RUBRIEK 1: Identificatie van de stof of het mengsel en van de vennootschap/onderneming

1.1. Productidentificatie

Identificatie van het preparaat:

Handelsnaam: WOODFILL S/T

Handelscode: 3001__7300

UFI: 9GF4-TG5H-YS26-YUUK

1.2. Relevant geïdentificeerd gebruik van de stof of het mengsel en ontraden gebruik

Aanbevolen gebruik: Polyesterplamuur voor hout

Afgeraden gebruik: Niet bestemd voor gebruik door de consument; Uitsluitend bestemd voor professioneel gebruik

1.3. Details betreffende de verstrekker van het veiligheidsinformatieblad

Leverancier: IMPA SpA Unipersonale

Via Crevada, 9/E – 31020 San Pietro di Feletto (TV) – ITALY

Tel. +39 0438 4548 - Fax +39 0438 454915

Verantwoordelijke: msdsref@impa.it

1.4. Telefoonnummer voor noodgevallen

NVIC (030-2748888)

RUBRIEK 2: Identificatie van de gevaren

2.1. Indeling van de stof of het mengsel

Verordening (EG) n. 1272/2008 (CLP)

Flam. Liq. 3	Ontvlambare vloeistof en damp.
Skin Irrit. 2	Veroorzaakt huidirritatie.
Eye Irrit. 2	Veroorzaakt ernstige oogirritatie.
Skin Sens. 1	Kan een allergische huidreactie veroorzaken.
Repr. 2	Mogelijk gevaar voor beschadiging van het ongeboren kind.
STOT RE 1	Veroorzaakt schade aan organen bij langdurige of herhaalde blootstelling.

Fysische-chemische effecten schadelijk voor de menselijke gezondheid en het milieu:

Geen ander risico

2.2. Etiketteringselementen

Verordening (EG) n. 1272/2008 (CLP)

Gevarenpictogrammen en signaalwoord

Gevaar

Gevarenaanduidingen

H226	Ontvlambare vloeistof en damp.
H315	Veroorzaakt huidirritatie.
H317	Kan een allergische huidreactie veroorzaken.
H319	Veroorzaakt ernstige oogirritatie.
H361d	Mogelijk gevaar voor beschadiging van het ongeboren kind.
H372	Veroorzaakt schade aan organen bij langdurige of herhaalde blootstelling.

Veiligheidsaanbevelingen

P201	Alvorens te gebruiken de speciale aanwijzingen raadplegen.
P210	Verwijderd houden van warmte, hete oppervlakken, vonken, open vuur en andere ontstekingsbronnen. Niet roken.
P260	Stof/rook/gas/nevel/damp/spuitnevel niet inademen.
P280	Draag beschermende handschoenen/kleding, oog/gezichtsbescherming en gehoorbescherming.

P314 Bij onwel voelen een arts raadplegen.

P403+P235 Op een goed geventileerde plaats bewaren. Koel bewaren.

Bijzondere schikkingen:

EUH211 Let op! Bij verneveling kunnen gevaarlijke inhaleerbare druppels worden gevormd. Spuitnevel niet inademen.

Bevat:

maleïnezuuranhydride

styreen

2,2'-[(4-methylfenyl)imino]bisethanol

kobaltbis(2-ethylhexanoaat)

Bijzondere bepalingen overeenkomstig bijlage XVII van REACH en latere wijzigingen:

Geen

2.3. Andere gevaren

Geen PBT, zPzB of hormoonontregelende stoffen die aanwezig zijn in de concentratie >= 0,1%.

Geen ander risico

RUBRIEK 3: Samenstelling en informatie over de bestanddelen

3.1. Stoffen

N.A.

