of activity: < 8 hours.	PROC 15
CS 19	Use as laboratory reagent. Duration of activity: < 1 hour.	PROC 15
CS 20	Low energy manipulation of substances bound in materials and/or articles. Duration < 8 hours. Low energy manipulation of	PROC 21

	substances bound in materials and/or articles	
CS 21	Low energy manipulation of substances bound in materials and/or articles. Duration < 1 hour.	PROC 21
CS 22	Maintenance. Modelled using PROC 8a.	PROC 8a, PROC 28

4.1. Env CS 1: Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article) (ERC 6d)

4.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily use amount at site: <= 0.3 tonnes/day *The fraction of main source is set to 10% (European Chemicals Bureau (2003), table B3.9). Number of emission days is set to 300*
• Annual use amount at site: <= 100 tonnes/year *The fraction of main source is set to 10% (European Chemicals Bureau (2003), table B3.9). Number of emission days is set to 300*
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 87.50%]
• Discharge rate of STP: >= 2E3 m3/day
• Application of the STP sludge on agricultural soil: Yes
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations
Other conditions affecting environmental exposure
• Receiving surface water flow rate: >= 1.8E4 m3/day

4.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.77. Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor	**Release factor before on site RMM:** 5E-3% **Release factor after on site RMM:** 5E-3% **Local release rate:** 0.015 kg/day **Explanation:** A/B-tabels of European Chemicals Bureau (2003), table A3.11.
Air	Estimated release factor	**Release factor before on site RMM:** 3.75% **Release factor after on site RMM:** 3.75% **Local release rate:** 11.25 kg/day **Explanation:** According to European Chemicals Bureau (2003), table A3.11, it should be 7.5%. However, this figure is believed to be very conservative, as this value is valid for all substances with a vapour pressure of up to 100 Pa (present substance has a vapour pressure of 0.01 Pa at the working temperature of 40oC). The release factor of the EU TGD (2003) (TGD Part II (2003), T A3.11, p. 235f) as a function of vapor pressure shows an almost linear relation between the log10 to the upper value of vapor pressure

Release	Release estimation method	Explanations
		(psat) and release factor to can be established: Release factor = 0.0875*log10(psat)-0.1042. Using this equation and setting the release factor to 50% of 0.075 corresponds to a vapor pressure of 1.6 Pa, which is well above the vapor pressure of TMPeoTA. Therefore, it is considered sufficient conservative to apply a release factor of 0.0375 (3.75%) Conclusion: we suggest to keep the applied release factor of 3.75%, which is considered very conservative. Therefore it is assessed sufficient conservative to apply half this value of 7.5%.
Non agricultural soil	Estimated release factor	**Release factor after on site RMM:** 1E-3% **Explanation:** European Chemicals Bureau (2003), table A3.11

4.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.78. Exposure concentrations and risks for the environment and man via the environment

Protection target	Exposure concentration	Risk quantification
Fresh water	**Local PEC:** 1.31E-4 mg/L	RCR = 0.067
Sediment (freshwater)	**Local PEC:** 2.54E-3 mg/kg dw	RCR = 0.067
Marine water	**Local PEC:** 1.36E-5 mg/L	RCR = 0.07
Sediment (marine water)	**Local PEC:** 2.65E-4 mg/kg dw	RCR = 0.07
Sewage Treatment Plant	**Local PEC:** 9.37E-4 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 2.85E-3 mg/kg dw	RCR = 0.443

4.2. Worker CS 2: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

4.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic	TRA Workers 3.0

	Method
employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.79. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.068 mg/m³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	3.4E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-4 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.3. Worker CS 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. No LEV. Duration of activity: < 8 hours (PROC 3)

4.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0

	Method
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.80. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.061

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form

no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.4. Worker CS 4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions.. With LEV. Duration of activity: < 8 hours (PROC 3)

4.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.81. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.069 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.02 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.02 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.061

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.5. Worker CS 5: Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours. (PROC 4)

4.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.82. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.6. Worker CS 6: Chemical production where opportunity for exposure arises. Duration of activity: < 15 minutes. (PROC 4)

4.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	

	Method
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.83. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.7. Worker CS 7: Chemical production where opportunity for exposure arises. Duration of activity: < 8 hours. (PROC 4)

4.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness	TRA Workers 3.0

	Method
Inhalation: 30%]	
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.84. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.8. Worker CS 8: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 4 hours.

