

**Sicherheitsdatenblatt****PRIMER ADW**

Sicherheitsdatenblatt vom 28/06/2023 Version 1

Achtung: Die Nummerierung startet mit 1.

**ABSCHNITT 1: Bezeichnung des Stoffs beziehungsweise des Gemischs und des Unternehmens****1.1. Produktidentifikator**

Kennzeichnung der Mischung:

Handelsname: PRIMER ADW

Handelscode: 582K

UFI: WYK1-H08D-G008-N88Y

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

Empfohlene Verwendung: Harz zur Verfestigung und Isolierung von Zementestrichen

**1.3. Einzelheiten zum Lieferanten, der das Sicherheitsdatenblatt bereitstellt**

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**1.4. Notrufnummer**

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**ABSCHNITT 2: Mögliche Gefahren****2.1. Einstufung des Stoffs oder Gemischs****Verordnung (EG) Nr. 1272/2008 (CLP)**

Flam. Liq. 2	Flüssigkeit und Dampf leicht entzündbar.
Acute Tox. 4	Gesundheitsschädlich bei Einatmen.
Skin Irrit. 2	Verursacht Hautreizungen.
Eye Irrit. 2	Verursacht schwere Augenreizung.
Resp. Sens. 1	Kann bei Einatmen Allergie, asthmaartige Symptome oder Atembeschwerden verursachen.
Skin Sens. 1	Kann allergische Hautreaktionen verursachen.
Carc. 2	Kann vermutlich Krebs erzeugen.
STOT SE 3	Kann die Atemwege reizen.
STOT SE 3	Kann Schläfrigkeit und Benommenheit verursachen.
STOT RE 2	Kann die Organe schädigen bei längerer oder wiederholter Exposition.

Für die menschlichen Gesundheit und die Umwelt gefährliche physisch-chemische Auswirkungen:

Keine weiteren Risiken

**2.2. Kennzeichnungselemente****Verordnung (EG) Nr. 1272/2008 (CLP)****Gefahrenpiktogramme und Signalwort**

Gefahr

### Gefahrenhinweise

H225	Flüssigkeit und Dampf leicht entzündbar.
H315	Verursacht Hautreizungen.
H317	Kann allergische Hautreaktionen verursachen.
H319	Verursacht schwere Augenreizung.
H332	Gesundheitsschädlich bei Einatmen.
H334	Kann bei Einatmen Allergie, asthmaartige Symptome oder Atembeschwerden verursachen.
H335	Kann die Atemwege reizen.
H336	Kann Schläfrigkeit und Benommenheit verursachen.
H351	Kann vermutlich Krebs erzeugen.
H373	Kann die Organe schädigen bei längerer oder wiederholter Exposition.

### Sicherheitshinweise

P210	Von Hitze, heißen Oberflächen, Funken, offenen Flammen sowie anderen Zünd-quellenarten fernhalten. Nicht rauchen.
P261	Einatmen von Rauch/Gas/Nebel/Dampf/Aerosol vermeiden.
P280	Schutzhandschuhe/Schutzkleidung und Augenschutz/Gesichtsschutz tragen.
P304+P340	BEI EINATMEN: Die Person an die frische Luft bringen und für ungehinderte Atmung sorgen.
P342+P311	Bei Symptomen der Atemwege: GIFTINFORMATIONSZENTRUM/Arzt anrufen.
P370+P378	Bei Brand: CO <sub>2</sub> -Feuerlöscher zum Löschen verwenden.

### Spezielle Vorschriften:

EUH204 Enthält Isocyanate. Kann allergische Reaktionen hervorrufen.

### Enthält:

Diphenylmethandiisocyanat, Isomeren und Homologen

Ethylacetat

Isocyanic acid,  
polymethylenepolyphenylene ester, polymer  
with .alpha.-hydro-.om

4,4'-Methylen-diphenyl-diisocyanat

Reaction mass of 4,4'-methylenediphenyl  
diisocyanate and o-(p-  
isocyanatobenzyl)phenyl isocyanate /  
methylene diphenyl diisocyanate

### Besondere Regelungen gemäß Anhang XVII der REACH-Verordnung nachfolgenden Änderungen:

Ab dem 24. August 2023 muss vor der industriellen oder gewerblichen Verwendung eine angemessene Schulung erfolgen.

### 2.3. Sonstige Gefahren

Keine PBT-, vPvB-Stoffe oder endokrine Disruptoren  
in Konzentrationen  $\geq 0.1$  %:

Bei Überempfindlichkeit der Atemwege (Asthma, chronische Bronchitis) wird vom Umgang mit dem Produkt abgeraten. Symptome an den Atemwegen können auch noch einige Stunden nach einer Überexposition auftreten. Staub, Dämpfe und Aerosole sind die Hauptgefahr für die Atemwege.

Keine weiteren Risiken

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## ABSCHNITT 3: Zusammensetzung/Angaben zu Bestandteilen

### 3.1. Stoffe

N.A.

### 3.2. Gemische

Kennzeichnung der Mischung: PRIMER ADW

### Gefährliche Bestandteile gemäß der CLP-Verordnung und dazugehörige Einstufung:

Menge	Name	Kennnr.	Einstufung	Registriernummer:
$\geq 50$ - $< 80$ %	Ethylacetat	CAS:141-78-6 EC:205-500-4 Index:607-022- 00-5	Flam. Liq. 2, H225; Eye Irrit. 2, H319; STOT SE 3, H336, EUH066	01-2119475103-46-xxxx

≥30 - <50 %	Isocyanic acid, polymethylenepolyphenylene ester, polymer with .alpha.-hydro-.om	CAS:53862-89-8 EC:670-234-1	Carc. 2, H351 Acute Tox. 4, H332 STOT RE 2, H373 Eye Irrit. 2, H319 Skin Irrit. 2, H315 STOT SE 3, H335 Resp. Sens. 1, H334 Skin Sens. 1, H317	
			Schätzung Akuter Toxizität: ATE - Einatmen (Stäube/Nebel): 15mg/l ATE - Einatmen (Dämpfe): 11mg/l	
≥10 - <20 %	Diphenylmethandiisocyanat, Isomeren und Homologen	CAS:9016-87-9 Index:615-005-00-9	Acute Tox. 4, H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 2, H351 STOT SE 3, H335 STOT RE 2, H373	
			Spezifische Konzentrationsgrenzwerte: 5% ≤ C < 100%: Skin Irrit. 2 H315 5% ≤ C < 100%: Eye Irrit. 2 H319 0.1% ≤ C < 100%: Resp. Sens. 1 H334 5% ≤ C < 100%: STOT SE 3 H335	
			Schätzung Akuter Toxizität: ATE - Einatmen (Stäube/Nebel): 1.5mg/l	
≥3 - <5 %	Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	EC:905-806-4	Carc. 2, H351 Acute Tox. 4, H332 STOT RE 2, H373 Eye Irrit. 2, H319 Skin Irrit. 2, H315 STOT SE 3, H335 Resp. Sens. 1, H334 Skin Sens. 1, H317	01-2119457015-45-xxxx
			Schätzung Akuter Toxizität: ATE - Einatmen (Dämpfe): 11mg/l	
≥3 - <5 %	4,4'-Methylenediphenyldiisocyanat	CAS:101-68-8 EC:202-966-0 Index:615-005-00-9	Acute Tox. 4, H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 Carc. 2, H351 STOT SE 3, H335 STOT RE 2, H373	01-2119457014-47-xxxx
			Spezifische Konzentrationsgrenzwerte: 5% ≤ C < 100%: Skin Irrit. 2 H315 5% ≤ C < 100%: Eye Irrit. 2 H319 0.1% ≤ C < 100%: Resp. Sens. 1 H334 5% ≤ C < 100%: STOT SE 3 H335	
			Schätzung Akuter Toxizität: ATE - Einatmen (Stäube/Nebel): 1.5mg/l	

## ABSCHNITT 4: Erste-Hilfe-Maßnahmen

### 4.1. Beschreibung der Erste-Hilfe-Maßnahmen

Nach Hautkontakt:

Die kontaminierten Kleidungsstücke sofort ablegen und sie auf sichere Weise entsorgen.

Körperbereiche, die mit dem Produkt in Kontakt getreten sind, bzw. bei denen dieser Verdacht besteht, müssen sofort mit viel fließendem Wasser und möglichst mit Seife gewaschen werden.

Den Körper vollständig waschen (Dusche oder Bad).

Nach Augenkontakt:

Im Falle von Augenkontakt die Augen über einen ausreichenden Zeitraum mit Wasser spülen und die Augenlider offen halten; sofort einen Augenarzt konsultieren.

Das unverletzte Auge schützen.

Nach Verschlucken:

Nicht zum Erbrechen bringen, Arzt aufsuchen zeigt dieses Sicherheitsdatenblatt und Kennzeichnung der Gefahr.

Nach Einatmen:

Den Verletzten ins Freie bringen, ihn ausruhen lassen und warm halten.

Bei unregelmäßiger oder ausbleibender Atmung künstliche Beatmung anwenden.

Im Falle von Einatmen unverzüglich einen Arzt konsultieren und ihm die Packung bzw. das Etikett zeigen.

#### **4.2. Wichtigste akute und verzögert auftretende Symptome und Wirkungen**

Die Symptome und Effekte treten wie durch die Gefahren erwartet ein, siehe Abschnitt 2.

#### **4.3. Hinweise auf ärztliche Soforthilfe oder Spezialbehandlung**

Im Falle eines Unfalls bzw. bei Unwohlsein sofort einen Arzt konsultieren (wenn möglich, die Bedienungsanleitung bzw. das Sicherheitsdatenblatt vorzeigen).

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### **ABSCHNITT 5: Maßnahmen zur Brandbekämpfung**

#### **5.1. Löschmittel**

Geeignete Löschmittel:

Bei Brand: CO<sub>2</sub>-Feuerlöscher zum Löschen verwenden.

CO<sub>2</sub>, Löschpulver, Schaum, zerstäubtes Wasser.

Löschmittel, die aus Sicherheitsgründen nicht verwendet werden dürfen:

Wasserstrahl.

#### **5.2. Besondere vom Stoff oder Gemisch ausgehende Gefahren**

Durch die Verbrennung entsteht ein dichter Rauch.

Die Explosions- bzw. Verbrennungsgase nicht einatmen (Kohlendioxid, Kohlenmonoxid, Stickoxide).

#### **5.3. Hinweise für die Brandbekämpfung**

Geeignete Atemgeräte verwenden.

Das kontaminierte Löschwasser getrennt auffangen. Nicht in der Abwasserleitung entsorgen.

Wenn im Rahmen der Sicherheit möglich, die unbeschädigten Behälter aus der unmittelbaren Gefahrenzone entfernen.

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### **ABSCHNITT 6: Maßnahmen bei unbeabsichtigter Freisetzung**

#### **6.1. Personenbezogene Vorsichtsmaßnahmen, Schutzausrüstungen und in Notfällen anzuwendende Verfahren**

Die persönliche Schutzausrüstung tragen.