3.2. Mengsels

Identificatie van het preparaat: WOODFILL S/T

Gevaarlijke stoffen volgens de CLP-verordening en desbetreffende indeling:

Hoeveelheid	Naam	Ident. nr.	Classificatie	Registratienummer:
≥15 - <20 %	styreen	CAS:100-42-5 EC:202-851-5 Index:601-026-00-0	Flam. Liq. 3, H226; Asp. Tox. 1, H304; Skin Irrit. 2, H315; Eye Irrit. 2, H319; Repr. 2, H361d; STOT SE 3, H335; STOT RE 1, H372; Aquatic Chronic 3, H412; Acute Tox. 4, H332	01-2119457861-32-xxxx
≥3 - <5 %	titaniumdioxide	CAS:13463-67-7 EC:236-675-5 Index:022-006-00-2	Carc. 2, H351	01-2119489379-17-xxxx
≥1 - <2.5 %	tolueen	CAS:108-88-3 EC:203-625-9 Index:601-021-00-3	Flam. Liq. 2, H225; Repr. 2, H361d; Asp. Tox. 1, H304; STOT RE 2, H373; Skin Irrit. 2, H315; STOT SE 3, H336	01-2119471310-51-xxxx
≥1 - <2.5 %	xyleen	CAS:1330-20-7 EC:215-535-7 Index:601-022-00-9	Flam. Liq. 3, H226 Acute Tox. 4, H312 Acute Tox. 4, H332 Asp. Tox. 1, H304 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 STOT RE 2, H373 Aquatic Chronic 3, H412 Acute toxiciteitsschatting : ATE - Dermaal: 1100mg/kg lg ATE - Inademing (Damp): 11mg/l	01-2119488216-32-xxxx
≥0.3 - <0.5 %	ethylacetaat	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
≥0.3 - <0.5 %	Kristallijn silica, kwarts (inadembare fractie)	CAS:14808-60-7 EC:238-878-4	STOT RE 1, H372	Vrijgesteld
≥0.1 - <0.3 %	1,1'-(p-tolylimino)dipropaan-2-ol	CAS:38668-48-3 EC:254-075-1	Acute Tox. 2, H300; Eye Irrit. 2, H319; Aquatic Chronic 3, H412	01-2119980937-17-xxxx
≥0.1 - <0.3 %	2,2'-[(4-methylfenyl)imino]bisethanol	CAS:3077-12-1 EC:221-359-1	Acute Tox. 4, H302; Eye Dam. 1, H318; Skin Sens. 1, H317; Aquatic Chronic 3, H412	01-2120791684-40-xxxx

≥0.1 - <0.3 %	kobaltbis(2-ethylhexanoaat)	CAS:136-52-7 EC:205-250-6	Eye Irrit. 2, H319; Skin Sens. 1A, H317; Repr. 1B, H360Fd; Aquatic Acute 1, H400; Aquatic Chronic 3, H412, M-Chronic:1	01-2119524678-29-xxxx
≥0.025 - <0.05 %	(2-methoxymethylethoxy)propanol	CAS:34590-94-8 EC:252-104-2	Stof waarvoor binnen de Unie een blootstellingsgrens op de werkvloer geldt.	01-2119450011-60-xxxx
≥0.025 - <0.05 %	maleïnezuuranhydride	CAS:108-31-6 EC:203-571-6 Index:607-096-00-9	Acute Tox. 4, H302 STOT RE 1, H372 Skin Corr. 1B, H314 Eye Dam. 1, H318 Resp. Sens. 1, H334 Skin Sens. 1A, H317, EUH071 Specifieke concentratiegrenzen: 0.001% ≤ C < 100%: Skin Sens. 1A H317	01-2119472428-31-xxxx
≥0.0015 - <0.005 %	methanol	CAS:67-56-1 EC:200-659-6 Index:603-001-00-X	Flam. Liq. 2, H225 Acute Tox. 3, H301 Acute Tox. 3, H311 Acute Tox. 3, H331 STOT SE 1, H370 Specifieke concentratiegrenzen: 3% ≤ C < 10%: STOT SE 2 H371 10% ≤ C < 100%: STOT SE 1 H370 Acute toxiciteitsschatting : ATE - Oraal: 100mg/kg lg ATE - Dermaal: 300mg/kg lg ATE - Inademing (Damp): 3mg/l	01-2119433307-44-xxxx
≥0.0015 - <0.005 %	cyclohexaan	CAS:110-82-7 EC:203-806-2 Index:601-017-00-1	Flam. Liq. 2, H225; Asp. Tox. 1, H304; Skin Irrit. 2, H315; STOT SE 3, H336; Aquatic Acute 1, H400; Aquatic Chronic 1, H410	01-2119463273-41-xxxx

Het mengsel bevat >= 1% titaandioxide CAS 13463-67-7 [in poedervorm met >= 1% deeltjes met aërodynamische diameter <= 10 µm]. De stof is ingedeeld als carcinogeen bij inademing van categorie 2 (H351 inademing) - Opmerkingen V,W,10. Volgens Verordening (EG) nr. 1272/2008 (CLP), bijlage II , deel 2, rubriek 2.12, moet op het etiket van de verpakking van vloeibare mengsels die >= 1 % titaandioxidedeeltjes met een aërodynamische diameter van 10 µm of minder bevatten, de volgende vermelding staan: EUH211: "Let op! Bij verneveling kunnen gevaarlijke inhaleerbare druppels worden gevormd. Spuitnevel niet inademen."

