SICHERHEITSDATENBLATT

Dieses Sicherheitsdatenblatt wurde gemäß folgenden Anforderungen erstellt:
Verordnung (EG) Nr. 1907/2006 und Verordnung (EC) Nr. 1272/2008

Überarbeitet am 10-Apr-2024 **Revisionsnummer** 1

ABSCHNITT 1: Bezeichnung des Stoffs beziehungsweise des Gemischs und des Unternehmens

1.1. Produktidentifikator

Produktbezeichnung GENOMER* 3365

Eindeutiger Rezepturidentifikator (UFI) U450-Q03A-800A-RJFN

Synonyme Modified polyetherpolyol acrylate

Reiner Stoff/reines Gemisch Gemisch

1.2. Relevante identifizierte Verwendungen des Stoffs oder Gemischs und Verwendungen, von denen abgeraten wird

Verwendung des Stoffes / des Gemisches
Bindemittel für radikalisch härtende Farben, Lacke, Klebstoffe etc.

Empfohlene Verwendung Es liegen keine Informationen vor

Verwendungen, von denen abgeraten wird Es liegen keine Informationen vor

Sonstige Angaben Nur zur industriellen Verwendung

1.3. Einzelheiten zum Lieferanten, der das Sicherheitsdatenblatt bereitstellt

Lieferant
RAHN AG
Dörflistrasse 120
8050 Zürich
Switzerland

Weitere Informationen siehe

Kontaktstelle	Regulatory Affairs Department
E-Mail-Adresse	SDSENC@rahn-group.com
Telefonnummer, wenn kein Notfall vorliegt	+41 44 315 42 00

1.4. Notrufnummer

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

ABSCHNITT 2: Mögliche Gefahren

2.1. Einstufung des Stoffs oder Gemischs

Verordnung (EG) Nr. 1272/2008

Schwere Augenschädigung/Augenreizung	Kategorie 2 - (H319)
Sensibilisierung der Haut	Kategorie 1 - (H317)
Chronische aquatische Toxizität	Kategorie 3 - (H412)

2.2. Kennzeichnungselemente

Enthält Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure

Signalwort
Achtung

Gefahrenhinweise
H317 - Kann allergische Hautreaktionen verursachen
H319 - Verursacht schwere Augenreizung
H412 - Schädlich für Wasserorganismen, mit langfristiger Wirkung

Sicherheitshinweise - Verordnung (EG) §28, Nr. 1272/2008
P261 - Einatmen von Staub/Rauch/Gas/Nebel/Dampf/Aerosol vermeiden
P280 - Schutzhandschuhe/Schutz-kleidung/Augenschutz/Gesichtsschutz tragen
P333 + P313 - Bei Hautreizung oder -ausschlag: Ärztlichen Rat einholen/ärztliche Hilfe hinzuziehen
P337 + P313 - Bei anhaltender Augenreizung: Ärztlichen Rat einholen/ärztliche Hilfe hinzuziehen
P362 + P364 - Kontaminierte Kleidung ausziehen und vor erneutem Tragen waschen
P501 - Inhalt/Behälter der Entsorgung gemäß lokalen, regionalen, nationalen und internationalen Vorschriften zuführen

2.3. Sonstige Gefahren

Es liegen keine Informationen vor.

ABSCHNITT 3: Zusammensetzung / Angaben zu Bestandteilen

3.2 Gemische

Chemische Bezeichnung	CAS-Nr	REACH-Registrierungsnummer	EG-Nr:	Einstufung gemäß Verordnung (EG) Nr. 1272/2008 [CLP]	Specific concentration limit (SCL)	M-Faktor	M-Faktor (langfristig)
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure 50 - 90 %	28961-43-5	01-2119489900-30-XXXX	500-066-5	Skin Sens. 1 (H317) Eye Irrit. 2 (H319) Aquatic Chronic 3 (H412)		-	-

Wortlaut der H- und EUH-Sätze siehe unter Abschnitt 16

Schätzung der akuten Toxizität
Siehe Abschnitt 11.1

Dieses Produkt enthält keine meldepflichtige Eu-gelisteten besonders besorgnis erregende Stoffe (SVHC) in einer Konzentration von >=0,1% (Verordnung (EG) Nr. 1907/2006 (REACH), Artikel 59)

ABSCHNITT 4: Erste-Hilfe-Maßnahmen

4.1 Beschreibung der Erste-Hilfe-Maßnahmen

Allgemeine Empfehlung Dieses Sicherheitsdatenblatt ist dem behandelnden Arzt vorzuzeigen.

