Ficha de datos de seguridad
PRIMER ADW
Ficha de datos de seguridad del 28/06/2023 Revisión 1

Atención: la numeración comienza desde 1.

SECCIÓN 1. Identificación de la sustancia o la mezcla y de la sociedad o la empresa

1.1. Identificador de producto

Identificación del preparado:

Nombre comercial: PRIMER ADW
Código comercial: 582K
UFI: WYK1-H08D-G008-N88Y

1.2. Usos pertinentes identificados de la sustancia o de la mezcla y usos desaconsejados

Uso recomendado: Resina consolidante y aislante para soleras a base de cemento

1.3. Datos del proveedor de la ficha de datos de seguridad

Proveedor: FASSA Srl
Via Lazzaris, 3 - 31027 Spresiano (TV) - ITALY
Tel. +39 0422 7222
Fax +39 0422 887509
Responsable: laboratorio.spresiano@fassabortolo.it

1.4. Teléfono de emergencia

+34 91 562 04 20

SECCIÓN 2. Identificación de los peligros

2.1. Clasificación de la sustancia o de la mezcla

Reglamento (CE) n. 1272/2008 (CLP)

Flam. Liq. 2	Líquido y vapores muy inflamables.
Acute Tox. 4	Nocivo en caso de inhalación.
Skin Irrit. 2	Provoca irritación cutánea.
Eye Irrit. 2	Provoca irritación ocular grave.
Resp. Sens. 1	Puede provocar síntomas de alergia o asma o dificultades respiratorias en caso de inhalación.
Skin Sens. 1	Puede provocar una reacción alérgica en la piel.
Carc. 2	Se sospecha que provoca cáncer.
STOT SE 3	Puede irritar las vías respiratorias.
STOT SE 3	Puede provocar somnolencia o vértigo.
STOT RE 2	Puede provocar daños en los órganos tras exposiciones prolongadas o repetidas.

Efectos físico-químicos nocivos para la salud humana y para el medio ambiente:

Ningún otro riesgo

2.2. Elementos de la etiqueta

Reglamento (CE) n. 1272/2008 (CLP)

Pictogramas de peligro y palabra de advertencia

Peligro

Indicaciones de peligro

H225	Líquido y vapores muy inflamables.
H315	Provoca irritación cutánea.
H317	Puede provocar una reacción alérgica en la piel.
H319	Provoca irritación ocular grave.
H332	Nocivo en caso de inhalación.
H334	Puede provocar síntomas de alergia o asma o dificultades respiratorias en caso de inhalación.
H335	Puede irritar las vías respiratorias.

H336	Puede provocar somnolencia o vértigo.
H351	Se sospecha que provoca cáncer.
H373	Puede provocar daños en los órganos tras exposiciones prolongadas o repetidas.

Consejos de prudencia

P210	Mantener alejado del calor, de superficies calientes, de chispas, de llamas abiertas y de cualquier otra fuente de ignición. No fumar.
P261	Evitar respirar el humo/el gas/la niebla/los vapores/el aerosol.
P280	Llevar guantes, prendas, gafas y máscara de protección.
P304+P340	EN CASO DE INHALACIÓN: Transportar a la persona al aire libre y mantenerla en una posición que le facilite la respiración.
P342+P311	En caso de síntomas respiratorios: Llamar a un CENTRO DE TOXICOLOGIA/médico.
P370+P378	En caso de incendio: Utilizar un extintor de CO2 para la extinción.

Disposiciones especiales:

EUH204	Contiene isocianatos. Puede provocar una reacción alérgica.

Contiene:

Difenilmetandiisocianato, isómeros y homólogos

Acetato de etilo

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

Diisocianato de 4,4'-metilen-difenilo

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

Disposiciones especiales de acuerdo con el anexo XVII del Reglamento REACH y sus posteriores modificaciones:

A partir del 24 de agosto de 2023 es obligatorio tener la formación adecuada para proceder a un uso industrial o profesional.

2.3. Otros peligros

Ninguna sustancia PBT, mPmB o perturbador endocrino presente en concentración >=0.1%

En caso de hipersensibilidad (asma, bronquitis crónica) se recomienda no manipular el producto. Incluso varias horas después de una posible sobreexposición pueden manifestarse síntomas de alteraciones de las vías respiratorias. El polvo, los vapores y los aerosoles son el principal peligro para las vías respiratorias.

Ningún otro riesgo

SECCIÓN 3. Composición/información sobre los componentes

3.1. Sustancias

N.A.