LEV. (PROC 8a)

4.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.85. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.24

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a

chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.9. Worker CS 9: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 15 minutes. (PROC 8a)

4.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.1. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.86. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.10. Worker CS 10: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration of activity: < 4 hours. No LEV. (PROC 8a)

4.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 4 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.87. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.24

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.11. Worker CS 11: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 8 hours. (PROC 8b)

4.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 95%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic	TRA Workers 3.0

	Method
employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.88. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	1.692 mg/m³ (TRA Workers)	RCR = 0.046
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.176

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.12. Worker CS 12: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: 8 hours. No LEV. (PROC 8b)

4.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.89. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.222

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic

DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.13. Worker CS 13: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration of activity: < 15 minutes. (PROC 8b)

4.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 0.25 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.90. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.222

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing

and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.14. Worker CS 14: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 8 hours. (PROC 9)

Transfer of substance/mixture into small containers

4.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.91. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.157

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.15. Worker CS 15: Transfer of substance or mixture into small containers (dedicated filling line, including weighing). Duration of activity < 1 hour. (PROC 9)

Transfer of substance/mixture into small containers

4.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0

	Method
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.92. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.686 mg/kg bw/day (TRA Workers)	RCR = 0.065
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.248

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.16. Worker CS 16: Tabletting, compression, extrusion, pelletisation, granulation. Duration of activity < 8 hours, (PROC 14)

tabletting, compression, extrusion, pelletisation, granulation

4.16.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

	Method
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.93. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers)	RCR = 0.033
Dermal, local, long term	0.05 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.05 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.124

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.17. Worker CS 17: Tabletting, compression, extrusion, pelletisation, granulation. Duration of activity < 1 hour, (PROC 14)

tabletting, compression, extrusion, pelletisation, granulation

4.17.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.17.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.94. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.343 mg/kg bw/day (TRA Workers)	RCR = 0.033
Dermal, local, long term	0.05 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.05 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.216

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are

torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.18. Worker CS 18: Use as laboratory reagent. Duration of activity: < 8 hours. (PROC 15)

4.18.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.18.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.95. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	3.383 mg/m³ (TRA Workers)	RCR = 0.091
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-		RCR = 0.095

Route of exposure and type of effects	Exposure concentration	Risk quantification
term		

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.19. Worker CS 19: Use as laboratory reagent. Duration of activity: < 1 hour. (PROC 15)

4.19.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.11. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.96. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	0.034 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.186

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.20. Worker CS 20: Low energy manipulation of substances bound in materials and/or articles. Duration < 8 hours. Low energy manipulation of substances bound in materials and/or articles (PROC 21)

Low energy manipulation of substances bound in materials and/or articles

4.20.1. Conditions of use

No Conditions of use linked to a main TRA or External tool dataset were defined for this contributing scenario.

4.20.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.97. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3 mg/m³ (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	RCR = 0.081
Dermal, systemic, long term	0.28 mg/kg bw/day (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	RCR = 0.027

Route of exposure and type of effects	Exposure concentration	Risk quantification
Dermal, local, long term	10 mg/cm² (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	Qualitative risk
Dermal, local, acute	10 mg/cm² (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.108

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Additional conditions of use related to the exposure estimate:

• Percentage (w/w) of substance in mixture/article: <= 100 %
• Physical form of the used product: Liquid
• Duration of activity: <= 8 h/day
• Place of use: Indoor
• Operating temperature: <= 60 °C
(*The maximum operating temperature is conservatively set to 60°C. In most situations -however - it will be well below 40°C.*)
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
• Occupational Health and Safety Management System: Advanced
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]
• Respiratory protection: No [Effectiveness Inhalation: 0%]
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.21. Worker CS 21: Low energy manipulation of substances bound in materials and/or articles. Duration < 1 hour. (PROC 21)

Low energy manipulation of substances bound in materials and/or articles

4.21.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	ECETOC TRA Workers 2020

	Method
• Physical form of the used product: Liquid	ECETOC TRA Workers 2020
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	ECETOC TRA Workers 2020
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	ECETOC TRA Workers 2020
Other conditions affecting workers exposure	
• Place of use: Indoor	ECETOC TRA Workers 2020
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	ECETOC TRA Workers 2020

4.21.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.98. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	3 mg/m³ (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	RCR = 0.081
Dermal, systemic, long term	0.28 mg/kg bw/day (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	RCR = 0.027
Dermal, local, long term	10 mg/cm² (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	Qualitative risk
Dermal, local, acute	10 mg/cm² (ECETOC TRA Workers 2020) **Supportive exposure (not used for RC):** (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.108

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Additional conditions of use related to the exposure estimate:

• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]
• Occupational Health and Safety Management System: Advanced
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]
• Respiratory protection: No [Effectiveness Inhalation: 0%]

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber

gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

4.22. Worker CS 22: Maintenance. Modelled using PROC 8a. (PROC 8a, PROC 28)

4.22.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

4.22.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.99. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	6.767 mg/m³ (TRA Workers)	RCR = 0.183
Dermal, systemic, long term	1.371 mg/kg bw/day (TRA Workers)	RCR = 0.131
Dermal, local, long term	0.1 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.1 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.313

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5. Exposure scenario: Widespread use by professional workers - Use by professional worker. PW-1

Environment contributing scenario(s):		
CS 1	Widespread use leading to inclusion into/onto article (indoor)	ERC 8c
Worker contributing scenario(s):		
CS 2	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	PROC 1
CS 3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 8 hours.	PROC 3
CS 4	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour.	PROC 3
CS 5	Mixing or blending in batch processes. Duration < 8 hours.	PROC 5
CS 6	Mixing or blending in batch processe. Duration < 1 hour.	PROC 5
CS 7	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration < 8 hours.	PROC 8a
CS 8	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration < 1 hour.	PROC 8a
CS 9	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration < 8 hours.	PROC 8b
CS 10	Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration < 1 hour.	PROC 8b
CS 11	Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	PROC 9
CS 12	Roller application or brushing. Duration of activity: < 1 hour.	PROC 10
CS 13	Roller application or brushing. Duration of activity: < 1 hour. LEV.	PROC 10
CS 14	Use as laboratory reagent. Duration of activity: < 8 hours.	PROC 15
CS 15	Use as laboratory reagent. Duration of activity: < 1 hour.	PROC 15
CS 16	Maintenance. Modelled using PROC 8a.	PROC 8a, PROC 28

5.1. Env CS 1: Widespread use leading to inclusion into/onto article (indoor) (ERC 8c)

5.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
• Daily local widespread use amount: <= 2.75E-4 tonnes/day
Conditions and measures related to biological sewage treatment plant
• Biological STP: Standard [Effectiveness Water: 87.50%]
Conditions and measures related to external treatment of waste (including article waste)
• Particular considerations on the waste treatment operations

5.1.2. Releases

The local releases to the environment are reported in the following table. Note that the releases reported do not account for the removal in the modelled biological STP.