RUBRIEK 4: Eerstehulpmaatregelen

4.1. Beschrijving van de eerstehulpmaatregelen

In geval van contact met de huid:

De besmette kledingstukken onmiddellijk uitdoen en deze op veilige wijze vernietigen.

De lichaamsdelen die met de giftige stof in aanraking zijn gekomen, of waarvan u dat vermoedt, onmiddellijk met veel stromend water afspoelen, zo mogelijk met zeep.

Het lichaam volledig wassen (douche of bad).

In geval van contact met de ogen:

In geval van contact met de ogen voldoende tijd spoelen met water, houd hierbij de oogleden van elkaar, en raadpleeg vervolgens onmiddellijk een oogarts.

Bescherm het ongedeerde oog.

In geval van inslikken:

Geen braken opwekken, maar medische hulp zoeken en de SDS en gevaarlabel laten zien.

In geval van inademen:

Breng de gewonde naar buiten in de open lucht en houd hem/haar warm en in rust.

4.2. Belangrijkste acute en uitgestelde symptomen en effecten

De symptomen en effecten zijn zoals verwacht mag worden op basis van de gevaren getoond in deel 2.

4.3. Vermelding van eventueel noodzakelijke onmiddellijke medische verzorging en speciale behandeling

In geval van ongeluk of onwel worden, onmiddellijk een arts raadplegen (zo mogelijk de gebruiksaanwijzing of de veiligheidsgegevens tonen).

RUBRIEK 5: Brandbestrijdingsmaatregelen

5.1. Blusmiddelen

Geschikte blusmiddelen:

CO2, poederblussers, schuim, waternevel.

Blusmiddelen die om veiligheidsredenen niet moeten worden gebruikt:

Waterstralen.

5.2. Speciale gevaren die door de stof of het mengsel worden veroorzaakt

De verbranding produceert zware rook.

Bij explosie en/of verbranding vrijkomende gassen (koolstofmonoxide en -dioxide, stikstofoxiden) niet inademen.

5.3. Advies voor brandweerlieden

Geschikte ademhalingapparatuur gebruiken.

Het voor de brand gebruikte besmette bluswater afzonderlijk verzamelen. Niet in het riool lozen.

De onbeschadigde containers, indien dit op een veilige manier gedaan kan worden, verplaatsen uit de gevarenzone.

RUBRIEK 6: Maatregelen bij het accidenteel vrijkomen van de stof of het mengsel

6.1. Persoonlijke voorzorgsmaatregelen, beschermingsmiddelen en noodprocedures

De individuele beschermingsmiddelen dragen.

Elke ontstekingsbron verwijderen.

Verplaats de personen naar een veilige plek.

Raadpleeg de beschermingsmaatregelen zoals uiteengezet bij punt 7 en 8.

6.2. Milieuvoorzorgsmaatregelen

Verhinder het doordringen in de grond/ondergrond. Verhinder het afvloeien in het oppervlaktewater of in het riool.

In geval van gaslek of infiltratie in waterlopen, grond of riool, de verantwoordelijke instanties op de hoogte stellen.

6.3. Insluitings- en reinigingsmethoden en -materiaal

Geschikt opvangmateriaal: inert absorberend materiaal (b.v. zand, vermiculiet)

Nadat u het product opgenomen heeft, de bewuste plek en het materiaal met water reinigen.

Bewaar het besmette spoelwater en verwijder dit.

6.4. Verwijzing naar andere rubrieken

Zie ook paragraaf 8 en 13

RUBRIEK 7: Hantering en opslag

7.1. Voorzorgsmaatregelen voor het veilig hanteren van de stof of het mengsel

Aanraking met huid en ogen, inademen van dampen en nevels vermijden.