Alle Entzündungsquellen entfernen.

Bei Exposition gegenüber Dämpfen, Stäuben oder Aerosolen Atemgeräte tragen.

Für eine angemessene Belüftung sorgen.

Einen angemessenen Atemschutz verwenden.

Die in Punkt 7 und 8 aufgeführten Schutzmaßnahmen beachten.

#### **6.2. Umweltschutzmaßnahmen**

Das Eindringen in den Boden/Unterboden verhindern. Das Abfließen in das Grundwasser oder in die Kanalisation verhindern.

Bei Austritt von Gas oder bei Eintritt in Wasserläufe, den Boden oder die Kanalisation die zuständigen Behörden informieren.

#### **6.3. Methoden und Material für Rückhaltung und Reinigung**

Geeigneten Materialien zur Aufnahme: saugfähige Inertmaterialien (z. B. Sand, Vermiculit).

Nach dem Auffangen betroffenen Bereich und betroffenes Material mit Wasser abspülen.

Das kontaminierte Waschwasser auffangen und entsorgen.

#### **6.4. Verweis auf andere Abschnitte**

Siehe auch die Abschnitte 8 und 13

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### **ABSCHNITT 7: Handhabung und Lagerung**

#### **7.1. Schutzmaßnahmen zur sicheren Handhabung**

Haut- und Augenkontakt sowie das Einatmen von Dämpfen vermeiden.

Das Belüftungssystem vor Ort verwenden.

Keine leeren Behälter verwenden, bevor diese nicht gereinigt wurden.

Vor dem Umfüllen sicherstellen, dass sich in den Behältern keine Reste inkompatibler Stoffe befinden.

Hinweise zur allgemeinen Hygiene am Arbeitsplatz:

Kontaminierte Kleidungsstücke müssen vor dem Eintritt in Speiseräume gewechselt werden.

Während der Arbeit nicht essen oder trinken.

Für die empfohlenen Schutzausrüstungen wird auf Abschnitt 8 verwiesen.

#### **7.2. Bedingungen zur sicheren Lagerung unter Berücksichtigung von Unverträglichkeiten**

Behälter gut geschlossen, in frischen und belüfteten Raum und weit von Wärmequellen halten.

Vor offenen Flammen, Zündfunken und Wärmequellen fern halten. Keiner direkten Sonneneinstrahlung aussetzen.

Lebensmittel, Getränke und Tiernahrung fern halten.

Unverträgliche Werkstoffe:

Siehe Kap. 10.5

Angaben zu den Lagerräumen:

Kühl und ausreichend belüftet.

### 7.3. Spezifische Endanwendungen

Empfehlungen

Siehe Kap. 1.2

Spezifische Lösungen für den Industriesektor

Kein besonderer Verwendungszweck

## ABSCHNITT 8: Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen

### 8.1. Zu überwachende Parameter

Bestandteile der Rezeptur mit arbeitsplatzbezogenen, zu überwachenden Grenzwerten.

	MAK-Typ	Land	Decke	Langzeit mg/m <sup>3</sup>	Langzeit ppm	Kurzzeit mg/m <sup>3</sup>	Kurzzeit ppm	Anmerkung
Ethylacetat CAS: 141-78-6	ACGIH				400			URT and eye irr
		EU		734	200	1468	400	
	MAK	AUSTRIA		734.000	200	1468.000	400	
	VLEP	BELGIUM		734.000	200	1468.000	400	
	VLEP	FRANCE		734.000	200	1468.000	400	
	AGW	GERMANY		730.000	200.000	1460.000	400	
	MAK	GERMANY		750.000	200.000	1500.000	400.000	
	ÁK	HUNGARY		1400		1400		
	VLEP	ITALY		734	200.000	1468	400.000	
	NDS	POLAND		734.000		1468.000		
	VLEP	ROMANIA		400.000	111.000	500.000	139.000	
	VLA	SPAIN		734.000	200.000	1460.000	400.000	
	SUVA	SWITZERLAND		730.000	200.000	1470.000	400.000	
	WEL	U.K.		730.000	200.000	1460.000	400.000	
	VLE	PORTUGAL		734.000	200.000	1468.000	400.000	
	GVI	CROATIA		734.000	200.000	1468.000	400.000	
	MV	SLOVENIA		734.000	200.000	1468.000	400.000	
	TLV	CZECHIA		700.000	191.100	900.000	245.700	
	IPRV	LITHUANIA		500.000	150.000	1100.000	300.000	
	TLV	BULGARIA		734.000	200.000	1468.000	400.000	
Diphenylmethandiisocyanat, Isomeren und Homologen CAS: 9016-87-9	AGW	GERMANY		0.050		0.050		Inhalable fraction , Skin
	AGW	GERMANY	C			0.100		Inhalable fraction , Skin
	MAK	GERMANY		0.050		0.050		Inhalable fraction , Skin
	MAK	GERMANY	C			0.100		Inhalable fraction , Skin
Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	NDS	POLAND		0.030		0.090		
	TLV	ROMANIA				0.150		
4,4'-Methylenediphenyldiisocyanat CAS: 101-68-8	ACGIH				0.005			Resp sens
	MAK	AUSTRIA		0.05	0.005	0.100	0.001	
	VLEP	BELGIUM		0.052	0.005			
	VLEP	FRANCE		0.100	0.010	0.200	0.020	
	AGW	GERMANY		0.050		0.050		Inhalable fraction and va
	AGW	GERMANY	C			0.100		Inhalable fraction and va
	MAK	GERMANY		0.050		0.050		Inhalable fraction and va

MAK	GERMANY	C		0.100		Inhalable fraction and va
ÁK	HUNGARY		0.050	0.050		
NDS	POLAND		0.030	0.090		
VLEP	ROMANIA			0.150		
VLA	SPAIN		0.005	0.052		
MV	SLOVENIA		0.050	0.050		
MV	SLOVENIA				0.005	Skin
TLV	CZECHIA		0.050	0.100		

#### Liste der Komponenten in der Formel mit PNEC-Wert

	<b>PNEC- GRENZ WERT</b>	<b>Expositionswe g</b>	<b>Expositionshäu figkeit</b>	<b>Bemerkung</b>
Ethylacetat CAS: 141-78-6	0.024 mg/l	Meerwasser		
	0.24 mg/l	Süßwasser		
	0.115 mg/kg	Meerwasser- Sedimente		
	1.15 mg/kg	Süßwasser- Sedimente		
	650 mg/l	Mikroorganismen in Kläranlagen (STP)		
	0.148 mg/kg	Boden (Landwirtschaft)		
Reaction mass of 4,4'- methylenediphenyl diisocyanate and o-(p- isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	0.003 mg/l	Süßwasser		
	0.001 mg/l	Meerwasser		
	11.7 mg/kg	Süßwasser- Sedimente		
	1.17 mg/kg	Meerwasser- Sedimente		
	2.33 mg/kg	Boden		
4,4'- Methylenediphenyldiisocya nat CAS: 101-68-8	1 mg/l	Süßwasser		
	0.1 mg/l	Meerwasser		
	1 mg/l	Mikroorganismen in Kläranlagen (STP)		
	1 mg/kg	Boden (Landwirtschaft)		

#### Abgeleitetes Null-Effekt-Niveau (DNEL)

	<b>Arbeits- Industrie</b>	<b>Arbeits- Gewerbe</b>	<b>Verbra- ucher</b>	<b>Exposition sweg</b>	<b>Expositionshäufigke it</b>	<b>Bemerkung</b>
Ethylacetat CAS: 141-78-6	734 mg/m3	367 mg/m3	367 mg/m3	Mensch - Inhalation	Langfristig, systemische Auswirkungen	

734 mg/m <sup>3</sup>	367 mg/m <sup>3</sup>	Mensch - Inhalation	Langfristig, lokale Auswirkungen
1468 mg/m <sup>3</sup>	734 mg/m <sup>3</sup>	Mensch - Inhalation	Kurzfristig, systemische Auswirkungen
1468 mg/m <sup>3</sup>	734 mg/m <sup>3</sup>	Mensch - Inhalation	Kurzfristig, lokale Auswirkungen
63 mg/kg	37 mg/kg	Mensch - dermal	Langfristig, systemische Auswirkungen
	4.5 mg/kg	Mensch - oral	Langfristig, systemische Auswirkungen

Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl) phenyl isocyanate / methylene diphenyl diisocyanate

0.1 mg/m<sup>3</sup>

Mensch - Inhalation

Kurzfristig (akut)

0.05 mg/m<sup>3</sup>

Mensch - Inhalation

Langfristig (wiederholt)

4,4'-Methylendiphenyldiisocyanat  
CAS: 101-68-8

0.1 mg/m<sup>3</sup> 0.05 mg/m<sup>3</sup>

Mensch - Inhalation

Kurzfristig, lokale Auswirkungen

0.05 mg/m<sup>3</sup> 0.025 mg/m<sup>3</sup>

Mensch - Inhalation

Langfristig, lokale Auswirkungen

Das Produkt kann Spuren von Phenylisocyanat enthalten.

Expositionsbeurteilungswert TRGS 430 (EBW): Polyisocyanatgehalt (MDI-Oligomere und/oder Prepolymere) beträgt 45%. Hierfür ist ein EBW von 0,05 mg/m<sup>3</sup> zu verwenden.

## 8.2. Begrenzung und Überwachung der Exposition

Für gute Lüftung sorgen. Wo vernünftigerweise praktikabel sollte dies durch die Verwendung von lokalen Abluftventilatoren und guter allgemeiner Absaugung erreicht werden.

Augenschutz:

Brille mit seitlichem Schutz (EN 166).

Hautschutz:

Antistatische Kleidung aus Naturfaser oder hitzebeständiger Synthetikfaser tragen.

Handschutz:

Es gibt kein Handschuhmaterial oder Kombination von Materialien, die unbegrenzten Widerstand gegen einzelne oder eine Kombination von Chemikalien geben.

Für längeren oder wiederholten Umgang sind chemikalienbeständige Handschuhe zu verwenden.

Geeignete Materialien für Schutzhandschuhe (EN 374/EN 16523); FKM (Fluorkautschuk): Dicke  $\geq$  0.4 mm; Permeationszeit  $\geq$  480 min.; NBR (Nitrilkautschuk): Dicke  $\geq$  0.4 mm; Permeationszeit  $\geq$  480 min.

Bei der Wahl geeigneter Handschuhe müssen nicht nur das Material, sondern auch andere Qualitätsmerkmale, die von einem Hersteller zum anderen variieren können, sowie die Art und Dauer der Verwendung der Mischung berücksichtigt werden.

Atemschutz:

Wenn Arbeiter Konzentrationen oberhalb des Arbeitsplatzgrenzwertes ausgesetzt sind, so muss ein für diesen Zweck geeignetes, zugelassenes Atemschutzgerät getragen werden.

Filtergerät, kombiniert (EN 14387): Maske mit Filter A-P2.