Table 9.100. Local releases to the environment

Release	Release estimation method	Explanations
Water	Estimated release factor	**Release factor before on site RMM:** 5E-3% **Release factor after on site RMM:** 5E-3% **Local release rate:** 1.38E-5 kg/day **Explanation:** The processes are dry and releases to water is only expected during rinsing of the printer and the surroundings. The material in cartridge printing is assumed to be solid – so releases of dust to the surfaces may take place during operations. All wet cleaning shall be preceded by vacuum cleaning. The value is retrieved for ESD22, p58
Air	Estimated release factor	**Release factor before on site RMM:** 0% **Release factor after on site RMM:** 0% **Explanation:** This emission into air is considered to be very low. The substance will if released into air during the activities very quickly settle on the surfaces (due to the very low vapor pressure) and will be removed primarily by vacuum cleaning and potentially rinsing.
Non agricultural soil	ERC	**Release factor after on site RMM:** 0%

5.1.3. Exposure and risks for the environment and man via the environment

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table. The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 9.101. Exposure concentrations and risks for the environment and man via the environment

Protection target	Exposure concentration	Risk quantification
Fresh water	**Local PEC:** 3.69E-5 mg/L	RCR = 0.019
Sediment (freshwater)	**Local PEC:** 7.18E-4 mg/kg dw	RCR = 0.019
Marine water	**Local PEC:** 4.29E-6 mg/L	RCR = 0.022
Sediment (marine water)	**Local PEC:** 8.35E-5 mg/kg dw	RCR = 0.022
Sewage Treatment Plant	**Local PEC:** 8.59E-7 mg/L	RCR < 0.01
Agricultural soil	**Local PEC:** 1.07E-3 mg/kg dw	RCR = 0.166

5.2. Worker CS 2: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC 1)

5.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	

	Method
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.102. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	0.041 mg/m³ (TRA Workers)	RCR < 0.01
Dermal, systemic, long term	2.04E-3 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-4 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-4 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.3. Worker CS 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes

with equivalent containment conditions. Duration of activity: < 8 hours. (PROC 3)

5.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.103. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.436 mg/m³ (TRA Workers)	RCR = 0.066
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.012 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.012 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.07

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are

torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.4. Worker CS 4: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions. Duration of activity: < 1 hour. (PROC 3)

5.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.104. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	2.436 mg/m³ (TRA Workers)	RCR = 0.066
Dermal, systemic, long term	0.041 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	0.012 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.012 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.07

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.5. Worker CS 5: Mixing or blending in batch processes. Duration < 8 hours. (PROC 5)

Mixing or blending in batch processes

5.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations -*	TRA Workers 3.0

	Method
however - it will be well below 40°C.	

5.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.105. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	8.12 mg/m³ (TRA Workers)	RCR = 0.219
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.298

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.6. Worker CS 6: Mixing or blending in batch processe. Duration < 1 hour. (PROC 5)

Mixing or blending in batch processes

5.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0

	Method
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.106. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	8.12 mg/m³ (TRA Workers)	RCR = 0.219
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.298

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.7. Worker CS 7: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration < 8 hours. (PROC 8a)

Transfer of substance/mixture in non-dedicated equipment

5.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.107. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.133

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.

Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.8. Worker CS 8: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities. Duration < 1 hour. (PROC 8a)

Transfer of substance/mixture in non-dedicated equipment

5.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.108. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.9. Worker CS 9: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration < 8 hours. (PROC 8b)

Transfer of substance/mixture in dedicated equipment

5.9.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 90%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.1. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.109. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.188

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.10. Worker CS 10: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]. Duration < 1 hour. (PROC 8b)

Transfer of substance/mixture in dedicated equipment

5.10.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0

	Method
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.10.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.110. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	8.12 mg/m³ (TRA Workers)	RCR = 0.219
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.298

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.11. Worker CS 11: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC 9)

5.11.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0

	Method
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.11.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.111. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	8.12 mg/m³ (TRA Workers)	RCR = 0.219
Dermal, systemic, long term	0.412 mg/kg bw/day (TRA Workers)	RCR = 0.039
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.259

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic

DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.12. Worker CS 12: Roller application or brushing. Duration of activity: < 1 hour. (PROC 10)