Gebruik geen lege containers voordat ze zijn gereinigd.

Voordat men overgaat tot de verplaatsing, controleren of er in de containers geen resten van niet-compatibel materiaal aanwezig zijn.

Advies inzake algemene beroepsmatige hygiëne:

verontreinigde kleding en beschermde uitrusting uittrekken alvorens ruimten te betreden waar wordt gegeten.

Tijdens het werk niet eten of drinken.

Verwezen wordt ook naar paragraaf 8 voor de aanbevolen beschermingsvoorzieningen.

7.2. Voorwaarden voor een veilige opslag, met inbegrip van incompatibele producten

Verpakkingen goed gesloten bewaren op een koele, goed geventileerde plaats, uit de buurt van warmtebronnen.

Uit de buurt van open vuur, vonken en warmtebronnen houden. Het blootstellen aan direct zonlicht vermijden.

Uit de buurt houden van voedsel, drank en voeder.

Niet samengaande stoffen:

Zie rubriek 10.5

Aanwijzingen voor de ruimten:

Frisse en goed geluchte ruimten.

7.3. Specifiek eindgebruik

Aanbeveling(en)

Zie rubriek 1.2

Specifieke oplossingen voor de industriesector:

Geen enkel bijzonder gebruik

RUBRIEK 8: Maatregelen ter beheersing van blootstelling/persoonlijke bescherming

8.1. Controleparameters

Lijst van bestanddelen met OEL waarde

	OEL-type	land	Lange termijn mg/m3	Lange termijn ppm	Korte termijn mg/m3	Korte termijn ppm	Opmerkinge
styreen CAS: 100-42-5	ACGIH			10		20	OTO, A3, BEI - CNS and hearing impair, URT irr, peripheral neuropathy, visual disorders
	MAK	AUSTRIA	85.000	20	340.000	80.000	
	VLEP	BELGIUM	108.000	25.000	216.000	50.000	

	VLEP	FRANCE	100	23.3	200	46.6	
	AGW	GERMANY	86	20	172	40	
	MAK	GERMANY	86.000	20.000	172.000	40.000	
	ÁK	HUNGARY	50.000		50.000		
	NDS	POLAND	50.000		200.000		
	VLEP	ROMANIA	50.000	12.000	150.000	35.000	
	VLA	SPAIN	86.000	20.000	172.000	40.000	
	SUVA	SWITZERLAND	85.000	20.000	170.000	40.000	
	WEL	U.K.	430.000	100.000	1080.000	250.000	
	GVI	CROATIA	430.000	100.000	1080.000	250.000	Skin
	MV	SLOVENIA	86.000	20.000	344.000	80.000	
	TLV	CZECHIA	100.000	23.100	400.000	92.400	
	IPRV	LITHUANIA	90.000	20.000	200.000	50.000	Skin
titaniumdioxide CAS: 13463-67-7	ACGIH		10				A4 - LRT irr
	VLEP	BELGIUM	10.000				
	VLEP	FRANCE	10.000				
	MAK	GERMANY	0.300		2.400		Respirable fraction, except ultrafine particles , Multiplied by the material density
	AGW	GERMANY	1.250				Respirable dust particles
	NDS	POLAND	10.000				Inhalable fraction
	VLEP	ROMANIA	10.000		15.000		
	VLA	SPAIN	10.000				Inhalable fraction
	SUVA	SWITZERLAND	3.000				Respirable aerosol
	WEL	U.K.	10.000				Inhalable aerosol
	WEL	U.K.	4.000				Respirable aerosol
	GVI	CROATIA	10.000				Inhalable fraction
	GVI	CROATIA	4.000				Respirable fraction
tolueen CAS: 108-88-3	ACGIH			20.000			A4, BEI - Visual impair, female repro, pregnancy loss
	UE		192.000	50	384	100	Skin
	MAK	AUSTRIA	190.000	50.000	380.000	100	
	VLEP	BELGIUM	77.000	20.000	384	100	Additional indication "D" means that the absorption of the agent through the skin, mucous membranes or eyes is an important part of the total exposure. It can be the result of both direct contact and its presence in the air.
	VLEP	FRANCE	76.800	20	384.000	100.000	
	AGW	GERMANY	190.000	50	760.000	200.000	
	MAK	GERMANY	190.000	50.000	380.000	100.000	Skin
	ÁK	HUNGARY	190		380		
	VLEP	ITALY	192.000	50.000			Skin
	NDS	POLAND	100.000		200.000		
	VLEP	ROMANIA	192.000	50.000	384.000	100.000	
	VLA	SPAIN	192.000	50.000	384.000	100.000	Skin
	SUVA	SWITZERLAND	190.000	50.000	760.000	200.000	
	MAC	NETHERLANDS	150.000		384.000		
	WEL	U.K.	191.000	50.000	384.000	100.000	