Kontrollen der Umweltexposition:

Siehe Kap. 6.2

Hygienische und technische Maßnahmen

Siehe der Abschnitt 7.

## ABSCHNITT 9: Physikalische und chemische Eigenschaften

### 9.1. Angaben zu den grundlegenden physikalischen und chemischen Eigenschaften

Aussehen: flüssig

Farbe: dunkelbraun

Geruch: fruchtig

Schmelzpunkt/Gefrierpunkt: N.D.

Unterer Siedepunkt und Siedeintervall: N.D.  
Entzündbarkeit: Das Produkt ist eingestuft Flam. Liq. 2 H225  
Oberer/unterer Flamm- bzw. Explosionspunkt: N.D.  
Flammpunkt: < 23°C  
Selbstentzündungstemperatur: N.D.  
Zersetzungstemperatur: N.D.  
pH-Wert: N.A.  
Kinematische Viskosität: N.A.  
Dichte: N.A.  
Dampfdichte: N.D.  
Dampfdruck: N.D.  
Wasserlöslichkeit: N.A.  
Löslichkeit in Öl: N.A.  
Partitionskoeffizient (n-Oktanol/Wasser): N.A.

**Partikeleigenschaften:**

Teilchengröße: N.A.

**9.2. Sonstige Angaben**

Leitfähigkeit: N.A.  
Explosionsgrenzen: N.A.  
Oxidierende Eigenschaften: N.A.  
Verdampfungsgeschwindigkeit: N.A.

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**ABSCHNITT 10: Stabilität und Reaktivität**

**10.1. Reaktivität**

Stabil unter Normalbedingungen

**10.2. Chemische Stabilität**

Stabil unter Normalbedingungen  
Polymerisation beginnend ab 200° C, Entwicklung von CO2

**10.3. Möglichkeit gefährlicher Reaktionen**

Bei Hitze und im Bandfall können Kohlendioxide und Dämpfe freigesetzt werden, die gesundheitsschädlich sein können.  
Von Oxydationsmitteln sowie stark alkalischen und stark sauren Materialien fernhalten, um exotherme Reaktionen zu vermeiden.

**10.4. Zu vermeidende Bedingungen**

Von Wärmequellen fernhalten.

**10.5. Unverträgliche Materialien**

Kontakt mit brandfördernden Materialien vermeiden. Das Produkt könnte in Brand geraten.  
Siehe Kap. 10.3

**10.6. Gefährliche Zersetzungsprodukte**

Keine gefährlichen Zersetzungsprodukte bei sachgemäßer Lagerung und Handhabung.  
Siehe Kap. 5.2

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**ABSCHNITT 11: Toxikologische Angaben**

**11.1. Angaben zu den Gefahrenklassen im Sinne der Verordnung (EG) Nr. 1272/2008**

**Toxikologische Informationen zum Produkt:**

a) akute Toxizität	Das Produkt ist eingestuft: Acute Tox. 4(H332)
b) Ätz-/Reizwirkung auf die Haut	Das Produkt ist eingestuft: Skin Irrit. 2(H315)
c) schwere Augenschädigung/-reizung	Das Produkt ist eingestuft: Eye Irrit. 2(H319)
d) Sensibilisierung der Atemwege/Haut	Das Produkt ist eingestuft: Resp. Sens. 1(H334), Skin Sens. 1(H317)
e) Keimzell-Mutagenität	Nicht klassifiziert Aufgrund der verfügbaren Daten sind die Einstufungskriterien nicht erfüllt.
f) Karzinogenität	Das Produkt ist eingestuft: Carc. 2(H351)
g) Reproduktionstoxizität	Nicht klassifiziert Aufgrund der verfügbaren Daten sind die Einstufungskriterien nicht erfüllt.
h) spezifische Zielorgan-Toxizität bei einmaliger Exposition	Das Produkt ist eingestuft: STOT SE 3(H335), STOT SE 3(H336)
i) spezifische Zielorgan-Toxizität bei wiederholter Exposition	Das Produkt ist eingestuft: STOT RE 2(H373)
j) Aspirationsgefahr	Nicht klassifiziert



Aufgrund der verfügbaren Daten sind die Einstufungskriterien nicht erfüllt.

### Toxikologische Informationen zu den Hauptbestandteilen des Produkts:

Ethylacetat	a) akute Toxizität	LD50 Oral Ratte 4934 mg/kg LD50 Haut Kaninchen > 20000 mg/kg LC50 Einatembarer Dampf Ratte > 22.5 mg/l 6h
Isocyanic acid, polymethylenepolyphenyl ene ester, polymer with .alpha.-hydro-.om	a) akute Toxizität	ATE - Einatmen (Stäube/Nebel) : 15 mg/l  ATE - Einatmen (Dämpfe) : 11 mg/l
Diphenylmethandiisocyanat, Isomeren und Homologen	a) akute Toxizität	ATE - Einatmen (Stäube/Nebel) : 1.5 mg/l  LD50 Oral Ratte > 10000 mg/kg LD50 Haut Kaninchen > 9400 mg/kg
Reaction mass of 4,4'- methylenediphenyl diisocyanate and o-(p- isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	a) akute Toxizität	ATE - Einatmen (Dämpfe) : 11 mg/l
4,4'- Methylen-diphenyl-diisocya nat	a) akute Toxizität	ATE - Einatmen (Stäube/Nebel) : 1.5 mg/l  LD50 Oral Ratte > 2000 mg/kg LD50 Haut Kaninchen > 9400 mg/kg

### 11.2. Angaben über sonstige Gefahren

#### Endokrinschädliche Eigenschaften:

Keine endokrinen Disruptoren in Konzentrationen  $\geq 0.1$  %.

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## ABSCHNITT 12: Umweltbezogene Angaben

Im Einklang mit der GLP verwenden, nicht herumliegen lassen.

### 12.1. Toxizität

Angaben zur Ökotoxizität:

#### Liste der ökotoxikologischen Eigenschaften des Produkts

Nicht eingestuft für Umweltgefahren

Keine Daten vorhanden

#### Liste der Bestandteile mit ökotoxikologischen Wirkungen

Bestandteil	Kennnr.	Ökotox-Infos
Ethylacetat	CAS: 141-78-6 - EINECS: 205- 500-4 - INDEX: 607-022-00-5	a) Akute aquatische Toxizität : LC50 Fische 230 mg/l 96h  a) Akute aquatische Toxizität : EC50 Daphnia 165 mg/l 48h
Diphenylmethandiisocyanat, Isomeren und Homologen	CAS: 9016-87-9 - INDEX: 615- 005-00-9	a) Akute aquatische Toxizität : LC50 Fische > 1000 mg/l 96h  a) Akute aquatische Toxizität : LC50 Daphnia > 1000 mg/l 24h b) Chronische aquatische Toxizität : NOEC Daphnia > 10 mg/l - 21d a) Akute aquatische Toxizität : ErC50 Algen > 1640 mg/l 72h
4,4'-Methylen-diphenyl-diisocyanat	CAS: 101-68-8 - EINECS: 202- 966-0 - INDEX: 615-005-00-9	a) Akute aquatische Toxizität : LC50 Fische > 1000 mg/l 96h

- a) Akute aquatische Toxizität : EC50 Daphnia > 1000 mg/l 24h  
b) Chronische aquatische Toxizität : NOEC Daphnia > 10 mg/l - 21d  
a) Akute aquatische Toxizität : EC50 Algen > 1640 mg/l 72h

## 12.2. Persistenz und Abbaubarkeit

Nach guten Arbeitspraktiken verwenden und das Produkt vorschriftsmäßig entsorgen. Die zuständigen Behörden verständigen, wenn das Produkt in Wasserläufe oder die Kanalisation gelangt bzw. wenn Erdreich oder Pflanzen kontaminiert wurden.

Bestandteil	Persistenz/Abbaubarkeit
Ethylacetat	Schnell abbaubar
Diphenylmethandiisocyanat, Isomeren und Homologen	Nicht schnell abbaubar

## 12.3. Bioakkumulationspotenzial

N.A.

## 12.4. Mobilität im Boden

N.A.

## 12.5. Ergebnisse der PBT- und vPvB-Beurteilung

Aufgrund der vorliegenden Angaben enthält das Produkt keine PBT/vPvB in Gehaltsprozenten  $\geq$  0.1%.

## 12.6. Endokrinschädliche Eigenschaften

Keine endokrinen Disruptoren in Konzentrationen  $\geq$  0.1 %.

## 12.7. Andere schädliche Wirkungen

N.A.

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## ABSCHNITT 13: Hinweise zur Entsorgung

### 13.1. Verfahren der Abfallbehandlung

Nach Möglichkeit wiederverwerten. Behördlich zugelassenen Deponien oder Verbrennungsanlagen zuführen. Entsprechend den geltenden örtlichen und nationalen Bestimmungen vorgehen.

Nicht in die Kanalisation oder fließende Gewässer gelangen lassen.

Durch das Produkt verunreinigte Behälter sind in Übereinstimmung mit lokalen und nationalen gesetzlichen Bestimmungen zu entsorgen.

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## ABSCHNITT 14: Angaben zum Transport



### 14.1. UN-Nummer oder ID-Nummer

1866

### 14.2. Ordnungsgemäße UN-Versandbezeichnung

ADR-Bezeichnung: HARZLÖSUNG, entzündbar (Dampfdruck bei 50 °C größer als 110 kPa)

IATA-Technische Bezeichnung: RESIN SOLUTION

IMDG-Technische Bezeichnung: RESIN SOLUTION

### 14.3. Transportgefahrenklassen

ADR-Straßentransport: 3

IATA-Klasse: 3

IMDG-Klasse: 3

### 14.4. Verpackungsgruppe

ADR-Verpackungsgruppe: II

IATA-Verpackungsgruppe: II

IMDG-Verpackungsgruppe: II

### 14.5. Umweltgefahren

Meeresschadstoff: Nein

Umweltbelastung: Nein

IMDG-EMS: F-E, S-E

#### 14.6. Besondere Vorsichtsmaßnahmen für den Verwender

Straßen- und Eisenbahntransport (ADR-RID):

ADR-Label: 3

ADR - Gefahrunummer: 33

ADR-Sondervorschriften: 640C

ADR-Tunnelbeschränkungscode:

Lufttransport (IATA):

IATA-Passagierflugzeug: 353

IATA-Frachtflugzeug: 364

IATA-Label: 3

IATA-Nebengefahr: -

IATA-Erg: 5L

IATA-Sondervorschriften: A3

Seetransport (IMDG):

IMDG-Code (Stauung): Category B

IMDG-Note (Stauung): -

IMDG-Nebengefahr: -

IMDG-Sondervorschriften: -

#### 14.7. Massengutbeförderung auf dem Seeweg gemäß IMO-Instrumenten

N.A.