3.2. Mezclas

Identificación del preparado: PRIMER ADW

Componentes peligrosos según el Reglamento CLP y su correspondiente clasificación:

Cantidad	Nombre	Núm. Ident.	Clasificación	Número de registro:
≥50 - <80 %	Acetato de etilo	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 Estimación de la toxicidad aguda: ETA - Inhalación (Polvo o niebla): 15mg/l ETA - Inhalación (Vapores): 11mg/l	

≥10 - <20 %	Difenilmetandiisocianato, isómeros y homólogos	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 Límites de concentración específicos: 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 Estimación de la toxicidad aguda: ETA - Inhalación (Polvo o niebla): 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 Estimación de la toxicidad aguda: ETA - Inhalación (Vapores): 11mg/l	01-2119457015-45-xxxx
≥3 - <5 %	Diisocianato de 4,4'-metilen-difenilo	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 Límites de concentración específicos: 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 Estimación de la toxicidad aguda: ETA - Inhalación (Polvo o niebla): 1.5mg/l	01-2119457014-47-xxxx

SECCIÓN 4. Primeros auxilios

4.1. Descripción de los primeros auxilios

En caso de contacto con la piel:

Quitarse de inmediato la indumentaria contaminada y eliminarla de manera segura.

Lavar inmediatamente con abundante agua corriente y eventualmente jabón las zonas del cuerpo que han entrado en contacto con el producto, incluso si fuera sólo una sospecha.

Lavar completamente el cuerpo (ducha o baño).

En caso de contacto con los ojos:

En caso de contacto con los ojos, enjugarlos con agua durante un tiempo adecuado y manteniendo los párpados abiertos, luego consultar de inmediato con un oftalmólogo.

Proteger el ojo ileso.

En caso de ingestión:

No inducir el vómito, consultar con un médico presentando la FDS (Ficha de Datos de Seguridad) y la etiqueta de productos peligrosos

En caso de inhalación:

Llevar al accidentado al aire libre y mantenerlo en reposo y abrigado.

En caso de respiración irregular o parada respiratoria, administrar respiración artificial.

En caso de inhalación consultar de inmediato con un médico y mostrarle el envase o la etiqueta.

4.2. Principales síntomas y efectos, agudos y retardados

Los síntomas y los efectos son como se espera de los peligros según las indicaciones de la sección 2.

4.3. Indicación de toda atención médica y de los tratamientos especiales que deban dispensarse inmediatamente

En caso de accidente o malestar, consultar de inmediato con un médico (si es posible mostrarle las instrucciones de uso o la ficha de seguridad)

SECCIÓN 5. Medidas de lucha contra incendios

5.1. Medios de extinción

Medios de extinción apropiados:

En caso de incendio: Utilizar un extintor de CO2 para la extinción.

CO2, extintores de polvo, espuma, agua nebulizada.

Medios de extinción que no se deben utilizar por motivos de seguridad:

Agua en chorros.

5.2. Peligros específicos derivados de la sustancia o la mezcla

La combustión produce humo pesado.

No inhalar los gases producidos por la explosión y/o la combustión (monóxido y dióxido de carbono, óxidos de nitrógeno).

5.3. Recomendaciones para el personal de lucha contra incendios

Utilizar equipos respiratorios apropiados.

Recoger por separado el agua contaminada utilizada para extinguir el incendio. No descargarla en la red de alcantarillado.

Si es posible, desde el punto de vista de la seguridad, retirar de inmediato del área los contenedores no dañados.

SECCIÓN 6. Medidas en caso de vertido accidental

6.1. Precauciones personales, equipo de protección y procedimientos de emergencia

Usar los dispositivos de protección individual.

Quitar toda fuente de encendido.

En caso de exposición a vapores/polvos/aerosoles, usar equipos respiratorios.

Proporcionar una ventilación adecuada.

Utilizar una protección respiratoria adecuada.

Consultar las medidas de protección expuestas en los puntos 7 y 8.

6.2. Precauciones relativas al medio ambiente

Evitar que el producto penetre en el suelo/subsuelo. Evitar que penetre en aguas superficiales o en el alcantarillado.

En caso de fuga de gas o penetración en cursos de agua, suelo o sistema de alcantarillado, informar a las autoridades responsables.

6.3. Métodos y material de contención y de limpieza

Material idóneo para la recogida: material absorbente inerte (por ejemplo, arena, vermiculita).

Después de recoger el producto, lave con agua la zona y los materiales implicados.

Conservar el agua de lavado contaminada y eliminarla.

6.4. Referencia a otras secciones

Véanse también los apartados 8 y 13.

SECCIÓN 7. Manipulación y almacenamiento

7.1. Precauciones para una manipulación segura

Evitar el contacto con la piel y ojos, la inhalación de vapores y nieblas.

Utilizar el sistema de ventilación localizado.

No utilizar contenedores vacíos que no hayan sido previamente limpiados.

Antes de realizar las operaciones de transferencia, asegurarse de que en los contenedores no haya materiales residuos incompatibles.

Recomendaciones sobre medidas generales de higiene en el trabajo:

La indumentaria contaminada debe ser sustituida antes de acceder a las áreas de almuerzo.

No comer ni beber durante el trabajo.

Remitirse también al apartado 8 para los dispositivos de protección recomendados.

7.2. Condiciones de almacenamiento seguro, incluidas posibles incompatibilidades

Conservar los recipientes bien cerrados en un lugar fresco y ventilado, lejos de fuentes de calor.