Einatmen An die frische Luft bringen.

Augenkontakt Sofort gründlich mit viel Wasser mindestens 15 Minuten lang ausspülen, auch unter den Augenlidern. Eventuell Vorhandene Kontaktlinsen nach Möglichkeit entfernen. Weiter ausspülen. Augen während des Ausspülens weit geöffnet halten. Betroffenen Bereich nicht reiben. Bei entstehender, anhaltender Reizung einen Arzt aufsuchen.

Hautkontakt Direkte Sonnen- / UV- Lichtstrahlen vermeiden. Mit Wasser und Seife waschen. Kann

	allergische Hautreaktionen verursachen. Bei Hautreizungen oder allergischen Reaktionen einen Arzt hinzuziehen.
Verschlucken	Mund ausspülen. Niemals einer bewusstlosen Person Wasser geben. KEIN Erbrechen herbeiführen. Einen Arzt rufen.
Selbstschutz des Ersthelfers	Berührung mit Haut, Augen und Kleidung vermeiden. Persönliche Schutzkleidung tragen (siehe Kapitel 8).

4.2. Wichtigste akute und verzögert auftretende Symptome und Wirkungen

Symptome	Juckreiz. Hautausschläge. Nesselausschlag. Kann Rötung und tränende Augen verursachen. Brenngefühl.

4.3. Hinweise auf ärztliche Soforthilfe oder Spezialbehandlung

Hinweis an den Arzt	Kann bei anfälligen Personen Sensibilisierung verursachen. Symptomatische Behandlung.

ABSCHNITT 5: Maßnahmen zur Brandbekämpfung

5.1. Löschmittel

Geeignete Löschmittel	Brandbekämpfungsmaßnahmen einsetzen, die an die örtlichen Gegebenheiten und das Umfeld angepasst sind.
Kleiner Brand	Trockenlöschmittel, CO2 oder Wasserspray.
Großbrand	Alkoholbeständiger Schaum. Sprühwasser.
Ungeeignete Löschmittel	Wasservollstrahl.

5.2. Besondere vom Stoff oder Gemisch ausgehende Gefahren

Besondere Gefahren, die von dem Stoff ausgehen	Das Produkt ist oder enthält einen Sensibilisator. Sensibilisierung durch Hautkontakt möglich.

5.3. Hinweise für die Brandbekämpfung

Spezielle Schutzausrüstung und Vorsichtsmaßnahmen für zur Brandbekämpfung	Löschtrupps müssen umgebungsluftunabhängige Atemschutzgeräte und vollständige Einsatzkleidung tragen. Persönliche Schutzausrüstung verwenden.

ABSCHNITT 6: Maßnahmen bei unbeabsichtigter Freisetzung

6.1. Personenbezogene Vorsichtsmaßnahmen, Schutzausrüstungen und in Notfällen anzuwendende Verfahren

Personenbezogene Vorsichtsmaßnahmen	Berührung mit Haut, Augen und Kleidung vermeiden. Ausreichende Belüftung sicherstellen. Vorgeschriebene persönliche Schutzausrüstung verwenden. Mitarbeiter in sichere Bereiche evakuieren. Personen vom Verschütteten/der Leckage fernhalten und auf windzugewandte Seite schicken.
Sonstige Angaben	Siehe Schutzmaßnahmen, die in den Abschnitten 7 und 8 aufgeführt sind.
Einsatzkräfte	In Abschnitt 8 empfohlene persönliche Schutzausrüstung verwenden.

6.2. Umweltschutzmaßnahmen

Umweltschutzmaßnahmen	Nicht in die Kanalisation oder Gewässer einleiten. Siehe Abschnitt 12 für zusätzliche umweltbezogene Angaben.

6.3. Methoden und Material für Rückhaltung und Reinigung

Methoden für Rückhaltung	Weitere Leckagen oder Verschütten vermeiden, wenn gefahrlos möglich.
Verfahren zur Reinigung	Mechanisch aufnehmen und in geeigneten Behältern zur Entsorgung bringen.