	VLE	PORTUGAL	192.000	50.000	384.000	100.000	Skin
	GVI	CROATIA	192.000	50.000	384.000	100.000	Skin
	MV	SLOVENIA	192.000	50.000	384.000	100.000	Skin
	TLV	CZECHIA	192.000	50.112	384.000	100.224	Skin
xyleen CAS: 1330-20-7	ACGIH			100.000		150.000	A4, BEI - URT and eye irr, CNS impair
	UE		221.000	50.000	442.000	100.000	Skin
	MAK	AUSTRIA	221.000	50	442.000	100	
	VLEP	BELGIUM	221.000	50.000	442.000	100.000	Additional indication "D" means that the absorption of the agent through the skin, mucous membranes or eyes is an important part of the total exposure. It can be the result of both direct contact and its presence in the air.
	VLEP	FRANCE	221.000	50	442.000	100	
	AGW	GERMANY	220.000	50.000	440.000	100.000	Skin
	MAK	GERMANY	220.000	50.000	440.000	100.000	Skin
	ÁK	HUNGARY	221.000		442.000		
	VLEP	ITALY	221.000	50.000	442.000	100.000	Skin
	NDS	POLAND	100.000		200.000		Skin
	VLEP	ROMANIA	221.000	50.000	442.000	100.000	
	VLA	SPAIN	221.000	50.000	442.000	100.000	
	SUVA	SWITZERLAND	435.000	100.000	870.000	200.000	
	MAC	NETHERLANDS	210.000		442.000		
	WEL	U.K.	220.000	50.000	441.000	100.000	
	VLE	PORTUGAL	221.000	50.000	442.000	100.000	Skin
	GVI	CROATIA	221.000	50.000	442.000	100.000	Skin
	MV	SLOVENIA	221.000	50.000	442.000	100.000	Skin
	TLV	CZECHIA	200.000	45.400	400.000	90.800	Skin
	IPRV	LITHUANIA	200.000	50.000	450.000	100.000	Skin
	TLV	BULGARIA	221.000	50.000	442.000	100.000	Skin
ethylacetaat 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	
Kristallijn silica, kwarts (inadembare fractie) CAS: 14808-60-7	ACGIH		0.025				(R), A2 - Pulm fibrosis, lung cancer
	UE		0.1				
	MAK	AUSTRIA	0.050				
	VLEP	FRANCE	0.100				Respirable aerosol
	ÁK	HUNGARY	0.150				Respirable aerosol
	NDS	POLAND	0.100				
	VLA	SPAIN	0.050				
	SUVA	SWITZERLAND	0.150				Respirable aerosol
	MAC	NETHERLANDS	0.075				Respirable dust
	GVI	CROATIA	0.100				
	MV	SLOVENIA	0.150				
	IPRV	LITHUANIA	0.100				
(2-methoxymethylethoxy) propanol CAS: 34590-94-8	ACGIH			100.000		150.000	Skin - Eye and URT irr, CNS impair
	UE		308.000	50.000			Skin
	MAK	AUSTRIA	307.000	50	614.000	100.000	
	VLEP	BELGIUM	308	50.000			Additional indication "D" means that the absorption of the agent through the skin, mucous membranes or eyes is an important part of the total exposure. It can be the result of both direct contact and its presence in the air.
	VLEP	FRANCE	308.000	50.000			Skin
	AGW	GERMANY	310.000	50.000	310.000	50.000	Inhalable aerosol and vapour
	MAK	GERMANY	310.000	50.000	310.000	50.000	Inhalable fraction and vapour
	ÁK	HUNGARY	308.000		308.000		
	VLEP	ITALY	308.000	50.000			
	NDS	POLAND	240.000		280.000		Skin
	VLEP	ROMANIA	308.000	50.000			
	VLA	SPAIN	308.000	50.000			Skin
	SUVA	SWITZERLAND	300.000	50.000	300.000	50.000	
	MAC	NETHERLANDS	300.000				
	WEL	U.K.	308.000	50.000			
	VLE	PORTUGAL	308.000	50.000			Skin
	GVI	CROATIA	308.000	50.000			Skin
	MV	SLOVENIA	308.000	50.000			Skin
	TLV	CZECHIA	270.000	43.740	550.000	89.100	Skin
	IPRV	LITHUANIA	300.000	50.000	450.000	75.000	Skin
maleïnezuuranhydride CAS: 108-31-6	ACGIH		0.01				(IFV), DSEN, RSEN, A4 - Resp sens
	MAK	AUSTRIA	0.410	0.100	0.800	0.200	
	VLEP	BELGIUM	0.010	0.002	1.000		Inhalable fraction and vapour
	VLEP	FRANCE			1.000		
	AGW	GERMANY	0.081	0.020	0.081	0.020	Inhalable fraction and vapour
	MAK	GERMANY	0.081	0.020	0.081	0.020	Inhalable fraction and vapour