Manténgase alejado de llamas libres, chispas y fuentes de calor. Evite la exposición directa al sol.

Mantener alejado de comidas, bebidas y piensos.

Materias incompatibles:

Ver punto 10.5

Indicaciones para los locales:

Frescos y adecuadamente aireados.

7.3. Usos específicos finales

Recomendaciones

Ver punto 1.2

Soluciones específicas para el sector industrial

Ningún uso particular

SECCIÓN 8. Controles de exposición/protección individual

8.1. Parámetros de control

Lista de los componentes en la fórmula con un valor OEL.

	Tipo OEL	país	Techo	Largo plazo mg/m3	Largo Plazo ppm	Corto plazo mg/m3	Corto plazo ppm	Nota
Acetato de etilo CAS: 141-78-6	ACGIH				400			URT and eye irr
	UE			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	
Difenilmetandiisocianato, isómeros y homólogos 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		
Diisocianato de 4,4'-metilen-difenilo 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

Lista de los componentes contenidos en la fórmula con valor PNEC (nivel ningún efecto previsto)

	Límite PNEC	Vía de exposición	Frecuencia de exposición	Notas
Acetato de etilo CAS: 141-78-6	0.024 mg/l	Agua marina		
	0.24 mg/l	agua dulce		
	0.115 mg/kg	Sedimentos de agua marina		
	1.15 mg/kg	Sedimentos de agua dulce		
	650 mg/l	Microorganismos en aguas residuales (STP)		
	0.148 mg/kg	Suelo (agricultura)		
Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	0.003 mg/l	agua dulce		
	0.001 mg/l	Agua marina		
	11.7 mg/kg	Sedimentos de agua dulce		
	1.17 mg/kg	Sedimentos de agua marina		
	2.33 mg/kg	suelo		
Diisocianato de 4,4'-metilen-difenilo CAS: 101-68-8	1 mg/l	agua dulce		
	0.1 mg/l	Agua marina		
	1 mg/l	Microorganismos en aguas residuales (STP)		
	1 mg/kg	Suelo (agricultura)		

Nivel sin efecto derivado. (DNEL)

	Trabajador industrial	Trabajador profesional	Consumidor	Vía de exposición	Frecuencia de exposición	Notas
Acetato de etilo CAS: 141-78-6		734 mg/m3	367 mg/m3	Por inhalación humana	A largo plazo, efectos sistémicos	
		734 mg/m3	367 mg/m3	Por inhalación humana	A largo plazo, efectos locales	
		1468 mg/m3	734 mg/m3	Por inhalación humana	A corto plazo, efectos sistémicos	
		1468 mg/m3	734 mg/m3	Por inhalación humana	A corto plazo, efectos locales	

		63 mg/kg	37 mg/kg	Dérmica humana	A largo plazo, efectos sistémicos
			4.5 mg/kg	Oral humana	A largo plazo, efectos sistémicos
Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl) phenyl isocyanate / methylene diphenyl diisocyanate	0.1 mg/m3			Por inhalación humana	A corto plazo (aguda)
	0.05 mg/m3			Por inhalación humana	A largo plazo (repetida)
Diisocianato de 4,4'-metilen-difenilo CAS: 101-68-8		0.1 mg/m3	0.05 mg/m3	Por inhalación humana	A corto plazo, efectos locales
		0.05 mg/m3	0.025 mg/m3	Por inhalación humana	A largo plazo, efectos locales

El producto puede contener trazas de isocianato de fenilo.

Valor de evaluación de la exposición según TRGS 430: el contenido de poliisocianato (oligómeros y/o prepolímeros de MDI) es del 45%. Por tanto, se debe tomar como valor de evaluación de la exposición 0,05 mg/m³.

8.2. Controles de la exposición

Procurar una ventilación adecuada. Cuando sea razonablemente factible, esto se puede lograr mediante el uso de ventilación de aire de cambio y una buena aspiración general.

Protección de los ojos:

Gafas con protección lateral (EN 166).

Protección de la piel:

El personal debe usar ropa antiestática hecha de fibra natural o fibra sintética resistente a altas temperaturas.

Protección de las manos:

No existe un material o una combinación de materiales para guantes que pueda garantizar una resistencia ilimitada a cualquier producto químico o combinación de productos.

Para la manipulación prolongada o repetida, usar guantes resistentes a los productos químicos.

Materiales adecuados para guantes de protección (EN 374/EN 16523); FKM (Caucho fluorado): espesor >= 0.4 mm; tiempo de permeación >= 480 min.; NBR (Caucho nitrilo): espesor >= 0.4 mm; tiempo de permeación >= 480 min.

La elección de los guantes adecuados no solo depende del material sino también de otras características de calidad que varían de un fabricante a otro, y de los métodos y tiempos de uso de la mezcla.

Protección respiratoria:

Si los trabajadores están expuestos a concentraciones superiores a los límites de exposición, deben utilizar respiradores certificados y adecuados.

Dispositivo de filtrado combinado (EN 14387): máscara con filtro A-P2.