Vermeidung sekundärer Gefahren Verschmutzte Gegenstände und Flächen unter Beachtung der Umweltvorschriften gründlich reinigen.

6.4. Verweis auf andere Abschnitte

Verweis auf andere Abschnitte Weitere Informationen finden Sie in Abschnitt 7. Weitere Informationen finden Sie in Abschnitt 8. Weitere Informationen finden Sie in Abschnitt 13.

ABSCHNITT 7: Handhabung und Lagerung

7.1. Schutzmaßnahmen zur sicheren Handhabung

Hinweise zum sicheren Umgang Mit einer guten Arbeitshygiene und Sicherheitstechnik handhaben. Berührung mit Haut, Augen und Kleidung vermeiden. Ausreichende Belüftung sicherstellen. Bei unzureichender Belüftung Atemschutzgerät anlegen. Bei Gebrauch nicht essen, trinken oder rauchen. Kontaminierte Kleidung ausziehen und vor erneutem Tragen waschen.

Allgemeine Hygienevorschriften Berührung mit Haut, Augen und Kleidung vermeiden. Bei der Arbeit geeignete Schutzhandschuhe und Schutzbrille/Gesichtsschutz tragen. Bei Gebrauch nicht essen, trinken oder rauchen.

7.2. Bedingungen zur sicheren Lagerung unter Berücksichtigung von Unverträglichkeiten

Lagerbedingungen Nicht bei Temperaturen über 40 °C (104 °F) lagern. Behälter gut verschlossen halten und an einem trockenen, kühlen und gut belüfteten Ort lagern. Darf nicht in die Hände von Kindern gelangen. Unter Verschluss aufbewahren. Von Hitze fernhalten. Vor Sonnenbestrahlung geschützt an einem gut belüfteten Ort aufbewahren.

7.3. Spezifische Endanwendungen

Risikomanagementmaßnahmen (RMM) Die erforderlichen Informationen werden in diesem Sicherheitsdatenblatt bereitgestellt.

ABSCHNITT 8: Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen

8.1. Zu überwachende Parameter

Expositionsgrenzen Dieses Produkt enthält, wie geliefert, keine gesundheitsschädlichen Stoffe mit Arbeitsplatzgrenzwerten, die durch die für die Region verantwortliche Behörde festgelegt wurden.

Biologische Arbeitsplatzgrenzwerte Dieses Produktes enthält im Lieferzustand keine gefährlichen Materialien mit biologischen Grenzwerten, die durch die länderspezifischen Regulierungsstellen festgesetzt wurden.

Abgeleitete Expositionshöhe ohne Beeinträchtigung (Derived No Effect Level) Es liegen keine Informationen vor.

Abgeschätzte Nicht-Effekt-Konzentration (PNEC, predicted no effect concentration) Es liegen keine Informationen vor.

8.2. Begrenzung und Überwachung der Exposition

Persönliche Schutzausrüstung

Augen-/Gesichtsschutz Schutzbrille mit Seitenschild (oder Schutzbrille) tragen.

Handschutz Handschuhe sollten regelmäßig und bei Anzeichen einer Beschädigung des Handschuhmaterials ausgetauscht werden. Geeignete Schutzhandschuhe tragen. Nitril-Kautschuk.

Haut- und Körperschutz Bei der Arbeit geeignete Schutzkleidung tragen.

Atemschutz Bei normalen Verwendungsbedingungen ist keine Schutzausrüstung erforderlich. Bei Überschreitung der Expositionsgrenzen oder bei auftretender Reizung kann Belüftung und Evakuierung erforderlich sein.

Allgemeine Hygienevorschriften Berührung mit Haut, Augen und Kleidung vermeiden. Bei der Arbeit geeignete Schutzhandschuhe und Schutzbrille/Gesichtsschutz tragen. Bei Gebrauch nicht essen, trinken oder rauchen.

Begrenzung und Überwachung der Umweltexposition Es liegen keine Informationen vor.