	ÁK	HUNGARY	0.400		0.400		
	NDS	POLAND	0.500		1.000		
	VLEP	ROMANIA	1.000	0.250	3.000	0.750	
	VLA	SPAIN	0.400	0.100			
	SUVA	SWITZERLAND	0.400	0.100	0.400	0.100	
	WEL	U.K.	1.000		3.000		
	GVI	CROATIA	0.410	0.100	0.800	0.200	
	MV	SLOVENIA	0.410	0.100	0.410	0.100	
	TLV	CZECHIA	1.000	0.245	2.000	0.490	
	IPRV	LITHUANIA	1.200	0.300	2.500	0.600	
methanol CAS: 67-56-1	ACGIH			200		250.000	Skin, BEI - Headache, eye dam, dizziness, nausea
	UE		260.000	200			Skin
	MAK	AUSTRIA	260.000	200.000	1040.000	800.000	
	VLEP	BELGIUM	266.000	200.000	333.000	250.000	Additional indication "D" means that the absorption of the agent through the skin, mucous membranes or eyes is an important part of the total exposure. It can be the result of both direct contact and its presence in the air.
	VLEP	FRANCE	260.000	200.000			
	AGW	GERMANY	130.000	100.000	260.000	200.000	Skin
	MAK	GERMANY	130.000	100.000	260.000	200.000	Skin
	ÁK	HUNGARY	260.000				
	VLEP	ITALY	260	200			Skin
	NDS	POLAND	100.000		300.000		
	VLEP	ROMANIA	260.000	200.000			
	VLA	SPAIN	266.000	200.000	333.000	250.000	Skin
	SUVA	SWITZERLAND	260.000	200.000	520.000	400.000	
	MAC	NETHERLANDS	133.000				
	WEL	U.K.	266.000	200.000	333.000	250.000	
	VLE	PORTUGAL	260.000	200.000			Skin
	GVI	CROATIA	260.000	200.000			Skin
	MV	SLOVENIA	260.000	200.000	1040.000	800.000	Skin
	TLV	CZECHIA	250.000	187.750	1000.000	751.000	Skin
cyclohexaan CAS: 110-82-7	ACGIH			100			CNS impair
	UE		700	200			
	MAK	AUSTRIA	700.000	200.000	2800.000	800.000	
	VLEP	BELGIUM	350.000	100.000			
	VLEP	FRANCE	700	200			
	AGW	GERMANY	700.000	200.000	2800.000	800.000	
	MAK	GERMANY	700	200.000	2800.000	800.000	
	ÁK	HUNGARY	700.000				
	VLE	ITALY	350.000	100.000			
	NDS	POLAND	300.000		1000.000		
	VLEP	ROMANIA	700.000	200.000			
	VLA	SPAIN	700.000	200.000			
	SUVA	SWITZERLAND	700.000	200.000	2800.000	800.000	
	MAC	NETHERLAND	700.000		1400.000		

	S					
WEL	U.K.	350.000	100.000	1050.000	300.000	
GVI	CROATIA	700.000	200.000			Skin
MV	SLOVENIA	700.000	200.000	2800.000	800.000	
TLV	CZECHIA	700.000	200.200	2000.000	572.000	