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### ABSCHNITT 15: Rechtsvorschriften

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

RL 98/24/EG (Schutz von Gesundheit und Sicherheit der Arbeitnehmer vor der Gefährdung durch chemische Arbeitsstoffe bei der Arbeit)

RL 2000/39/EG (Arbeitsplatz-Richtgrenzwerte)

Richtlinie 2010/75/EU

Verordnung (EG) Nr. 1907/2006 (REACH)

Verordnung (EG) Nr. 1272/2008 (CLP)

Verordnung (EG) Nr. 790/2009 (1. ATP CLP) und (EU) Nr. 758/2013

Verordnung (EU) Nr. 2020/878

Verordnung (EU) Nr. 286/2011 (2. ATP CLP)

Verordnung (EU) Nr. 618/2012 (3. ATP CLP)

Verordnung (EU) Nr. 487/2013 (4. ATP CLP)

Verordnung (EU) Nr. 944/2013 (5. ATP CLP)

Verordnung (EU) Nr. 605/2014 (6. ATP CLP)

Verordnung (EU) Nr. 2015/1221 (7. ATP CLP)

Verordnung (EU) Nr. 2016/918 (8. ATP CLP)

Verordnung (EU) Nr. 2016/1179 (9. ATP CLP)

Verordnung (EU) Nr. 2017/776 (10. ATP CLP)

Verordnung (EU) Nr. 2018/669 (11. ATP CLP)

Verordnung (EU) Nr. 2018/1480 (13. ATP CLP)

Verordnung (EU) Nr. 2019/521 (12. ATP CLP)

Verordnung (EU) Nr. 2020/217 (14. ATP CLP)

Verordnung (EU) Nr. 2020/1182 (15. ATP CLP)

Verordnung (EU) Nr. 2021/643 (16. ATP CLP)

Verordnung (EU) Nr. 2021/849 (17. ATP CLP)

Verordnung (EU) Nr. 2022/692 (18. ATP CLP)

#### Beschränkungen zum Produkt oder zu den Inhaltsstoffen gemäß Anhang XVII der Verordnung (EG) 1907/2006 (REACH) und nachfolgenden Änderungen:

Beschränkungen zum Produkt: 3, 40

Beschränkungen zu den Inhaltsstoffen gemäß: 56, 74, 75

#### Anordnungen zu der Richtlinie EU 2012/18 (Seveso III):

Seveso III Kategorie gemäß dem Anhang 1, Teil 1	Unterer Schwellenwert (Tonnen)	Oberer Schwellenwert (Tonnen)
Das Produkt gehört zur Kategorie: P5c	5000	50000

#### Verordnung (EU) Nr. 649/2012 (PIC-Verordnung)

Kein Stoff gelistet

**Wassergefährdungsklasse**

3: Severe hazard to waters

**SVHC-Stoffe:**

Aufgrund der vorliegenden Angaben enthält das Produkt keine SVHC in Gehaltsprozenten  $\geq 0.1\%$ .

**15.2. Stoffsicherheitsbeurteilung**

Keine Stoffsicherheitsbeurteilung wurde durchgeführt für das Gemisch

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**ABSCHNITT 16: Sonstige Angaben**

<b>Code</b>	<b>Beschreibung</b>
EUH066	Wiederholter Kontakt kann zu spröder oder rissiger Haut führen.
H225	Flüssigkeit und Dampf leicht entzündbar.
H315	Verursacht Hautreizungen.
H317	Kann allergische Hautreaktionen verursachen.
H319	Verursacht schwere Augenreizung.
H332	Gesundheitsschädlich bei Einatmen.
H334	Kann bei Einatmen Allergie, asthmaartige Symptome oder Atembeschwerden verursachen.
H335	Kann die Atemwege reizen.
H336	Kann Schläfrigkeit und Benommenheit verursachen.
H351	Kann vermutlich Krebs erzeugen.
H373	Kann die Organe schädigen bei längerer oder wiederholter Exposition.
H373	Kann bei Einatmen die Organe schädigen bei längerer oder wiederholter Exposition.
H373	Kann bei Einatmen die Organe schädigen (Atemwege) bei längerer oder wiederholter Exposition.

<b>Code</b>	<b>Gefahrenklasse und Gefahrenkategorie</b>	<b>Beschreibung</b>
2.6/2	Flam. Liq. 2	Entzündbare Flüssigkeiten, Kategorie 2
3.1/4/Inhal	Acute Tox. 4	Akute Toxizität (inhalativ), Kategorie 4
3.2/2	Skin Irrit. 2	Reizung der Haut, Kategorie 2
3.3/2	Eye Irrit. 2	Reizung der Augen, Kategorie 2
3.4.1/1	Resp. Sens. 1	Sensibilisierung der Atemwege, Kategorie 1
3.4.2/1	Skin Sens. 1	Sensibilisierung der Haut, Kategorie 1
3.6/2	Carc. 2	Karzinogenität, Kategorie 2
3.8/3	STOT SE 3	Spezifische Zielorgan-Toxizität (einmalige Exposition), Kategorie 3
3.9/2	STOT RE 2	Spezifische Zielorgan-Toxizität (wiederholte Exposition), Kategorie 2

**Einstufung und Verfahren, das zum Ableiten der Einstufung von Gemischen gemäß Verordnung (EG) 1272/2008 [CLP] verwendet wurde:**

**Einstufung gemäß Verordnung (EG) Nr. Einstufungsverfahren 1272/2008**

2.6/2	auf der Basis von Prüfdaten
3.1/4/Inhal	Berechnungsmethode
3.2/2	Berechnungsmethode
3.3/2	Berechnungsmethode
3.4.1/1	Berechnungsmethode
3.4.2/1	Berechnungsmethode
3.6/2	Berechnungsmethode
3.8/3	Berechnungsmethode
3.8/3	Berechnungsmethode
3.9/2	Berechnungsmethode

Diese Unterlagen wurden von einem Fachmann mit entsprechender Ausbildung abgefasst.

**Hauptsächliche Literatur:**

ECDIN - Daten- und Informationsnetz über umweltrelevante Chemikalien - Vereinigtes Forschungszentrum, Kommission der Europäischen Gemeinschaft

SAX's GEFÄHRLICHE EIGENSCHAFTEN VON INDUSTRIELLEN SUBSTANZEN - Achte Auflage - Van Nostrand Reinold  
Sicherheitsdatenblätter der Rohstoffzulieferer.

CCNL - Anlage 1

Die vorstehenden Angaben stützen sich auf den heutigen Stand unserer Kenntnisse. Sie gelten nur für das angegebene Produkt und stellen

keine Zusicherung von Eigenschaften dar.

Es obliegt dem Anwender die Zuständigkeit und die Vollständigkeit dieser Angaben für seine spezifische Anwendung zu kontrollieren.

Dieses Datenblatt ersetzt alle früheren Ausgaben.

Legende der im Sicherheitsdatenblatt verwendeten Abkürzungen und Akronyme:

ACGIH: American Conference of Governmental Industrial Hygienists (ACGIH)

ADR: Europäisches Übereinkommen über die internationale Beförderung gefährlicher Güter auf der Straße

ATE: Schätzung Akuter Toxizität

ATEmix: Schätzwert der akuten Toxizität (Gemische)

BEI: Biologischer Expositionsindex

CAS: Chemical Abstracts Service (Abteilung der American Chemical Society)

CAV: Giftzentrale

CE: Europäische Gemeinschaft

CLP: Einstufung, Verpackung und Kennzeichnung

CMR: karzinogen, mutagen und reproduktionstoxisch

COV: Flüchtige organische Verbindung

CSA: Stoffsicherheitsbeurteilung

CSR: Stoffsicherheitsbericht

DNEL: Abgeleitetes Null-Effekt-Niveau (DNEL)

EC50: Mittlere effektive Konzentration

ECHA: Europäische Chemikalienagentur

EINECS: Europäisches Verzeichnis der auf dem Markt vorhandenen chemischen Stoffe

ES: Expositionsszenarium

GefStoffVO: Gefahrstoffverordnung

GHS: Global harmonisiertes System zur Einstufung und Kennzeichnung von Chemikalien

IARC: Internationales Krebsforschungszentrum

IATA: Internationale Flug-Transport-Vereinigung (IATA)

IC50: Mittlere Inhibitorkonzentration

IMDG: Gefahrgutkennzeichnung für gefährliche Güter im Seeschiffsverkehr (IMDG-Code)

LC50: Letale Konzentration für 50 Prozent der Testpopulation

LD50: Letale Dosis für 50 Prozent der Testpopulation

LDLo: Niedrige letale Dosis

N.A.: Nicht anwendbar

N/A: Nicht anwendbar

N/D: Nicht definiert/Nicht verfügbar

N.D.: Nicht verfügbar

NIOSH: National Institute for Occupational Safety and Health

NOAEL: Dosis ohne beobachtbare schädliche Wirkung

OSHA: Occupational Safety and Health Administration

PBT: persistent, bioakkumulativ und giftig

PGK: Verpackungsvorschrift

PNEC: Abgeschätzte Nicht-Effekt-Konzentration (PNEC-Wert)

PSG: Passagiere

RID: Regelung zur internationalen Beförderung gefährlicher Güter im Schienenverkehr

STEL: Grenzwert für Kurzzeitexposition

STOT: Zielorgan-Toxizität

TLV: Arbeitsplatzgrenzwert

TLV-TWA: Schwellenwert für zeitgemittelten 8-Stunden-Zag (TWATLV) (ACGIH-Standard)

vPvB: sehr persistent, sehr bioakkumulativ

WGK: Wassergefährdungsklasse

# Ethyl acetate

## Substance identification

Chemical Name: Ethyl acetate

CAS number: 141-78-6

## ETHYL ACETATE

ES 1: Cosmetics, personal care products (PC39); User for consumers (SU21).

ES 2: Filling of drums and small packages (CS6); INDUSTRIAL USES (SU3).

ES 3: Formulation or repackaging (F); INDUSTRIAL USES (SU3).

ES 4: Use of non-reactive processing aid at industrial site (no inclusion in article) (ERC4); Industrial uses (su3);; Extraction agents (PC40).

ES 5: PROFESSIONAL APPLICATION OF COATINGS AND INKS; INDUSTRIAL USES (SU3).

ES 6: Use as laboratory reagent (PROC15); Industrial uses (su3);; Industrial use.

ES 7: Use in cleaning products (GEST4\_I, GEST4\_P, GEST4\_C); INDUSTRIAL USES (SU3).

ES 8: Use in lubricants (GEST6\_I, GEST6\_P, GEST6\_C); INDUSTRIAL USES (SU3).

ES 9: Professional application of coatings and inks (14); INDUSTRIAL USES (SU3). Covers use in coatings (paints, inks, adhesives, etc.) including exposures during use (receipt of material, storage, preparation and transfer of bulk and semi-bulk products, application by spray, roller or spreader, dipping, flow, fluidized bed on production lines and film formation), the cleaning and maintenance of the equipment and the associated laboratory activities [GES3\_].

ES 10: Use as laboratory reagent (PROC15);; Industrial uses (su3);; Professional (G27).