Controles de la exposición ambiental:

Ver punto 6.2

Medidas higiénicas y técnicas

Ver apartado 7.

SECCIÓN 9. Propiedades físicas y químicas

9.1. Información sobre propiedades físicas y químicas básicas

Aspecto: Líquido

Color: marrón oscuro

Olor: sabroso

Punto de fusión/congelamiento: N.D.

Punto de ebullición inicial e intervalo de ebullición: N.D.

Inflamabilidad: El producto está clasificado Flam. Liq. 2 H225

Límite superior/inferior de inflamabilidad o explosión: N.D.

Punto de inflamación: < 23°C

Temperatura de auto-inflamación: N.D.

Temperatura de descomposición: N.D.

pH: N.A.

Viscosidad cinemática: N.A.

Densidad: N.A.

Densidad de los vapores: N.D.

Presión de vapor: N.D.

Hidrosolubilidad: N.A.

Solubilidad en aceite: N.A.

Coeficiente de reparto (n-octanol/agua): N.A.

Características de las partículas:

Tamaño de las partículas: N.A.

9.2. Otros datos

Conductividad: N.A.

Propiedades explosivas: N.A.

Propiedades comburentes: N.A.

Tasa de evaporación: N.A.

SECCIÓN 10. Estabilidad y reactividad

10.1. Reactividad

Estable en condiciones normales

10.2. Estabilidad química

Estable en condiciones normales

A partir de 200 °C polimerización, desarrollo de CO2.

10.3. Posibilidad de reacciones peligrosas

Debido al efecto del calor o en caso de incendio, se pueden liberar óxidos de carbono y vapores que pueden ser perjudiciales para la salud.

Mantener alejado de agentes oxidantes y materiales fuertemente alcalinos o ácidos, para evitar reacciones exotérmicas.

10.4. Condiciones que deben evitarse

Evitar acercarse a fuentes de calor.

10.5. Materiales incompatibles

Evitar el contacto con materiales oxidantes. El producto podría inflamarse.

Ver punto 10.3

10.6. Productos de descomposición peligrosos

En caso de almacenamiento y manipulación adecuados no se desarrollan productos de descomposición peligrosos.

Ver punto 5.2

SECCIÓN 11. Información toxicológica

11.1. Información sobre las clases de peligro definidas en el Reglamento (CE) n.o 1272/2008

Información toxicológica del producto:

a) toxicidad aguda	El producto está clasificado: Acute Tox. 4(H332)
b) corrosión o irritación cutáneas	El producto está clasificado: Skin Irrit. 2(H315)
c) lesiones o irritación ocular graves	El producto está clasificado: Eye Irrit. 2(H319)
d) sensibilización respiratoria o cutánea	El producto está clasificado: Resp. Sens. 1(H334), Skin Sens. 1(H317)
e) mutagenicidad en células germinales	No clasificado A la vista de los datos disponibles, no se cumplen los criterios de clasificación.
f) carcinogenicidad	El producto está clasificado: Carc. 2(H351)
g) toxicidad para la reproducción	No clasificado A la vista de los datos disponibles, no se cumplen los criterios de clasificación.
h) toxicidad específica en determinados órganos (STOT) – exposición única	El producto está clasificado: STOT SE 3(H335), STOT SE 3(H336)
i) toxicidad específica en determinados órganos (STOT) – exposición repetida	El producto está clasificado: STOT RE 2(H373)
j) peligro de aspiración	No clasificado A la vista de los datos disponibles, no se cumplen los criterios de clasificación.

La información toxicológica de las sustancias principales halladas en el producto:

Acetato de etilo	a) toxicidad aguda	LD50 Oral Rata 4934 mg/kg
		LD50 Piel Conejo > 20000 mg/kg

		LC50 Vapor de inhalación Rata > 22.5 mg/l 6h
Isocyanic acid, polymethylenepolyphenylene ester, polymer with .alpha.-hydro-.om	a) toxicidad aguda	ETA - Inhalación (Polvo o niebla) : 15 mg/l
		ETA - Inhalación (Vapores) : 11 mg/l
Difenilmetandiisocianato, isómeros y homólogos	a) toxicidad aguda	ETA - Inhalación (Polvo o niebla) : 1.5 mg/l
		LD50 Oral Rata > 10000 mg/kg
		LD50 Piel Conejo > 9400 mg/kg
Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate / methylene diphenyl diisocyanate	a) toxicidad aguda	ETA - Inhalación (Vapores) : 11 mg/l
Diisocianato de 4,4'-metilen-difenilo	a) toxicidad aguda	ETA - Inhalación (Polvo o niebla) : 1.5 mg/l
		LD50 Oral Rata > 2000 mg/kg
		LD50 Piel Conejo > 9400 mg/kg

11.2. Información relativa a otros peligros

Propiedades de alteración endocrina:

Ningún perturbador endocrino presente en concentración >= 0.1%

SECCIÓN 12. Información ecológica

Utilícese con técnicas de trabajo adecuadas, evitando la dispersión del producto en el medio ambiente.