PNEC blootstellingslimietwaarden

	PNEC-limiet.	Wijze van blootstelling	Frequentie van blootstelling	Opmerkingen
styreen CAS: 100-42-5	0.028 mg/l	Zoet water		
	0.014 mg/l	Zeewater		
	0.614 mg/kg	Zoet water sedimenten		
	0.307 mg/kg	Zeewater sedimenten		
	0.2 mg/kg	Bodem (agrarisch)		
	5 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)		
tolueen CAS: 108-88-3	0.68 mg/l	Zeewater		
	0.68 mg/l	Zoet water		
	16.39 mg/kg	Zeewater sedimenten		
	16.39 mg/kg	Zoet water sedimenten		
	13.61 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)		
	2.89 mg/kg	Bodem (agrarisch)		
xyleen CAS: 1330-20-7	0.327 mg/l	Zeewater		
	0.327 mg/l	Zoet water		
	6.58 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)		
	12.46 mg/kg	Zeewater sedimenten		
	12.46 mg/kg	Zoet water sedimenten		
	2.31 mg/kg	Bodem (agrarisch)		
ethylacetaat CAS: 141-78-6	0.024 mg/l	Zeewater		
	0.24 mg/l	Zoet water		

	0.115 mg/kg	Zeewater sedimenten
	1.15 mg/kg	Zoet water sedimenten
	650 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	0.148 mg/kg	Bodem (agrarisch)
1,1'-(p-tolylimino)dipropaan-2-ol CAS: 38668-48-3	0.017 mg/l	Zoet water
	0.002 mg/l	Zeewater
	199.5 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	0.163 mg/kg	Zoet water sedimenten
	0.016 mg/kg	Zeewater sedimenten
	0.005 mg/kg	bodem
2,2'-[(4-methylfenyl)imino]bisethanol CAS: 3077-12-1	0.003 mg/l	Zeewater
	0.026 mg/l	Zoet water
	10 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	0.012 mg/kg	Zeewater sedimenten
	0.121 mg/kg	Zoet water sedimenten
	0.009 mg/kg	Bodem (agrarisch)
kobaltbis(2-ethylhexanoaat) CAS: 136-52-7	1.06 µg/l	Zoet water
	2.36 µg/l	Zeewater
	0.37 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	69.8 mg/kg	Zeewater sedimenten
	53.8 mg/kg	Zoet water sedimenten

	10.9 mg/kg	Bodem (agrarisch)
(2-methoxymethylethoxy) propanol CAS: 34590-94-8	1.9 mg/l	Zeewater
	19 mg/l	Zoet water
	4168 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	7.02 mg/kg	Zeewater sedimenten
	70.2 mg/kg	Zoet water sedimenten
	2.74 mg/kg	Bodem (agrarisch)
maleïnezuuranhydride CAS: 108-31-6	0.038 mg/l	Zoet water
	0.004 mg/l	Zeewater
	44.6 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	0.296 mg/kg	Zoet water sedimenten
	0.03 mg/kg	Zeewater sedimenten
	0.037 mg/kg	bodem
methanol CAS: 67-56-1	2.08 mg/l	Zeewater
	20.8 mg/l	Zoet water
	100 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	7.7 mg/kg	Zeewater sedimenten
	77 mg/kg	Zoet water sedimenten
	100 mg/kg	Bodem (agrarisch)
cyclohexaan CAS: 110-82-7	0.207 mg/l	Zeewater
	0.207 mg/l	Zoet water
	3.24 mg/l	Micro-organismes in afvalwaterzuiveringsinstallatie (STP)
	16.68 mg/kg	Zeewater sedimenten

16.68 mg/kg	Zoet water sedimenten	
3.38 mg/kg	Bodem (agrarisch)	

Afgeleide dosis zonder effect. (DNEL)