ABSCHNITT 9: Physikalische und chemische Eigenschaften

9.1. Angaben zu den grundlegenden physikalischen und chemischen Eigenschaften

Aussehen

Physikalischer Zustand	Flüssigkeit
Farbe	farblos
Geruch	Amine-like

Eigenschaft	Werte	Bemerkungen • Methode
Schmelzpunkt / Gefrierpunkt	Keine Daten verfügbar	
Siedepunkt / Siedebereich	Keine Daten verfügbar	
Entzündbarkeit (fest, gasförmig)	Keine Daten verfügbar	
Entzündlichkeitsgrenzwert in der Luft		
Obere Entzündbarkeits- oder Explosionsgrenze	Keine Daten verfügbar	
Untere Entzündbarkeits- oder Explosionsgrenze	Keine Daten verfügbar	
Flammpunkt	> 100 °C	
Selbstentzündungstemperatur	Es liegen keine Informationen vor	Produkt ist nicht selbstentzündlich.
Zersetzungstemperatur	Keine Daten verfügbar	
pH-Wert	Keine Daten verfügbar	
pH (als wässrige Lösung)	Keine Daten verfügbar	
Viskosität, kinematisch	Keine Daten verfügbar	
Dynamische Viskosität	100 - 200 mPas @ 25°C	
Wasserlöslichkeit	Keine Daten verfügbar	
Löslichkeit(en)	Keine Daten verfügbar	
Verteilungskoeffizient	Keine Daten verfügbar	
Dampfdruck	Keine Daten verfügbar	
Relative Dichte		
Schüttdichte	Keine Daten verfügbar	
Flüssigkeitsdichte	Keine Daten verfügbar	
Dampfdichte	Keine Daten verfügbar	
Partikeleigenschaften		
Partikelgröße	Es liegen keine Informationen vor	
Partikelgrößenverteilung	Es liegen keine Informationen vor	
Oberflächenspannung	Keine Daten verfügbar	

9.2. Sonstige Angaben

9.2.1. Angaben zu physikalischen Gefahrenklassen
Nicht zutreffend

9.2.2. Andere Sicherheitsmerkmale
Es liegen keine Informationen vor

ABSCHNITT 10: Stabilität und Reaktivität

10.1. Reaktivität

Reaktivität Es liegen keine Informationen vor.

10.2. Chemische Stabilität

Stabilität Unter normalen Bedingungen stabil.

Explosionsdaten

Empfindlichkeit gegenüber mechanischer Einwirkung Keine.

Empfindlichkeit gegenüber statischer Entladung Keine.

10.3. Möglichkeit gefährlicher Reaktionen

Möglichkeit gefährlicher Reaktionen Keine bekannten gefährlichen Reaktionen.

10.4. Zu vermeidende Bedingungen

Zu vermeidende Bedingungen Von Zündquellen fernhalten - Nicht rauchen. Polymerisation unter Einwirkung von weissem Licht, ultraviolettem Licht oder Hitze. UV-Einstrahlung/Sonnenlicht.

10.5. Unverträgliche Materialien

Unverträgliche Materialien Vor radikalbildenden Initiatoren, Peroxiden, stark alkalischen Stoffen, sowie reaktiven Metallen fernhalten, um exotherme Polymerisationsreaktionen zu vermeiden.

10.6. Gefährliche Zersetzungsprodukte

Gefährliche Zersetzungsprodukte Nach vorliegenden Informationen keine bekannt.

ABSCHNITT 11: Toxikologische Angaben

11.1. Angaben zu Gefahrenklassen gemäß Verordnung (EG) Nr. 1272/2008

Angaben zu wahrscheinlichen Expositionswegen

Produktinformationen

Einatmen Kann zu einer Reizung der Augen und der Atemwege führen.

Augenkontakt Verursacht schwere Augenreizung. Kann Rötung, Juckreiz und Schmerzen verursachen.

Hautkontakt Sensibilisierung durch Hautkontakt möglich. Wiederholte oder langandauernde Exposition der Haut kann bei anfälligen Personen allergische Reaktionen hervorrufen. Kann Reizungen verursachen. Langandauernder Kontakt kann Rötung und Reizung verursachen.

Verschlucken Verschlucken kann zu gastrointestinalen Irritationen, Übelkeit, Erbrechen und Diarrhö führen.