12.1. Toxicidad

Información Ecotoxicológica:

Lista de propiedades eco-toxicológicas del producto

No clasificado para riesgos medio ambientales

No hay datos disponibles para el producto

Lista de componentes con propiedades ecotoxicológicas

Componente	Núm. Ident.	Inform Ecotox
Acetato de etilo	CAS: 141-78-6 - EINECS: 205-500-4 - INDEX: 607-022-00-5	a) Toxicidad acuática aguda : LC50 Peces 230 mg/l 96h
		a) Toxicidad acuática aguda : EC50 Daphnia 165 mg/l 48h
Difenilmetandiisocianato, isómeros y homólogos	CAS: 9016-87-9 - INDEX: 615-005-00-9	a) Toxicidad acuática aguda : LC50 Peces > 1000 mg/l 96h
		a) Toxicidad acuática aguda : LC50 Daphnia > 1000 mg/l 24h
		b) Toxicidad acuática crónica : NOEC Daphnia > 10 mg/l - 21d
		a) Toxicidad acuática aguda : ErC50 Algas > 1640 mg/l 72h
Diisocianato de 4,4'-metilen-difenilo	CAS: 101-68-8 - EINECS: 202-966-0 - INDEX: 615-005-00-9	a) Toxicidad acuática aguda : LC50 Peces > 1000 mg/l 96h
		a) Toxicidad acuática aguda : EC50 Daphnia > 1000 mg/l 24h
		b) Toxicidad acuática crónica : NOEC Daphnia > 10 mg/l - 21d
		a) Toxicidad acuática aguda : EC50 Algas > 1640 mg/l 72h

12.2. Persistencia y degradabilidad

Utilizar el producto según las buenas prácticas de trabajo, evitando la dispersión del producto en el ambiente. Comunicar a las autoridades

competentes si el producto ha llegado a cursos de agua o alcantarillado o ha contaminado el suelo o la vegetación.

Componente	Persistencia/degradabilidad:
Acetato de etilo	Rápidamente degradable
Difenilmetandiisocianato, isómeros y homólogos	No rápidamente degradable

12.3. Potencial de bioacumulación

N.A.

12.4. Movilidad en el suelo

N.A.

12.5. Resultados de la valoración PBT y mPmB

Sobre la base de los datos disponibles, el producto no contiene sustancias PBT/mPmB en porcentaje ≥ 0.1%.

12.6. Propiedades de alteración endocrina

Ningún perturbador endocrino presente en concentración >= 0.1%

12.7. Otros efectos adversos

N.A.

SECCIÓN 13. Consideraciones relativas a la eliminación

13.1. Métodos para el tratamiento de residuos

Recuperar si es posible. Enviar a centros de eliminación autorizados o a incineración en condiciones controladas. Operar conforme con las disposiciones locales y nacionales vigentes.

No permitir la entrada en alcantarillados o cursos de agua.

Deseche los recipientes contaminados por el producto de acuerdo con las disposiciones legales locales o nacionales.

SECCIÓN 14. Información relativa al transporte

14.1. Número ONU o número ID

1866

14.2. Designación oficial de transporte de las Naciones Unidas

ADR-Designación del transporte: RESINA, SOLUCIONES DE

IATA-Nombre técnico: RESIN SOLUTION

IMDG-Nombre técnico: RESIN SOLUTION

14.3. Clase(s) de peligro para el transporte

ADR-Por carretera: 3

IATA-Clase: 3

IMDG-Clase: 3

14.4. Grupo de embalaje

ADR-Grupo de embalaje: II

IATA-Grupo de embalaje: II

IMDG-Grupo de embalaje: II

14.5. Peligros para el medio ambiente

Agente contaminante del mar: No

Contaminante ambiental: No

IMDG-EMS: F-E, S-E

14.6. Precauciones particulares para los usuarios

Carretera y Ferrocarril (ADR-RID)

ADR-Etiquetado: 3

ADR - Número de identificación del peligro: 33

ADR-Disposiciones especiales: 640C

ADR-Categoria de transporte (Código de restricción en túneles):

Aire (IATA)

IATA-Pasajeros del avión: 353

IATA-Carga del avión: 364

IATA-Etiquetado: 3

IATA-Peligro secundario: -

IATA-Erg: 5L

IATA-Disposiciones especiales: A3

Mar (IMDG)

IMDG-Código de estiba: Category B

IMDG-Nota de estiba: -

IMDG-Peligro secundario: -

IMDG-Disposiciones especiales: -

14.7. Transporte marítimo a granel con arreglo a los instrumentos de la OMI

N.A.