ES 11: Use in agrochemical products (GEST11\_P, GEST11\_C); INDUSTRIAL USES (SU3).

ES 12: Use in detergent products (GEST4\_I, GEST4\_P, GEST4\_C).

ES 13: Use in lubricants (GEST6\_I, GEST6\_P, GEST6\_C)

ES 14: Adhesives, Sealants (PC1); Use in coatings (GEST3\_I, GEST3\_P, GEST3\_C).

## ES 5: PROFESSIONAL APPLICATION OF COATINGS AND INKS (17); INDUSTRIAL USES (SU3).

### 5.1. USE AT INDUSTRIAL SITES

#### Environment

SC 1: Use of non-reactive processing aid at industrial site (no inclusion in article) ERC4

#### Worker

SC 2: Generalized exposures (closed systems) PROC1

SC 3: Generalized exposures (closed systems); Use in closed systems, with sample taking PROC2

SC 4: Film formation - forced drying (50 -100°C). Stove (>100°C), Curing by UV/EB radiation PROC2

SC 5: Mixing operations, Generalized exposures PROC3

SC 6: Film formation, air drying PROC4

SC 7: Preparation of material for application, Mixing operations (open systems) PROC5

SC 8: Spraying (automatic/robotic) PROC7

SC 9: Manual spraying PROC7

SC 10: Material transfers, Non-Specialized site PROC8a

SC 11: Material transfers, Specialized site PROC8b

SC 12: Roller, diffusion, flow application PROC10

SC 13: Immersion, dipping and pouring PROC13

SC 14: Laboratory activities PROC15

SC 15: Material transfers, Drum/batch transfers, Transfer from/pour from containers PROC9

SC 16: Production or preparation of articles by tableting, compression, extrusion or pelettisation. PROC14

### 5.2. CONDITIONS OF USE THAT AFFECT EXPOSURE

#### 5.2.1 Environmental exposure control: Use of non-reactive processing aid at industrial site (no inclusion in article) (ERC4)

##### Amount used (or contained in articles), frequency and duration of use/exposure

Daily amount per site:  $\leq 1$  t/day

Annual amount per site:  $\leq 300$  t/year

##### Organizational and technical measures and conditions

A wastewater treatment plant is expected.

Assumed domestic sewage treatment plant flow:  $\geq 2 \times 10^3$  m<sup>3</sup>/day.

##### Conditions and measures for waste treatment (including the article of waste)

Waste treatment: Dispose of waste products or used containers according to local regulations.

##### Other conditions affecting environmental exposure

Water flow on the receiving surface: 18,000 m<sup>3</sup>/day.

## 5.2.2. Worker Exposure Control: Chemical production or refinement in closed processes without likelihood of exposure or in processes with equivalent containment conditions (PROC1)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.3. Worker Exposure Control: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.4. Worker Exposure Control: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.5. Worker Exposure Control: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.6. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.7. Worker Exposure Control: Mixing or blending in batch processes (PROC5)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.8. Worker Exposure Control: Industrial spraying (PROC7)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 95%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.9. Worker Exposure Control: Industrial spraying (PROC7)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 95%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed



### 5.2.10. Worker Exposure Control: Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities (PROC8a)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.11. Worker Exposure Control: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 95%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.12. Worker Exposure Control: Application with rollers or brushes (PROC10)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.13. Worker Exposure Control: Treatment of articles by dipping and pouring (PROC13)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.14. Worker Exposure Control: Use as laboratory reagents (PROC15)

**Product features (article)**

Covers concentrations up to 100%.

**Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

**Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

**Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.15. Worker Exposure Control: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

**Product features (article)**

Covers concentrations up to 100%.

**Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

**Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

**Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 5.2.16. Worker Exposure Control: Tableting, compression, extrusion, pelletising, granulation (PROC14)

**Product features (article)**

Covers concentrations up to 100%.

**Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

**Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

**Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

### 5.3.1. Environmental release and exposure: Use of non-reactive processing aid at industrial site (no inclusion in article) (ERC4)

Route release	Release rate	Method for estimating for release
water	20 kg/day	Estimated release factor
air	980 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Estimated exposure	RCR
Fresh water	0.119 mg/l (EUSES v2.1)	0,495
freshwater sediments	0.708 mg/kg dry weight (EUSES v2.1)	0,616
Sea water	0.012 mg/l (EUSES v2.1)	0,495
Marine sediment	0.071 mg/kg dry weight (EUSES v2.1)	0,617
Sewage treatment plant	1.184 mg/l (EUSES v2.1)	< 0.01
Farmland	0.081 mg/kg dry weight (EUSES v2.1)	0,547
Prey for predators (freshwater)	1.469 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for predators (marine water)	0.148 mg/kg dry weight (EUSES v2.1)	< 0.01
Main predator prey (marine water)	0.031 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for Predators (Terrestrial)	0.028 mg/kg dry weight (EUSES v2.1)	< 0.01

### 5.3.2. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	systemic	Short term	0.147 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	local	Long-term	0.037 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	local	Short term	0.147 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	Long-term	0.034 mg/kg p.c./day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	Long-term	/	< 0.01

### 5.3.3. Worker exposure: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	361.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	361.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	1.37 mg/kg p.c./day (ECETOC TRA worker v3)	0.022
combined routes	systemic	Long-term	/	0.147

### 5.3.4. Worker exposure: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	361.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	361.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	1.37 mg/kg p.c./day (ECETOC TRA worker v3)	0.022
combined routes	systemic	Long-term	/	0.147

### 5.3.5. Worker exposure: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
dermal	systemic	Long-term	0.69 mg/kg p.c./day (ECETOC TRA worker v3)	0.011
combined routes	systemic	Long-term	/	0.261

### 5.3.6. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	36.71 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.05
inhalation	systemic	Short term	146.8 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.1
inhalation	local	Long-term	36.71 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.05
inhalation	local	Short term	146.8 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.1
dermal	systemic	Long-term	6.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.109
combined routes	systemic	Long-term	/	0.159

### 5.3.7. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.343

### 5.3.8. Worker exposure: Industrial spraying (PROC7)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	42.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.68
combined routes	systemic	Long-term	/	0.805

### 5.3.9. Worker exposure: Industrial spraying (PROC7)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	42.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.68
combined routes	systemic	Long-term	/	0.805

### 5.3.10. Worker exposure: Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities (PROC8a)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.343

### 5.3.11. Worker exposure: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,038
inhalation	systemic	Short term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,075
inhalation	local	Long-term	27.53 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,038
inhalation	local	Short term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0,075
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.255

### 5.3.12. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	27.43 mg/kg p.c./day (ECETOC TRA worker v3)	0.435
combined routes	systemic	Long-term	/	0.56

### 5.3.13. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.343

### 5.3.14. Worker exposure: Use as laboratory reagents (PROC15)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
dermal	systemic	Long-term	0.34 mg/kg p.c./day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	Long-term	/	0.255

### 5.3.15. Worker exposure: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) (PROC9)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	73.42 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.1
inhalation	systemic	Short term	293.6 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.2
inhalation	local	Long-term	73.42 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.1
inhalation	local	Short term	293.6 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.2
dermal	systemic	Long-term	6.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.109
combined routes	systemic	Long-term	/	0.209

### 5.3.16. Worker exposure: Tableting, compression, extrusion, pelletising, granulation (PROC14)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	3.43 mg/kg p.c./day (ECETOC TRA worker v3)	0.054
combined routes	systemic	Long-term	/	0.179

### 5.4. GUIDANCE FOR DOWNSTREAM USERS TO ASSESS WHETHER THEY COMPLY WITH THE LIMITS SET BY THE EXPOSURE SCENARIO

Guidance to check compliance with the exposure scenario: <https://echa.europa.eu/>

**ES 9: PROFESSIONAL APPLICATION OF COATINGS AND INKS (14); INDUSTRIAL USES (SU3). COVERS USE IN COATINGS (PAINTS, INKS, ADHESIVES, ETC.) INCLUDING EXPOSURES DURING USE (RECEIPT OF MATERIAL, STORAGE, PREPARATION AND TRANSFER OF BULK AND SEMI-BULK PRODUCTS, APPLICATION BY SPRAY, ROLLER OR SPREADER, DIPPING, FLOW, FLUIDIZED BED ON PRODUCTION LINES AND FILM FORMATION), THE CLEANING AND MAINTENANCE OF THE EQUIPMENT AND THE ASSOCIATED LABORATORY ACTIVITIES [GES3\_I].**

## **9.1. WIDE DISPERSIVE USE BY PROFESSIONAL WORKERS**

### **Environment**

SC 1: Wide dispersive use of non-reactive processing aid (no inclusion into the article, outdoor) ERC8d

### **Worker**

SC 3: Generalized exposures (closed systems) PROC1  
SC 4: Filling of equipment from drums and containers PROC2  
SC 5: Generalized exposures (closed systems), Use in closed systems PROC2  
SC 6: Preparation of material for application, Generalized exposures PROC3  
SC 7: Film formation - air drying, Indoor use PROC4  
SC 8: Film formation - air drying, Outdoor use PROC4  
SC 9: Preparation of material for application, Indoor use PROC5  
SC 10: Preparation of material for application, Outdoor use PROC5  
SC 11: Material transfers, Drum/batch transfers, Non-Specialized site PROC8a  
SC 12: 12 Material Transfers, Drum/batch transfers, specialized site PROC8b  
SC 13: Roller, diffusion, flow application, Indoor use PROC10  
SC 14: Roller, diffusion, flow application, Outdoor use PROC10  
SC 15: Manual spraying, Indoor use PROC11  
SC 16: Manual spraying, Outdoor use PROC11  
SC 17: Immersion, dipping and pouring, Indoor use PROC13  
SC 18: Immersion, dipping and pouring, Outdoor use PROC13  
SC 19: Laboratory activities PROC15  
SC 20: Hand application - finger paints, crayons, stickers, Indoor use PROC19  
SC 21: Hand application - finger paints, crayons, stickers, Outdoor use PROC19

## **9.2. CONDITIONS OF USE THAT AFFECT EXPOSURE**

### **9.2.1 Environmental exposure control: Wide dispersive use of non-reactive processing aid (no inclusion into the article, outdoor) (ERC8d)**

#### **Organizational and technical measures and conditions**

A wastewater treatment plant is expected.

#### **Conditions and measures for waste treatment (including the article of waste)**

Waste treatment: Dispose of waste products or used containers according to local regulations.

### **9.2.3. Worker Exposure Control: Chemical production or refinement in closed processes without likelihood of exposure or in processes with equivalent containment conditions (PROC1)**

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### **9.2.4. Worker Exposure Control: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)**

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.5. Worker Exposure Control: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.6. Worker Exposure Control: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (3 to 5 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.7. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (3 to 5 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.8. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Assumes that activities are undertaken with appropriate and well maintained equipment by trained personnel operating under supervision.