Symptome im Zusammenhang mit den physikalischen, chemischen und toxikologischen Eigenschaften

Symptome Juckreiz. Hautausschläge. Nesselausschlag. Kann Rötung und tränende Augen verursachen.

Akute Toxizität

Toxizitätskennzahl

Die folgenden Werte werden auf der Basis von Kapitel 3.1 des GHS-Dokuments berechnet

ATEmix (oral) 3,089.60 mg/kg

ATEmix (dermal) 20,380.80 mg/kg

0 Prozent des Gemisches bestehen aus einem oder mehreren Bestandteilen unbekannter akuter oraler Toxizität.

Angaben zu den Bestandteilen
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)

Methode	OECD-Test-Nr. 401: Akute orale Toxizität
Spezies	Ratte
Expositionsweg	Sondenernährung
Ergebnisse	LD50 > 2000 mg/kg bw

Methode	Not Specified
Spezies	Kaninchen
Expositionsweg	Dermal
Ergebnisse	LD50 > 13'200 mg/kg bw

Angaben zu den Bestandteilen

Chemische Bezeichnung	LD50 oral	LD50 dermal	LC50 Einatmen
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure	> 2000 mg/kg bw (Rat)	> 13'200 mg/kg bw (Rabbit)	-

Verzögert und sofort auftretende Wirkungen sowie chronische Wirkungen nach kurzer oder lang anhaltender Exposition

Ätz-/Reizwirkung auf die Haut Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	OECD-Test-Nr. 404: Akute dermale Reizung/Ätzung
Spezies	Kaninchen
Expositionsweg	Dermal
Effektive Dosis	0.5 mL
Expositionszeit	4 Stunden
Ergebnisse	Nicht reizend

Schwere Augenschädigung/Augenreizung Verursacht schwere Augenreizung.

Angaben zu den Bestandteilen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	OECD-Test-Nr. 405: Akute Augenreizung/Ätzung
Spezies	Kaninchen
Expositionsweg	Augen
Effektive Dosis	0.1 mL
Ergebnisse	Reizend

Sensibilisierung der Atemwege oder der Haut Kann allergische Hautreaktionen verursachen.

Angaben zu den Bestandteilen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	OECD-Test-Nr. 406: Sensibilisierung der Haut
Spezies	Meerschweinchen
Expositionsweg	Dermal
Ergebnisse	Sensibilisierend

Keimzell-Mutagenität Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

Angaben zu den Bestandteilen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	OECD Test-Nr. 474: Erythrozyten-Mikrokerntest bei Säugetieren
Spezies	in vivo
Ergebnisse	Nicht mutagen

Methode	OECD-Test-Nr. 476: Mutagenität - In-vitro-Test auf Chromosomenaberrationen in Säugetierzellen
Spezies	in-vitro
Ergebnisse	inconclusive

Methode	OECD-Test-Nr. 471: Rückmutationstest unter Verwendung von Bakterien
Spezies	in-vitro
Ergebnisse	Nicht mutagen

Karzinogenität Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

Reproduktionstoxizität Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

Angaben zu den Bestandteilen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	Read Across from result of OECD 414 study with CAS 42978-66-5
Spezies	Ratte
Expositionsweg	Oral / Dermal
Expositionszeit	max. 52 Tage
Ergebnisse	NOAEL = 750 mg/kg bw/day (Fertility) NOAEL = 1000 mg/kg bw/day (Teratogenicity)

Methode	Read Across from result of OECD 443 study with CAS 42978-66-5
Spezies	Ratte
Expositionsweg	Oral Sondenernährung
Expositionszeit	max. 90 Tage
Ergebnisse	NOAEL = > 100 mg/kg bw/day

STOT - einmaliger Exposition Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

STOT - wiederholter Exposition Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

Angaben zu den Bestandteilen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)	
Methode	OECD-Test-Nr. 408: 90-Tage-Toxizitätsstudie bei Wiederholter Oraler Verabreichung an Nagetieren
Spezies	Ratte
Expositionsweg	Oral Sondenernährung
Expositionszeit	90 Tage
Ergebnisse	NOAEL = 150 mg/kg bw/day (local) NOAEL = 375 mg/kg bw/day (systemic)

Aspirationsgefahr Auf Basis der verfügbaren Daten sind die Kriterien für eine Einstufung nicht erfüllt.