SECCIÓN 15. Información reglamentaria

15.1. Reglamentación y legislación en materia de seguridad, salud y medio ambiente específicas para la sustancia o la mezcla

Dir. 98/24/CE (Riesgos relacionados con los agentes quí˙micos durante el trabajo)
Dir. 2000/39/CE (Valores límite de exposición profesional)
Directiva 2010/75/EU
Reglamento (CE) n. 1907/2006 (REACH)
Reglamento (CE) n. 1272/2008 (CLP)
Reglamento (CE) n. 790/2009 (ATP 1 CLP) y (UE) n. 758/2013
Reglamento (UE) n. 2020/878
Reglamento (UE) n. 286/2011 (ATP 2 CLP)
Reglamento (UE) n. 618/2012 (ATP 3 CLP)
Reglamento (UE) n. 487/2013 (ATP 4 CLP)
Reglamento (UE) n. 944/2013 (ATP 5 CLP)
Reglamento (UE) n. 605/2014 (ATP 6 CLP)
Reglamento (UE) n. 2015/1221 (ATP 7 CLP)
Reglamento (UE) n. 2016/918 (ATP 8 CLP)
Reglamento (UE) n. 2016/1179 (ATP 9 CLP)
Reglamento (UE) n. 2017/776 (ATP 10 CLP)
Reglamento (UE) n. 2018/669 (ATP 11 CLP)
Reglamento (UE) n. 2018/1480 (ATP 13 CLP)
Reglamento (UE) n. 2019/521 (ATP 12 CLP)
Reglamento (UE) n. 2020/217 (ATP 14 CLP)
Reglamento (UE) n. 2020/1182 (ATP 15 CLP)
Reglamento (UE) n. 2021/643 (ATP 16 CLP)
Reglamento (UE) n. 2021/849 (ATP 17 CLP)
Reglamento (UE) n. 2022/692 (ATP 18 CLP)

Restricciones relacionadas con el producto o las sustancias contenidas, de acuerdo con el anexo XVII del Reglamento (CE) 1907/2006 (REACH) y las modificaciones posteriores:

Restricciones relacionadas con el producto: 3, 40

Restricciones relacionadas con las sustancias contenidas: 56, 74, 75

Disposiciones sobre la directiva EU 2012/18 (Seveso III):

Categoría Seveso III de acuerdo con el anexo 1, parte 1	Requisitos de nivel inferior (toneladas)	Requisitos de nivel superior (toneladas)
el producto pertenece a la categoría: P5c	5000	50000

Reglamento (UE) No 649/2012 (Reglamento PIC)

No hay sustancias listadas

Clase de peligro para las aguas (Alemania).

3: Severe hazard to waters

Sustancias SVHC:

Sobre la base de los datos disponibles, el producto no contiene sustancias SVHC en porcentaje ≥ 0.1%.

15.2. Evaluación de la seguridad química

No se ha realizado ninguna evaluación de la seguridad química para la mezcla

SECCIÓN 16. Otra información

Código	Descripción
EUH066	La exposición repetida puede provocar sequedad o formación de grietas en la piel.
H225	Líquido y vapores muy inflamables.
H315	Provoca irritación cutánea.
H317	Puede provocar una reacción alérgica en la piel.
H319	Provoca irritación ocular grave.
H332	Nocivo en caso de inhalación.
H334	Puede provocar síntomas de alergia o asma o dificultades respiratorias en caso de inhalación.
H335	Puede irritar las vías respiratorias.
H336	Puede provocar somnolencia o vértigo.
H351	Se sospecha que provoca cáncer.
H373	Puede provocar daños en los órganos tras exposiciones prolongadas o repetidas.
H373	Puede provocar daños en los órganos tras exposiciones prolongadas o repetidas por inhalación.
H373	Puede provocar daños en los órganos (vias respiratorias) tras exposiciones prolongadas o repetidas por inhalación.

Código	Clase y categoría de peligro	Descripción
2.6/2	Flam. Liq. 2	Líquidos inflamables, Categoría 2
3.1/4/Inhal	Acute Tox. 4	Toxicidad aguda (por inhalación), Categoría 4
3.2/2	Skin Irrit. 2	Irritación cutánea, Categoría 2
3.3/2	Eye Irrit. 2	Irritación ocular, Categoría 2
3.4.1/1	Resp. Sens. 1	Sensibilización respiratoria, Categoría 1
3.4.2/1	Skin Sens. 1	Sensibilización cutánea, Categoría 1
3.6/2	Carc. 2	Carcinogenicidad, Categoría 2
3.8/3	STOT SE 3	Toxicidad específica en determinados órganos (exposiciones única), Categoría 3
3.9/2	STOT RE 2	Toxicidad específica en determinados órganos (exposiciones repetidas), Categoría 2

Clasificación y procedimiento utilizado para determinar la clasificación de las mezclas con arreglo al Reglamento (CE) nº 1272/2008 [CLP]:

Clasificación con arreglo al Reglamento (CE) nº 1272/2008	Procedimento de clasificación
2.6/2	Conforme a datos obtenidos de los ensayos
3.1/4/Inhal	Método de cálculo
3.2/2	Método de cálculo
3.3/2	Método de cálculo
3.4.1/1	Método de cálculo
3.4.2/1	Método de cálculo
3.6/2	Método de cálculo
3.8/3	Método de cálculo
3.8/3	Método de cálculo
3.9/2	Método de cálculo

Este documento ha sido preparado por una persona competente que ha recibido un entrenamiento adecuado

Principales fuentes bibliográficas:

ECDIN: Environmental Chemicals Data and Information Network, Centro Común de Investigación, Comisión de las Comunidades Europeas

SAX's DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS, 8ª ed., Van Nostrand Reinold

Fichas de datos de seguridad de los proveedores de materias primas.