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.9. Worker Exposure Control: Mixing or blending in batch processes (PROC5)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (3 to 5 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed



## 9.2.10. Worker Exposure Control: Mixing or blending in batch processes (PROC5)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

## 9.2.11. Worker Exposure Control: Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities (PROC8a) (PROC8b)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (3 to 5 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 9.2.12. Worker Exposure Control: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 90%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 9.2.13. Worker Exposure Control: Application with rollers or brushes (PROC10)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 9.2.14. Worker Exposure Control: Application with rollers or brushes (PROC10)

### **Product features (article)**

Covers concentrations up to 100%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.15. Worker Exposure Control: Non-industrial spray application (PROC11)

#### **Product features (article)**

Covers concentrations up to 25 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (3 to 5 air changes per hour).

#### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable gloves tested to EN374.

If skin contamination is expected to extend to other parts of the body, these parts should also be protected with impermeable clothing equivalent to that described for the hands.

For more information, refer to Section 8 of the SDS (safety data sheet).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.16. Worker Exposure Control: Non-industrial spray application (PROC11)

#### **Product features (article)**

Covers concentrations up to 25 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable gloves tested to EN374.

If skin contamination is expected to extend to other parts of the body, these parts should also be protected with impermeable clothing equivalent to that described for the hands.

For more information, refer to Section 8 of the SDS (safety data sheet).

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.17. Worker Exposure Control: Treatment of articles by dipping and pouring (PROC13)

#### **Product features (article)**

Covers concentrations up to 25 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.18. Worker Exposure Control: Treatment of articles by dipping and pouring (PROC13)

#### **Product features (article)**

Covers concentrations up to 25 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.19. Worker Exposure Control: Use as laboratory reagents (PROC15)

#### **Product features (article)**

Covers concentrations up to 100%.

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.20. Worker Exposure Control: Hand-mixing with direct contact and only PPE available (PROC19)

#### **Product features (article)**

Covers concentrations up to 25 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

#### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable gloves tested to EN374.

If skin contamination is expected to extend to other parts of the body, these parts should also be protected with impermeable clothing equivalent to that described for the hands.

For more information, refer to Section 8 of the SDS (safety data sheet).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.2.21. Worker Exposure Control: Hand-mixing with direct contact and only PPE available (PROC19)

#### **Product features (article)**

Covers concentrations up to 5 %

#### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

#### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable gloves tested to EN374.

If skin contamination is expected to extend to other parts of the body, these parts should also be protected with impermeable clothing equivalent to that described for the hands.

For more information, refer to Section 8 of the SDS (safety data sheet).

#### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

### 9.3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

#### 9.3.1. Environmental release and exposure: Wide dispersive use of non-reactive processing aid (no inclusion into the article, outdoor) (ERC8d)

Route release	Release rate	Method for estimating for release
water	0.014 kg/day	Estimated release factor
air	980 kg/day	Estimated release factor
Soil	0 kg/day	Estimated release factor

Protection target	Estimated exposure	RCR
Fresh water	0.000396 mg/l (EUSES v2.1)	< 0.01
freshwater sediments	0.00236 mg/kg dry weight (EUSES v2.1)	< 0.01
Sea water	0.0000597 mg/l (EUSES v2.1)	< 0.01
Marine sediment	0.000356 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0.000805 mg/l (EUSES v2.1)	< 0.01
Farmland	0.000131 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for predators (freshwater)	0.011 mg/kg wet weight (EUSES v2.1)	< 0.01
Prey for predators (marine water)	0.00167 mg/kg wet weight (EUSES v2.1)	< 0.01
Main predator prey (marine water)	0.00158 mg/kg wet weight (EUSES v2.1)	< 0.01
Prey for Predators (Terrestrial)	0.000114 mg/kg wet weight (EUSES v2.1)	< 0.01

#### 9.3.3. Worker exposure: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions (PROC1)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	0.367 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	systemic	Short term	1.468 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	local	Long-term	0.367 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
inhalation	local	Short term	1.468 mg/m <sup>3</sup> (ECETOC TRA worker v3)	< 0.01
dermal	systemic	Long-term	0.034 mg/kg p.c./day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	Long-term	/	< 0.01

#### 9.3.4. Worker exposure: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
dermal	systemic	Long-term	1.37 mg/kg p.c./day (ECETOC TRA worker v3)	0.022
combined routes	systemic	Long-term	/	0.272

### 9.3.5. Worker exposure: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
dermal	systemic	Long-term	1.37 mg/kg p.c./day (ECETOC TRA worker v3)	0.022
combined routes	systemic	Long-term	/	0.272

### 9.3.6. Worker exposure: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	0.69 mg/kg p.c./day (ECETOC TRA worker v3)	0.011
combined routes	systemic	Long-term	/	0.361

### 9.3.7. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
dermal	systemic	Long-term	6.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.109
combined routes	systemic	Long-term	/	0.284

### 9.3.8. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	6.86 mg/kg p.c./day (ECETOC TRA worker v3)	0.109
combined routes	systemic	Long-term	/	0.459

### 9.3.9. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.568

### 9.3.10. Worker exposure: Mixing or blending in batch processes (PROC5)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.393

### 9.3.11. Worker exposure: Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities (PROC8a)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.568

### 9.3.12. Worker exposure: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
dermal	systemic	Long-term	13.71 mg/kg p.c./day (ECETOC TRA worker v3)	0.218
combined routes	systemic	Long-term	/	0.343

### 9.3.13. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	27.43 mg/kg p.c./day (ECETOC TRA worker v3)	0.435
combined routes	systemic	Long-term	/	0.785

### 9.3.14. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
dermal	systemic	Long-term	27.43 mg/kg p.c./day (ECETOC TRA worker v3)	0.435
combined routes	systemic	Long-term	/	0.61

### 9.3.15. Worker exposure: Non-industrial spray application (PROC11)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	308.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.42
inhalation	systemic	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.84
inhalation	local	Long-term	308.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.42
inhalation	local	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.84
dermal	systemic	Long-term	12.85 mg/kg p.c./day (ECETOC TRA worker v3)	0.204
combined routes	systemic	Long-term	/	0.624

### 9.3.16. Worker exposure: Non-industrial spray application (PROC11)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.21
inhalation	systemic	Short term	616.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.42
inhalation	local	Long-term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.21
inhalation	local	Short term	616.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.42
dermal	systemic	Long-term	12.85 mg/kg p.c./day (ECETOC TRA worker v3)	0.204
combined routes	systemic	Long-term	/	0.414

### 9.3.17. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
dermal	systemic	Long-term	8.226 mg/kg p.c./day (ECETOC TRA worker v3)	0.131
combined routes	systemic	Long-term	/	0.356

### 9.3.18. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.053
inhalation	systemic	Short term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
inhalation	local	Long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.053
inhalation	local	Short term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
dermal	systemic	Long-term	8.226 mg/kg p.c./day (ECETOC TRA worker v3)	0.131
combined routes	systemic	Long-term	/	0.183

### 9.3.19. Worker exposure: Use as laboratory reagents (PROC15)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.5
dermal	systemic	Long-term	0.34 mg/kg p.c./day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	Long-term	/	0.255

### 9.3.20. Worker exposure: Hand-mixing with direct contact and only PPE available (PROC19)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	330.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	systemic	Short term	1.32 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.9
inhalation	local	Long-term	330.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Short term	1.32 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.9
dermal	systemic	Long-term	16.97 mg/kg p.c./day (ECETOC TRA worker v3)	0.269
combined routes	systemic	Long-term	/	0.72

### 9.3.21. Worker exposure: Hand-mixing with direct contact and only PPE available (PROC19)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	5.657 mg/kg p.c./day (ECETOC TRA worker v3)	0.09
combined routes	systemic	Long-term	/	0.44

## 9.4. GUIDANCE FOR DOWNSTREAM USERS TO ASSESS WHETHER THEY COMPLY WITH THE LIMITS SET BY THE EXPOSURE SCENARIO

Guidance to check compliance with the exposure scenario: <https://echa.europa.eu/>



## ES 12: USE IN DETERGENT PRODUCTS (GEST4\_I, GEST4\_P, GEST4\_C).

### 12.1. WIDE DISPERSIVE USE BY PROFESSIONAL WORKERS

#### **Environment**

SC 1: Wide dispersive use of non-reactive processing aid (no inclusion into the article, indoors) ERC8a

#### **Worker**

SC 2: Filling of equipment from drums and containers, specialised site PROC8b

SC 3: Automated process with (semi) closed systems; Use in closed systems PROC2

SC 4: Automated process with (semi) closed systems Drum/batch transfers, Use in closed systems PROC3

SC 5: Semi-automatic process (e.g: Semi-automatic application of floor care and maintenance products) PROC4

SC 6: Filling of equipment from drums and containers, Outdoor use PROC8a

SC 7: Immersion, dipping and pouring, Manual, Surfaces, Cleaning PROC13

SC 8: Cleaning with low-pressure washers, Roller application or brushing, No spraying PROC10

SC 9: Cleaning with high pressure washers, Spraying, Indoor use PROC11

SC 10: Cleaning with high pressure washers Spraying, Outdoor use PROC11

SC 11: Application of cleaning products in closed systems, Manual, Surfaces, Cleaning PROC10

SC 12: Ad hoc manual application via trigger sprays, partial dipping, etc., Roller application or brushing PROC10

SC 13: Application of cleaning products in closed systems, Outdoor use PROC4

SC 14: Cleaning of medical devices PROC4

### 12.2. CONDITIONS OF USE THAT AFFECT EXPOSURE

#### 12.2.1 Environmental exposure control: Wide dispersive use of non-reactive processing aid (no inclusion into the article, indoors) (ERC8a)

##### **Organizational and technical measures and conditions**

A wastewater treatment plant is expected.

##### **Conditions and measures for waste treatment (including the article of waste)**

Waste treatment: Dispose of waste products or used containers according to local regulations.

#### 12.2.2. Worker Exposure Control: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

##### **Product features (article)**

Covers concentrations up to 25 %

##### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

##### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

##### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

#### 12.2.3. Worker Exposure Control: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

##### **Product features (article)**

Covers concentrations up to 25 %

##### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

##### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

##### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

#### 12.2.4. Worker Exposure Control: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

##### **Product features (article)**

Covers concentrations up to 25 %

##### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

##### **Organizational and technical measures and conditions**

Provide a basic level of general ventilation (1 to 3 air changes per hour).

##### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.5. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.6. Worker Exposure Control: Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities (PROC8a)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.7. Worker Exposure Control: Treatment of articles by dipping and pouring (PROC13)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.8. Worker Exposure Control: Application with rollers or brushes (PROC10)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.9. Worker Exposure Control: Non-industrial spray application (PROC11)

### **Product features (article)**

Covers concentrations up to 5 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (from 5 to 10 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.10. Worker Exposure Control: Non-industrial spray application (PROC11)

### **Product features (article)**

Covers concentrations up to 1%.

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable gloves tested to EN374.