5.12.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.12.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.112. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers)	RCR = 0.157
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.212

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in

the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.13. Worker CS 13: Roller application or brushing. Duration of activity: < 1 hour. LEV. (PROC 10)

5.13.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.13.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.113. Exposure concentrations and risks for workers

Route of exposure and type of effects	**Exposure concentration**	**Risk quantification**
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	1.646 mg/kg bw/day (TRA Workers)	RCR = 0.157
Dermal, local, long term	0.12 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.12 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Exposure concentration	Risk quantification
Combined routes, systemic, long-term		RCR = 0.266

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.14. Worker CS 14: Use as laboratory reagent. Duration of activity: < 8 hours. (PROC 15)

5.14.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.14.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.114. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.112

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.15. Worker CS 15: Use as laboratory reagent. Duration of activity: < 1 hour. (PROC 15)

5.15.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 1 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: No [Effectiveness Inhalation: 0%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Respiratory protection: No [Effectiveness Inhalation: 0%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.15.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.115. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	4.06 mg/m³ (TRA Workers)	RCR = 0.11
Dermal, systemic, long term	0.02 mg/kg bw/day (TRA Workers)	RCR < 0.01
Dermal, local, long term	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	5.95E-3 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.112

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.
Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

5.16. Worker CS 16: Maintenance. Modelled using PROC 8a. (PROC 8a, PROC 28)

5.16.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 25 %	TRA Workers 3.0

	Method
• Physical form of the used product: Liquid	TRA Workers 3.0
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
Technical and organisational conditions and measures	
• General ventilation: Good general ventilation (3-5 air changes per hour) [Effectiveness Inhalation: 30%]	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Local exhaust ventilation: Yes (TRA effectiveness) [Effectiveness Inhalation: 80%, Dermal: 0%]	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Respiratory protection: Yes (Respirator with APF of 10) [Effectiveness Inhalation: 90%]	TRA Workers 3.0
• Dermal protection: Yes (Chemically resistant gloves conforming to EN374 with basic employee training) and (other) appropriate dermal protection [Effectiveness Dermal: 90%]	TRA Workers 3.0
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 60 °C *The maximum operating temperature is conservatively set to 60°C. In most situations - however - it will be well below 40°C.*	TRA Workers 3.0

5.16.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.116. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk quantification
Inhalation, systemic, long term	2.03 mg/m³ (TRA Workers)	RCR = 0.055
Dermal, systemic, long term	0.823 mg/kg bw/day (TRA Workers)	RCR = 0.078
Dermal, local, long term	0.06 mg/cm² (TRA Workers)	Qualitative risk
Dermal, local, acute	0.06 mg/cm² (TRA Workers)	Qualitative risk
Combined routes, systemic, long-term		RCR = 0.133

Remarks on exposure dataset obtained with ECETOC TRA

Explanation: The vapor pressure at 60oC is well below 100 Pa, so a very conservative value is applied
The vapour pressure at operating temperature (60°C) used for the calculation is 100 Pa (set by the assessor).

Risk characterisation

Qualitative risk characterisation (Dermal, local, long term , Dermal, local, acute, Eye, local):
Working with this substance requires stringent use of appropriate chemical resistant gloves, protective clothing and suitable eye protection, if any skin/eye contact is foreseen. Gloves should adhere to EN374. For example, in the case of short-term contact time with TMPeoTA, i.e. up to 1/2 hr. maximum, medium (~0.4mm) nitrile rubber gloves or thick (>0.7mm) butyl rubber gloves may be used. Gloves must be replaced immediately, if they are torn or change appearance. Additionally, depending on the activity, aprons, protecting boots, and/or a chemical-protection suit (according to DIN-EN14605) must be worn.
Eye protection should be used at any possible contact.
Workers should receive a task specific training on how to use the protective equipment and the correct use of it needs to be supervised. Besides that, workers should be warned to avoid skin and eye contact, to wash off any skin contamination immediately and thoroughly with soap and water, and to report skin/eye problems that may develop. Taking these measures into account, the intensity of exposure is considered to be very low.