CCNL - Allegato 1

La información aquí detallada se basa en nuestros conocimientos hasta la fecha señalada arriba. Se refiere exclusivamente al producto indicado y no constituye garantía de cualidades particulares.

El usuario debe asegurarse de la idoneidad y exactitud de dicha información en relación al uso específico que debe hacer del producto.

Esta ficha anula y sustituye toda edición precedente.

Explicación de las abreviaturas y acrónimos usados en la ficha de datos de seguridad:

ACGIH: Conferencia Americana de Higienistas Industriales Gubernamentales

ADR: Acuerdo europeo relativo al transporte internacional de mercancías peligrosas por carretera.
ATE: Estimación de la toxicidad aguda
ATEmix: Estimación de Toxicidad Aguda (Mezclas)
BEI: Índice Biológico de Exposición
CAS: Chemical Abstracts Service (de la American Chemical Society).
CAV: Instituto de toxicología
CE: Comunidad Europea
CLP: Clasificación, etiquetado, embalaje.
CMR: Carcinógeno, mutagénico y tóxico para la reproducción
COV: Compuesto orgánico volátil
CSA: Valoración de la seguridad química
CSR: Informe sobre la seguridad química
DNEL: Nivel sin efecto derivado.
EC50: Concentración efectiva media
ECHA: Agencia Europea de Sustancias y Preparados Químicos
EINECS: Catálogo Europeo de Sustancias Químicas Comercializadas.
ES: Escenario de exposición
GefStoffVO: Ordenanza sobre sustancias peligrosas, Alemania.
GHS: Sistema Globalmente Armonizado de clasificación y etiquetado de productos químicos.
IARC: Centro Internacional de Investigaciones sobre el Cáncer
IATA: Asociación de Transporte Aéreo Internacional.
IC50: Concentración inhibitoria media
IMDG: Código marítimo internacional de mercancías peligrosas.
LC50: Concentración letal para el 50% de la población expuesta.
LD50: Dosis letal para el 50% de la población expuesta.
LDLo: Dosis letal baja
N.A.: No aplicable
N/A: No aplicable
N/D: No definido/No disponible
N.D.: No disponible
NIOSH: Instituto Nacional para la Salud y la Seguridad Ocupacional
NOAEL: Nivel sin Efecto Adverso Observado
OSHA: Administración de Seguridad y Salud Ocupacional.
PBT: Persistente, bioacumulable y tóxico
PGK: Instrucciones de embalaje
PNEC: Concentración prevista sin efecto.
PSG: Pasajeros
RID: Normas relativas al transporte internacional de mercancías peligrosas por ferrocarril.
STEL: Nivel de exposición de corta duración.
STOT: Toxicidad específica en determinados órganos.
TLV: Valor límite del umbral.
TLV-TWA: Valor límite del umbral para el tiempo medio ponderado de 8 horas por día (Estándar ACGIH).
vPvB: Muy persistente y muy bioacumulable.
WGK: Clase de peligro para las aguas (Alemania).

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_I].
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 tabletting, 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: ≤ 1 t/day
Annual amount per site: ≤ 300 t/year