11.2. Informationen zu anderen Gefahren

11.2.1. Endokrin disruptive Eigenschaften

Endokrin disruptive Eigenschaften Es liegen keine Informationen vor.

11.2.2. Sonstige Angaben

Andere schädliche Wirkungen Es liegen keine Informationen vor.

ABSCHNITT 12: Umweltbezogene Angaben

12.1. Toxizität

Ökotoxizität Schädlich für Wasserorganismen, mit langfristiger Wirkung.

Unbekannte aquatische Toxizität Enthält 0 % Bestandteile mit unbekannter Gewässergefährdung.

Chemische Bezeichnung	Algen/Wasserpflanzen	Fische	Toxizität gegenüber	Krebstiere

			Mikroorganismen	
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure	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. Persistenz und Abbaubarkeit

Persistenz und Abbaubarkeit Es liegen keine Informationen vor.

Angaben zu den Bestandteilen			
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure (28961-43-5)			
Methode	Expositionszeit	Wert	Ergebnisse
OECD-Test-Nr. 301B: Leichte biologische Abbaubarkeit: CO2-Entwicklungstest (TG 301 B)	28 Tage	Bioabbaubarkeit : 60% (after 28 days)	Leicht biologisch abbaubar

12.3. Bioakkumulationspotenzial

Bioakkumulation

Angaben zu den Bestandteilen

Chemische Bezeichnung	Verteilungskoeffizient
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure	Log Pow = 2.89

12.4. Mobilität im Boden

Mobilität im Boden Es liegen keine Informationen vor.

12.5. Ergebnisse der PBT- und vPvB-Beurteilung

Ergebnisse der PBT- und vPvB-Bewertung

Chemische Bezeichnung	Ergebnisse der PBT- und vPvB-Bewertung
Propylidintrimethanol, ethoxyliert, Ester mit Acrylsäure	Der Stoff ist kein PBT- / vPvB

12.6. Andere schädliche Wirkungen

Endokrin disruptive Eigenschaften Es liegen keine Informationen vor.

12.7. Andere schädliche Wirkungen

Es liegen keine Informationen vor.

ABSCHNITT 13: Hinweise zur Entsorgung

13.1. Verfahren zur Abfallbehandlung

Abfall aus Rückständen/nicht verwendeten Produkten Kann auf Mülldeponie oder der Verbrennungsanlage gemäß den lokalen Vorschriften entsorgt werden.

Kontaminierte Verpackung Die Verpackung kann nach Reinigung wiederverwendet oder stofflich verwertet werden.

Abfallschlüssel / Abfallbezeichnungen gemäß EAK / AVV 08 01 99.

Sonstige Angaben Nicht in die Kanalisation gelangen lassen.

ABSCHNITT 14: Angaben zum Transport

IATA

14.1 UN-Nummer oder ID-Nummer Nicht reguliert

14.2 Ordnungsgemäße UN-Versandbezeichnung Nicht reguliert

14.3 Transportgefahrenklassen Nicht reguliert
14.4 Verpackungsgruppe Nicht reguliert
14.5 Umweltgefahren Nicht zutreffend
14.6 Besondere Vorsichtsmaßnahmen für den Verwender

IMDG
14.1 UN-Nummer oder ID-Nummer Nicht reguliert
14.2 Ordnungsgemäße UN-Versandbezeichnung Nicht reguliert
14.3 Transportgefahrenklassen Nicht reguliert
14.4 Verpackungsgruppe Nicht reguliert
14.5 Meeresschadstoff Nicht zutreffend
Umweltgefahren Nicht zutreffend
14.6 Besondere Vorsichtsmaßnahmen für den Verwender
14.7 Massengutbeförderung auf dem Seeweg gemäß IMO-Instrumenten Es liegen keine Informationen vor

ADR
14.1 UN-Nummer oder ID-Nummer Nicht reguliert
14.2 Ordnungsgemäße UN-Versandbezeichnung Nicht reguliert
14.3 Transportgefahrenklassen Nicht reguliert
14.4 Verpackungsgruppe Nicht reguliert
14.5 Umweltgefahren Nicht zutreffend
14.6 Besondere Vorsichtsmaßnahmen für den Verwender