Local respiratory irritation is expected to be low. Furthermore, as the substance is marketed in a non-solid form no dust formation is expected. Therefore, no respiratory DNEL for local effects was derived. The systemic DNEL for inhalation is assessed also to ensure safe use with respect to local respiratory effects.

6. Exposure scenario: Service life (consumers) – Fully cured coatings and inks_consumer

Environment contributing scenario(s):		
CS 1	Service life use of fully cured coatings and inks	ERC10a; ERC11a;
Consumer contributing scenario(s):		
CS 2	Potential contact with fully cured coatings and inks	AC 0
Workers contributing scenario(s):		
CS 3	Potential contact with fully cured coatings and inks	PROC 0

6.1. Env CS 1: Fully cured coatings and inks (ERC10a; ERC11a;)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

6.2. Cons CS 2: Fully cured coatings and inks (AC 0)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

6.3. Workers CS 3: Fully cured coatings and inks (AC 0)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

Remark: Measurements for migration have been done and results are attached in IUCLID in Section 3.5.6.

7. Exposure scenario: Service life (consumers) – Fully cured coatings and inks_industrial

Environment contributing scenario(s):		
CS 1	Service life use of fully cured coatings and inks	ERC12a; ERC12c
Consumer contributing scenario(s):		
CS 2	Potential contact with fully cured coatings and inks	AC 0
Workers contributing scenario(s):		
CS 3	Potential contact with fully cured coatings and inks	PROC 0

7.1. Env CS 1: Fully cured coatings and inks (ERC12a; ERC12c)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

7.2. Cons CS 2: Fully cured coatings and inks (AC 0)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

7.3. Workers CS 3: Fully cured coatings and inks (AC 0)

This scenario has not been calculated. Justification	In accordance to the Article 14 (2a-f) of the REACh Regulation (EC) No 1907/2006, exposure estimation and risk characterisation needs not to be performed if the substance in a preparation is less than 0.1%

Remark: Measurements for migration have been done and results are attached in IUCLID in Section 3.5.6.

10. RISK CHARACTERISATION RELATED TO COMBINED EXPOSURE

10.1. Human health

10.1.1. Workers

10.1.2. Consumer

10.2. Environment (combined for all emission sources)

10.2.1. All uses (regional scale)

10.2.1.1. Total releases

The total releases to the environment from all the exposure scenarios covered are presented in the table below. This is the sum of the releases to the environments from all exposure scenarios addressed.

Table 10.1. Total releases to the environment per year from all life cycle stages

Release route	Total releases per year
Water	199 kg/year
Air	3.75E4 kg/year
Soil	1.66E4 kg/year

10.2.2. Regional assessment

The regional predicted environmental concentration (PEC regional) and the related risk characterisation ratios when a PNEC is available are presented in the table below. The exposure to man via the environment from regional exposure and the related risk characterisation ratios are also provided (when relevant). The exposure concentration for human via inhalation is equal to the PEC air.
The exposure estimates have been obtained with EUSES 2.1.2 unless stated otherwise.

Table 10.2. Predicted regional exposure concentrations (Regional PEC) and risks for the environment

Protection target	Regional PEC	Risk characterisation
Fresh water	**Regional PEC:** 3.68E-5 mg/L	RCR = 0.019
Sediment (freshwater)	**Regional PEC:** 6.8E-4 mg/kg dw	RCR = 0.018
Marine water	**Regional PEC:** 4.28E-6 mg/L	RCR = 0.022
Sediment (marine water)	**Regional PEC:** 7.43E-5 mg/kg dw	RCR = 0.02
Agricultural soil	**Regional PEC:** 1.07E-3 mg/kg dw	RCR = 0.166

10.2.3. Local exposure due to all widespread uses

Not relevant as there are not several widespread uses covered in this CSR.