If skin contamination is expected to extend to other parts of the body, these parts should also be protected with impermeable clothing equivalent to that described for the hands.

For more information, refer to Section 8 of the SDS (safety data sheet).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.11. Worker Exposure Control: Application with rollers or brushes (PROC10)

### **Product features (article)**

Covers concentrations up to 5 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 5.2.12. Worker Exposure Control: Application with rollers or brushes (PROC10)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.13. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Conditions and measures for personal protection, hygiene and health assessment**

Wear suitable respirator.

For more information, refer to Section 8 of the SDS (safety data sheet).

Inhalation - minimum yield of 90%

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Outdoor use

Temperature: Process temperature up to 40°C is assumed

## 12.2.14. Worker Exposure Control: Production of chemicals with the possibility of exposure (PROC4)

### **Product features (article)**

Covers concentrations up to 25 %

### **Amount used (or contained in articles), frequency and duration of use/exposure**

Frequency of use: Covers use up to 8 h/day

### **Organizational and technical measures and conditions**

Local exhaust ventilation

Inhalation - minimum yield of 80%

Provide a basic level of general ventilation (1 to 3 air changes per hour).

### **Other conditions affecting worker exposure**

Indoor and outdoor use: Indoor use

Temperature: Process temperature up to 40°C is assumed

## 12.3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

### 12.3.1. Environmental release and exposure: Wide dispersive use of non-reactive processing aid (no inclusion into the article, indoors) (ERC8a)

Route release	Release rate	Method for estimating for release
water	0.014 kg/day	Environmental Release Category (ERC)
air	0.014 kg/day	Environmental Release Category (ERC)
Soil	0 kg/day	Environmental Release Category (ERC)

Protection target	Estimated exposure	RCR
Fresh water	0.000397 mg/l (EUSES v2.1)	< 0.01
freshwater sediments	0.00237 mg/kg dry weight (EUSES v2.1)	< 0.01
Sea water	0.0000598 mg/l (EUSES v2.1)	< 0.01
Marine sediment	0.000357 mg/kg dry weight (EUSES v2.1)	< 0.01
Sewage treatment plant	0.000811 mg/l (EUSES v2.1)	< 0.01
Farmland	0.000131 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for predators (freshwater)	0.011 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for predators (marine water)	0.00167 mg/kg dry weight (EUSES v2.1)	< 0.01
Main predator prey (marine water)	0.00158 mg/kg dry weight (EUSES v2.1)	< 0.01
Prey for Predators (Terrestrial)	0.000114 mg/kg dry weight (EUSES v2.1)	< 0.01

### 12.3.2. Worker exposure: Transfer of a substance or a mixture (charging/discharging) at dedicated facilities (PROC8b)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
dermal	systemic	Long-term	8.226 mg/kg p.c./day (ECETOC TRA worker v3)	0.131
combined routes	systemic	Long-term	/	0.356

### 12.3.3. Worker exposure: Chemical production or refinery in closed process with occasional controlled exposure or processes with equivalent containment conditions (PROC2)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.15
inhalation	local	Long-term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.15
inhalation	local	Short term	440.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	440.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
dermal	systemic	Long-term	0.822 mg/kg p.c./day (ECETOC TRA worker v3)	0.013
combined routes	systemic	Long-term	/	0.163

### 12.3.4. Worker exposure: Chemical production or formulation in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions (PROC3)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
dermal	systemic	Long-term	0.414 mg/kg p.c./day (ECETOC TRA worker v3)	< 0.01
combined routes	systemic	Long-term	/	0.307

### 12.3.5. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
dermal	systemic	Long-term	4.116 mg/kg p.c./day (ECETOC TRA worker v3)	0.065
combined routes	systemic	Long-term	/	0.29

### 12.3.6. Worker exposure: Transfer of substance or preparation (charging/discharging) at non dedicated facilities (PROC8a)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	77.09 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
inhalation	systemic	Short term	308.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.21
inhalation	local	Long-term	77.09 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
inhalation	local	Short term	308.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.21
dermal	systemic	Long-term	8.226 mg/kg p.c./day (ECETOC TRA worker v3)	0.131
combined routes	systemic	Long-term	/	0.236

### 12.3.7. Worker exposure: Treatment of articles by dipping and pouring (PROC13)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
dermal	systemic	Long-term	8.226 mg/kg p.c./day (ECETOC TRA worker v3)	0.131
combined routes	systemic	Long-term	/	0.356

### 12.3.8. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	330.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	systemic	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.9
inhalation	local	Long-term	330.3 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.45
inhalation	local	Short term	mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.9
dermal	systemic	Long-term	16.45 mg/kg p.c./day (ECETOC TRA worker v3)	0.261
combined routes	systemic	Long-term	/	0.711

### 12.3.9. Worker exposure: Non-industrial spray application (PROC11)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
dermal	systemic	Long-term	21.42 mg/kg p.c./day (ECETOC TRA worker v3)	0.34
combined routes	systemic	Long-term	/	0.64

### 12.3.10. Worker exposure: Non-industrial spray application (PROC11)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	2.143 mg/kg p.c./day (ECETOC TRA worker v3)	0.034
combined routes	systemic	Long-term	/	0.384

### 12.3.11. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m <sup>3</sup> (ECETOC TRA worker v3)	0.7
dermal	systemic	Long-term	5.486 mg/kg p.c./day (ECETOC TRA worker v3)	0.087
combined routes	systemic	Long-term	/	0.437

### 12.3.12. Worker exposure: Application with rollers or brushes (PROC10)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.6
dermal	systemic	Long-term	16.45 mg/kg p.c./day (ECETOC TRA worker v3)	0.261
combined routes	systemic	Long-term	/	0.561

### 12.3.13. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.053
inhalation	systemic	Short term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
inhalation	local	Long-term	38.54 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.053
inhalation	local	Short term	154.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.105
dermal	systemic	Long-term	4.116 mg/kg p.c./day (ECETOC TRA worker v3)	0.065
combined routes	systemic	Long-term	/	0.118

### 12.3.14. Worker exposure: Production of chemicals with the possibility of exposure (PROC4)

Exposure routes	Health effect	Exposure indicator	Estimated exposure	RCR
inhalation	systemic	Long-term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.15
inhalation	systemic	Short term	440.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
inhalation	local	Long-term	110.1 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.15
inhalation	local	Short term	440.5 mg/m <sup>3</sup> (ECETOC TRA worker v3)	0.3
dermal	systemic	Long-term	4.116 mg/kg p.c./day (ECETOC TRA worker v3)	0.065
combined routes	systemic	Long-term	/	0.215

## 12.4. GUIDANCE FOR DOWNSTREAM USERS TO ASSESS WHETHER THEY COMPLY WITH THE LIMITS SET BY THE EXPOSURE SCENARIO

Guidance to check compliance with the exposure scenario: <https://echa.europa.eu/>

# 4,4'-methylenediphenyl diisocyanate

## Identification of the exposure scenario

**Product name:** 4,4'-methylenediphenyl diisocyanate

CAS number: 101-68-8

Review date: 27/05/2021 rev. 13.1

## PROFESSIONAL USE - USE IN COATINGS

### 1. TITLE SECTION

#### **Structured short title**

Wide dispersive use by professional workers; Use in coatings.

#### **Worker**

**SC1** Use in coatings [MDI]: PROC4

**SC2** Use in coatings [MDI]: PROC5

**SC3** Use in coatings [MDI]: PROC8a

**SC4** Use in coatings [MDI]: PROC8b

**SC5** Use in coatings [MDI]: PROC10

**SC6** Use in coatings [MDI]: PROC11

**SC7** Use in coatings [MDI]: PROC13

### 2. CONDITIONS OF USE AFFECTING EXPOSURE

#### **2.1. Control of worker exposure: Use in batch and other processes (synthesis), where exposure opportunities occur (PROC4) [MDI]**

##### **Product features (article)**

**Concentration of substance in mixture/article:** ≤ 60%

**Molar mass:** 250 g/mol

**Vapour pressure:** 0.001 pa at 20°C

**Physical form of the product** Low volatile liquid

##### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

##### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

With local extract system (LEV):

- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.



### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Use adequate eye protection.
- Use adequate eye protection.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor use

Temperature: 50°C

## **2.2. Control of worker exposure: Mixture or mixture by batch processes (batch process) for the formulation of preparations and articles (contact in different phases and/or important contact) (PROC5) [MDI]**

### **Product features (article)**

**Concentration of substance in mixture/article:** ≤ 60%

**Molar mass:** 250 g/mol

**Vapour pressure:** 0.001 pa at 20°C

**Physical form of the product** Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.



Indoor use with local exhaust system (LEV):

- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.

Indoor use without local ventilation system or outdoor use:

Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.
- Indoor use without local ventilation system or outdoor use:
- Wear a respirator in accordance with EN140.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor/Outdoor use

Temperature: 23°C

## **2.3. Control of worker exposure: Transfer of a substance or a preparation (filling/emptying) from/to vessels/large containers, in non-dedicated facilities (PROC8a) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Remarks: Daily or more rarely. Short term

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.4. Control of worker exposure: Transfer of a substance or a preparation (filling/emptying) from/to vessels/large containers, in non-dedicated facilities (PROC8b) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Remarks: Daily or more rarely. Short term

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.
- Handle substance within a closed system.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.5. Worker Exposure Control: Roller or Brush Application (PROC10) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.6. Control of worker exposure: Non-industrial spraying (PROC11) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 6 hours/day

Remarks: 1,-,5

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

Indoor use 1:

- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Handle substance within a predominantly closed system provided with extract ventilation.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.

Indoor use 2:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Make sure a spray booth is used.

Indoor use 3:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Open doors and windows.
- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Ensure good ventilation.

Indoor use 4:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.

Outdoor use 5:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Make sure the operation is performed outdoors.
- Stay upwind/keep distance from source.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

#### General information

- Regardless of the risk reduction measures described here, a respirator is generally recommended for spray applications.

#### Indoor use 2:

- Wear a full face respirator in accordance with EN136.

#### Indoor use 3:

- Wear a full face respirator in accordance with EN136.

#### Indoor use 4:

- Wear a full face respirator in accordance with EN136.

#### Outdoor use 5:

- Wear a full face respirator in accordance with EN136.

### **Other conditions affecting worker exposure**

Exposed skin area: 1500 cm<sup>2</sup> (both hands and forearms)

Indoor and outdoor use: Indoor/Outdoor use

Temperature: 35°C

Remarks: 1,-,5

## **2.7 Controlling Worker Exposure: Treatment of Articles by dipping and pouring (PROC13) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.