ABSCHNITT 15: Rechtsvorschriften

15.1. Vorschriften zu Sicherheit, Gesundheits- und Umweltschutz/spezifische Rechtsvorschriften für den Stoff oder das Gemisch

Nationale Vorschriften

Deutschland
Wassergefährdungsklasse (WGK) Wassergefährdungsklasse = 2 (Selbsteinstufung)

Europäische Union
Richtlinie 98/24/EG für den Schutz von Gesundheit und Sicherheit der Arbeitnehmer gegen Gefährdung durch chemische Arbeitsstoffe bei der Arbeit beachten.

Genehmigungen und/oder Verwendungsbeschränkungen:
Dieses Produkt enthält keine Stoffe (Verordnung Nr. 1907/2006 (REACH), Anhang XVII) in Konzentrationen von 0.1 % oder mehr, die Beschränkungen unterliegen. Dieses Produkt enthält keine zulassungspflichtigen Stoffe (Verordnung Nr. 1907/2006 (REACH), Anhang XIV) in Konzentrationen von 0.1 % oder mehr.

Persistente organische Schadstoffe
Nicht zutreffend

Verordnung zu ozonzonabbauenden Stoffen (EG) Nr. 1005/2009
Nicht zutreffend

Chemical Weapons Convention (CWC)
Dieses Produkt enthält keine Chemikalien, die unter die Chemiewaffenkonvention fallen.

Internationale

Bestandsverzeichnisse

TSCA	Alle Bestandteile dieses Produktes sind entweder im U.S. TSCA Chemical Inventory gelistet oder sie sind von der Verpflichtung einer Listung im U.S. TSCA Chemical Inventory ausgenommen.
DSL/NDSL	Alle Bestandteile dieses Produktes sind entweder in der Canadian Domestic Substances List (DSL) gelistet oder sie sind von der Verpflichtung einer Listung im DSL ausgenommen.
REACH	Registriert. Nicht-EU-Kunden bitte vor einem Import in die EU RAHN kontaktieren

Legende:

TSCA - US-amerikanisches Gefahrstoff-Überwachungsgesetz Abschnitt 8(b) Bestandsverzeichnis
DSL/NDSL - Kanadische Entsprechung der europäischen Altstoffliste/Kanadische Liste mit Stoffen, die nur im Ausland auf dem Markt sind
REACH - Registration, Evaluation, Authorization and Restriction of Chemicals

15.2. Stoffsicherheitsbeurteilung

Stoffsicherheitsbericht Eine Stoffsicherheitsbeurteilung wurde nicht durchgeführt

ABSCHNITT 16: Sonstige Angaben

Schlüssel oder Legende für im Sicherheitsdatenblatt verwendete Abkürzungen und Akronyme

Wortlaut der H-Sätze, auf die in Abschnitt 3 Bezug genommen wird
H317 - Kann allergische Hautreaktionen verursachen
H319 - Verursacht schwere Augenreizung
H412 - Schädlich für Wasserorganismen, mit langfristiger Wirkung

Hergestellt durch Regulatory Affairs ENC

Hinweis zur Überarbeitung Es liegen keine Informationen vor.

Überarbeitet am 10-Apr-2024

Dieses Materialsicherheitsdatenblatt entspricht den Anforderungen der Vorschrift (EU) Nr. 1907/2006
Haftungssauschluss
Die Angaben stützen sich auf den heutigen Stand unserer Kenntnisse und sollen unsere Produkte im Hinblick auf Sicherheitserfordernisse beschreiben. Sie haben keineswegs die Bedeutung einer Garantie für eine besondere Beschaffenheit der Sache und sind auch nicht als blosse Vereinbarung der Beschaffenheit zu verstehen. Es obliegt dem Verwender, selbst zu prüfen, ob das Produkt für das beabsichtigte Einsatzgebiet und den jeweiligen Verwendungszweck geeignet ist. Eine Haftung für Schäden im Zusammenhang mit der Verwendung dieser Informationen ist ausgeschlossen. Es gelten in jedem Fall unsere allgemeinen Verkaufsbedingungen.

Ende des Sicherheitsdatenblatts

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.