Organizational and technical measures and conditions
A wastewater treatment plant is expected.
Assumed domestic sewage treatment plant flow: ≥ 2E³ m³/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 m³/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/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	systemic	Short term	0.147 mg/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	local	Long-term	0.037 mg/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	local	Short term	0.147 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	361.7 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	361.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	361.7 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	361.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m³ (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.05
inhalation	systemic	Short term	146.8 mg/m³ (ECETOC TRA worker v3)	0.1
inhalation	local	Long-term	36.71 mg/m³ (ECETOC TRA worker v3)	0.05
inhalation	local	Short term	146.8 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0,038
inhalation	systemic	Short term	110.1 mg/m³ (ECETOC TRA worker v3)	0,075
inhalation	local	Long-term	27.53 mg/m³ (ECETOC TRA worker v3)	0,038
inhalation	local	Short term	110.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m³ (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.1
inhalation	systemic	Short term	293.6 mg/m³ (ECETOC TRA worker v3)	0.2
inhalation	local	Long-term	73.42 mg/m³ (ECETOC TRA worker v3)	0.1
inhalation	local	Short term	293.6 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	systemic	Short term	1.468 mg/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	local	Long-term	0.367 mg/m³ (ECETOC TRA worker v3)	< 0.01
inhalation	local	Short term	1.468 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m³ (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m³ (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m³ (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m³ (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.125
inhalation	systemic	Short term	367.1 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Long-term	91.77 mg/m³ (ECETOC TRA worker v3)	0.125
inhalation	local	Short term	367.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.175
inhalation	systemic	Short term	513.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Long-term	128.4 mg/m³ (ECETOC TRA worker v3)	0.175
inhalation	local	Short term	513.9 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.42
inhalation	systemic	Short term	mg/m³ (ECETOC TRA worker v3)	0.84
inhalation	local	Long-term	308.3 mg/m³ (ECETOC TRA worker v3)	0.42
inhalation	local	Short term	mg/m³ (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/m³ (ECETOC TRA worker v3)	0.21
inhalation	systemic	Short term	616.7 mg/m³ (ECETOC TRA worker v3)	0.42
inhalation	local	Long-term	154.1 mg/m³ (ECETOC TRA worker v3)	0.21
inhalation	local	Short term	616.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m³ (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.053
inhalation	systemic	Short term	154.1 mg/m³ (ECETOC TRA worker v3)	0.105
inhalation	local	Long-term	38.54 mg/m³ (ECETOC TRA worker v3)	0.053
inhalation	local	Short term	154.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.25
inhalation	systemic	Short term	734.2 mg/m³ (ECETOC TRA worker v3)	0.5
inhalation	local	Long-term	183.5 mg/m³ (ECETOC TRA worker v3)	0.25
inhalation	local	Short term	734.2 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.45
inhalation	systemic	Short term	1.32 g/m³ (ECETOC TRA worker v3)	0.9
inhalation	local	Long-term	330.3 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Short term	1.32 g/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	mg/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	mg/m³ (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/m³ (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m³ (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.15
inhalation	local	Long-term	110.1 mg/m³ (ECETOC TRA worker v3)	0.15
inhalation	local	Short term	440.5 mg/m³ (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	440.5 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m³ (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m³ (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m³ (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.105
inhalation	systemic	Short term	308.3 mg/m³ (ECETOC TRA worker v3)	0.21
inhalation	local	Long-term	77.09 mg/m³ (ECETOC TRA worker v3)	0.105
inhalation	local	Short term	308.3 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.225
inhalation	systemic	Short term	660.7 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Long-term	165.1 mg/m³ (ECETOC TRA worker v3)	0.225
inhalation	local	Short term	660.7 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.45
inhalation	systemic	Short term	mg/m³ (ECETOC TRA worker v3)	0.9
inhalation	local	Long-term	330.3 mg/m³ (ECETOC TRA worker v3)	0.45
inhalation	local	Short term	mg/m³ (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/m³ (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m³ (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m³ (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.35
inhalation	systemic	Short term	1.03 g/m³ (ECETOC TRA worker v3)	0.7
inhalation	local	Long-term	256.9 mg/m³ (ECETOC TRA worker v3)	0.35
inhalation	local	Short term	1.03 g/m³ (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/m³ (ECETOC TRA worker v3)	0.3
inhalation	systemic	Short term	881.0 mg/m³ (ECETOC TRA worker v3)	0.6
inhalation	local	Long-term	220.2 mg/m³ (ECETOC TRA worker v3)	0.3
inhalation	local	Short term	881.0 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.053
inhalation	systemic	Short term	154.1 mg/m³ (ECETOC TRA worker v3)	0.105
inhalation	local	Long-term	38.54 mg/m³ (ECETOC TRA worker v3)	0.053
inhalation	local	Short term	154.1 mg/m³ (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/m³ (ECETOC TRA worker v3)	0.15
inhalation	systemic	Short term	440.5 mg/m³ (ECETOC TRA worker v3)	0.3
inhalation	local	Long-term	110.1 mg/m³ (ECETOC TRA worker v3)	0.15
inhalation	local	Short term	440.5 mg/m³ (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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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/m³ (EasyTRA, v4.1)	0.012	General ventilation	30%
			Respiratory protection	90% efficiency
			LEV	90% efficiency
Local effects, by inhalation, local	0.0006 mg/m³ (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/m³ (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/m³ (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/m³ (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/m³ (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/m³ (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/m³ (EasyTRA, v4.1)	0.240	Indoor use	1
			General ventilation	30%
			LEV	99% efficiency
Local effects, by inhalation, local	0.003 mg/m³ (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/m³ (EasyTRA, v4.1)	0.440	Indoor use	3
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.003 mg/m³ (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/m³ (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/m³ (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.

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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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 cm² (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/m³ (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/m³ (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/m³ (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/m³ (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/m³ (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/m³ (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/m³ (EasyTRA, v4.1)	0.240	Indoor use	1
			General ventilation	30%
			LEV	99% efficiency
Local effects, by inhalation, local	0.003 mg/m³ (EasyTRA, v4.1)	0.060	Indoor use	2
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.022 mg/m³ (EasyTRA, v4.1)	0.440	Indoor use	3
			General ventilation	30%
			Respiratory protection	97.5% efficiency
Local effects, by inhalation, local	0.003 mg/m³ (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/m³ (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/m³ (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.