These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE**

### **3.1. Worker exposure: Use in batch and other processes (synthesis), where exposure opportunities occur (PROC4) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.0006 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.012	General ventilation	30%
			Respiratory protection	90% efficiency
			LEV	90% efficiency
Local effects, by inhalation, local	0.0006 mg/m <sup>3</sup> (EasyTRA, v4.1)	0,012	General ventilation	30%
			Respiratory protection	90% efficiency Without local ventilation
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

### **Learn more about exposure estimates**

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### **3.2. Worker exposure: Mixture or blending by batch processes (discontinuous process) for the formulation of preparations and articles (contact in different phases and/or important contact) (PROC5)**

#### **[MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.00011 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0022	Indoor use	
			General ventilation	30%
			LEV	90% efficiency
			Respiratory protection	90% efficiency
Local effects, by inhalation, local	0.00011 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0022	Outdoor use	
			Outdoor use	30%
			Respiratory protection	90% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

### ***Learn more about exposure estimates***

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR  $\leq$  1).

\* Qualitative approach used to establish safe use.

### **3.3. Worker exposure: Transfer of a substance or a preparation (filling/ emptying) from/ to vessels/ large containers, in non-dedicated facilities (PROC8a) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.0036 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.072	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

### ***Learn more about exposure estimates***

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR  $\leq$  1).

\* Qualitative approach used to establish safe use.

### **3.4. Worker exposure: Transfer of a substance or a preparation (filling/ emptying) from/ to vessels/ large containers, in dedicated facilities (PROC8b) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.00364 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0728	General ventilation	30%
			Closed system	99% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

### ***Learn more about exposure estimates***

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR  $\leq$  1).

\* Qualitative approach used to establish safe use.

### **3.5. Worker exposure: Roller or brush application (PROC10) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.017 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.340	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

### ***Learn more about exposure estimates***

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR  $\leq$  1). \* Qualitative approach used to establish safe use.



### 3.6. Worker exposure: Non-industrial misting (PROC11) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.012 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.240	Indoor use	1
			General ventilation	30%
			LEV	99% efficiency
Local effects, by inhalation, local	0.003 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.060	Indoor use	2
			General ventilation	30%
			Paint booth	90% reduction
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.022 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.440	Indoor use	3
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.003 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.060	Indoor use	4
			General ventilation	30%
			LEV	90% efficiency
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.0022 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.440	Outdoor use	5
			Outdoors:	30% reduction
			Respiratory protection	97.5% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.7. Worker exposure: Treatment of articles by dipping and pouring (PROC13) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.017 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.340	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

## 4. GUIDANCE FOR DOWNSTREAM USERS TO ASSESS WHETHER THEY COMPLY WITH THE LIMITS SET BY THE EXPOSURE SCENARIO MDI

The risk management measures described in this exposure scenario apply to the specified substance in the concentration described by the scenario. The concentration of the substance in the product may differ. Downstream users should therefore check whether a scaling of the risk management measures is appropriate.

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Further information on the risk management measures and operational conditions for this type of exposure is available at [www.ISOPA.org](http://www.ISOPA.org).

## PROFESSIONAL USE - ADHESIVES, SEALANTS

### 1. TITLE SECTION

#### **Structured short title**

Wide dispersive use by professional workers; Adhesives, sealants

#### **Worker**

**SC1** Adhesives, Sealants [MDI]: PROC4

**SC2** Adhesives, Sealants [MDI]: PROC5

**SC3** Adhesives, Sealants [MDI]: PROC8a

**SC4** Adhesives, Sealants [MDI]: PROC8b

**SC5** Adhesives, Sealants [MDI]: PROC10

**SC6** Adhesives, Sealants [MDI]: PROC11

**SC7** Adhesives, Sealants [MDI]: PROC13

### 2. CONDITIONS OF USE AFFECTING EXPOSURE

#### **2.1. Control of worker exposure: Use in batch and other processes (synthesis), where exposure opportunities occur (PROC4) [MDI]**

##### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

##### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

##### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

With local extract system (LEV):

- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:
- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor use

Temperature: 50°C

### **2.2. Control of worker exposure: Mixture or mixture by batch processes (batch process) for the formulation of preparations and articles (contact in different phases and/or important contact) (PROC5) [MDI]**

#### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

#### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Frequency of use: 5 days/week

#### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

Indoor use without local ventilation system or outdoor use:

- Ensure that the control measures can be inspected and undergo maintenance.

Indoor use with local exhaust system (LEV):

- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

Indoor use without local ventilation system or outdoor use:

- Wear a respirator in accordance with EN140.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor/Outdoor use

Temperature: 23°C

## **2.3. Control of worker exposure: Transfer of a substance or a preparation (filling/emptying) from/to vessels/large containers, in non-dedicated facilities (PROC8a) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Remarks: Daily or more rarely. Short term

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.4. Control of worker exposure: Transfer of a substance or a preparation (filling/emptying) from/to vessels/large containers, in non-dedicated facilities (PROC8b) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 1 hour/day

Remarks: Daily or more rarely. Short term

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.
- Handle substance within a closed system.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:
- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.5. Worker Exposure Control: Roller or Brush Application (PROC10) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.



These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 960 cm<sup>2</sup> (both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **2.6. Control of worker exposure: Non-industrial spraying (PROC11) [MDI]**

### **Product features (article)**

**Concentration of substance in mixture/article:** ≤ 60%

**Molar mass:** 250 g/mol

**Vapour pressure:** 0.001 pa at 20°C

**Physical form of the product** Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 6 hours/day

Remarks: 1,-,5

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

Indoor use 1:

- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Handle substance within a predominantly closed system provided with extract ventilation.
- Provide a ventilation extract for points where emissions occur.
- Provide extract ventilation at material transfer points and other openings.

Indoor use 2:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Make sure a spray booth is used.

Indoor use 3:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Open doors and windows.
- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Ensure good ventilation.

Indoor use 4:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Localized aspiration is required.
- Provide a ventilation extract for points where emissions occur.

Outdoor use 5:

- Access to the work area is restricted to authorised personnel only.
- Ensure that the control measures can be inspected and undergo maintenance.
- Make sure the operation is performed outdoors.
- Stay upwind/keep distance from source.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.



#### General information

- Regardless of the risk reduction measures described here, a respirator is generally recommended for spray applications.

#### Indoor use 2:

- Wear a full face respirator in accordance with EN136.

#### Indoor use 3:

- Wear a full face respirator in accordance with EN136.

#### Indoor use 4:

- Wear a full face respirator in accordance with EN136.

#### Outdoor use 5:

- Wear a full face respirator in accordance with EN136.

#### **Other conditions affecting worker exposure**

Exposed skin area: 1500 cm<sup>2</sup> (both hands and forearms)

Indoor and outdoor use: Indoor/Outdoor use

Temperature: 35°C

Remarks: 1,-,5

## **2.7. Controlling Worker Exposure: Treatment of Articles by dipping and pouring (PROC13) [MDI]**

### **Product features (article)**

Concentration of substance in mixture/article: ≤ 60%

Molar mass: 250 g/mol

Vapour pressure: 0.001 pa at 20°C

Physical form of the product Low volatile liquid

### **Amounts used, frequency and duration of use (or useful life)**

General exposures: 8 hours/day

Frequency of use: 5 days/week

### **Organizational and technical measures and conditions**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).
- Handle substance within a predominantly closed system provided with extract ventilation.
- Handle in a fume hood or under extract ventilation.
- Clean up spills immediately.
- Ensure personnel are informed and trained on the nature of exposure and the basic actions to be taken to minimise exposure.
- Ensure that the control measures can be inspected and undergo maintenance.

### **Conditions and measures for personal protection, hygiene and health assessment**

These measures apply to all subsystems for products at temperatures below 40°C for pure MDI and below 45°C for other MDI-based substances or without spray application:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.

These measures apply to all subsystems for products at temperatures above 40°C for pure MDI and above 45°C for other MDI-based substances or with spray application and with aprotic polar solvents below 40°C:

- Do not inhale vapours/aerosols.
- Make sure that direct skin contact is avoided.
- Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
- Wash off any skin contamination immediately.
- Use adequate eye protection.
- Wear appropriate coveralls to avoid skin exposure.
- The use of latex gloves is not tolerated.
- Wear a full face respirator in accordance with EN136.
- Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying.

### **Other conditions affecting worker exposure**

Exposed skin area: 480 cm<sup>2</sup> (palm both hands)

Indoor and outdoor use: Indoor use

Temperature: 23°C

## **3. EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE**

### **3.1. Worker exposure: Use in batch and other processes (synthesis), where exposure opportunities occur (PROC4) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.0006 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.012	General ventilation	30%
			LEV	90% efficiency
			Respiratory protection	90% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### **Learn more about exposure estimates**

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### **3.2. Worker exposure: Mixture or blending by batch processes (discontinuous process) for the formulation of preparations and articles (contact in different phases and/or important contact) (PROC5) [MDI]**

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.00011 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0022	Indoor use	
			General ventilation	30%
			LEV	90% efficiency
			Respiratory protection	90% efficiency
Local effects, by inhalation, local	0.00011 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0022	Outdoor use	
			Outdoor use	30%
			Respiratory protection	90% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### **Learn more about exposure estimates**

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.3. Worker exposure: Transfer of a substance or a preparation (filling/ emptying) from/ to vessels/ large containers, in non-dedicated facilities (PROC8a) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.0036 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.072	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.4. Worker exposure: Transfer of a substance or a preparation (filling/ emptying) from/ to vessels/ large containers, in dedicated facilities (PROC8b) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.00364 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.0728	General ventilation	30%
			Closed system	99% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.5. Worker exposure: Roller or brush application (PROC10) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.017 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.340	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.6. Worker exposure: Non-industrial misting (PROC11) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.012 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.240	Indoor use	1
			General ventilation	30%
			LEV	99% efficiency
Local effects, by inhalation, local	0.003 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.060	Indoor use	2
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.022 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.440	Indoor use	3
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.003 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.060	Indoor use	4
			General ventilation	30%
			LEV	90% efficiency
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.022 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.440	Outdoor use	5
			Outdoors:	30% reduction
			Respiratory protection	97.5% efficiency
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

### 3.7. Worker exposure: Treatment of articles by dipping and pouring (PROC13) [MDI]

Exposure routes	Exposure level	RCR	Observations	
Local effects, by inhalation, local	0.017 mg/m <sup>3</sup> (EasyTRA, v4.1)	0.340	General ventilation	30%
Dermal exposure	* (Qualitative evaluation)	< 1	Gloves	90% protection

#### Learn more about exposure estimates

Based on the risk management measures adopted, the risk to humans is sufficiently controlled (RCR ≤ 1).

\* Qualitative approach used to establish safe use.

## 4. GUIDANCE FOR DOWNSTREAM USERS TO ASSESS WHETHER THEY COMPLY WITH THE LIMITS SET BY THE EXPOSURE SCENARIO MDI

The risk management measures described in this exposure scenario apply to the specified substance in the concentration described by the scenario. The concentration of the substance in the product may differ. Downstream users should therefore check whether a scaling of the risk management measures is appropriate.

Guidance is based on assumed operating conditions which may not be applicable to all sites, thus, scaling may be necessary to define appropriate site-specific risk management measures.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Further information on the risk management measures and operational conditions for this type of exposure is available at [www.ISOPA.org](http://www.ISOPA.org).