	Industriearbeider	Vrijberoepbeoefenaar	Consument	Wijze van blootstelling	Frequentie van blootstelling	Opmerkingen
styreen CAS: 100-42-5		289 mg/m3	174.25 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten	
		85 mg/m3	10.2 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten	
		306 mg/m3	182.75 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten	
		406 mg/kg	343 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten	
			2.1 mg/kg	Humaan Oraal	Lange termijn, systematische effecten	
tolueen CAS: 108-88-3		192 mg/m3	56.5 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten	
		384 mg/m3	226 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten	
		384 mg/kg	226 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten	
			8.13 mg/kg	Humaan Oraal	Lange termijn, systematische effecten	
		192 mg/m3	56.5 mg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten	
		384 mg/m3	226 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten	
xyleen CAS: 1330-20-7		221 mg/m3	65.3 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten	
		442 mg/m3	260 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten	
		442 mg/m3	260 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten	
		221 mg/m3	65.3 mg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten	
		212 mg/kg	125 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten	
			12.5 mg/kg	Humaan Oraal	Lange termijn, systematische effecten	
ethylacetaat CAS: 141-78-6		734 mg/m3	367 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten	

	734 mg/m3	367 mg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten
	1468 mg/m3	734 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten
	1468 mg/m3	734 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten
	63 mg/kg	37 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
		4.5 mg/kg	Humaan Oraal	Lange termijn, systematische effecten
1,1'-(p-tolylimino)dipropaan-2-ol CAS: 38668-48-3	2.47 mg/m3	0.4 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten
	0.7 mg/kg	0.3 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
		0.25 mg/kg	Humaan Oraal	Lange termijn, systematische effecten
2,2'-[(4-methylfenyl)imino]bisethanol CAS: 3077-12-1	3.29 mg/m3	0.58 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten
	0.47 mg/kg	0.17 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
		0.16 mg/kg	Humaan Oraal	Lange termijn, systematische effecten
kobaltbis(2-ethylhexanoaat) CAS: 136-52-7	235.1 µg/m3	37 µg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten
		175 µg/kg	Humaan Oraal	Lange termijn, systematische effecten
(2-methoxymethylethoxy)propanol CAS: 34590-94-8		36 mg/kg	Humaan Oraal	Lange termijn, systematische effecten
	283 mg/kg	121 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
	308 mg/m3	37.2 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten
maleïnezuuranhydride CAS: 108-31-6	0.2 mg/m3		Humane Inhalatie	Korte termijn, systematische effecten
	0.081 mg/m3		Humane Inhalatie	Lange termijn, systematische effecten
	0.081 mg/m3		Humane Inhalatie	Lange termijn, plaatselijke effecten
	0.2 mg/m3		Humane Inhalatie	Korte termijn, lokale effecten

methanol CAS: 67-56-1		8 mg/kg	Humaan Oraal	Korte termijn, systematische effecten
		8 mg/kg	Humaan Oraal	Lange termijn, systematische effecten
	40 mg/kg	8 mg/kg	Humaan Dermaal	Korte termijn, systematische effecten
	40 mg/kg	8 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
	260 mg/m3	50 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten
	260 mg/m3	50 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten
	260 mg/m3	50 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten
	260 mg/m3	50 mg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten
cyclohexaan CAS: 110-82-7	700 mg/m3	206 mg/m3	Humane Inhalatie	Lange termijn, systematische effecten
	1400 mg/m3	412 mg/m3	Humane Inhalatie	Korte termijn, systematische effecten
	700 mg/m3	206 mg/m3	Humane Inhalatie	Lange termijn, plaatselijke effecten
	1400 mg/m3	412 mg/m3	Humane Inhalatie	Korte termijn, lokale effecten
	2016 mg/kg	1186 mg/kg	Humaan Dermaal	Lange termijn, systematische effecten
		59.4 mg/kg	Humaan Oraal	Lange termijn, systematische effecten

Het gips bestaat uit calciumsulfaat (CaSO4). Onzuiverheden in gipsproducten bevatten gewoonlijk klei, carbonaten of mergel, afhankelijk van de locatie van de groeven waar het mineraal wordt gewonnen, en deze kunnen kleine concentraties siliciumdioxide bevatten (amorf of kristallijn).

Gipsproducten hebben geen of een zeer laag siliciumdioxidegehalte en, zelfs als het voorkomt, is de aanwezigheid ervan zo gering dat het geen significant gezondheidsrisico vormt.

Als er bij het hanteren van gipsproducten stoffig materiaal kan vrijkomen, wordt het gebruik van een masker aanbevolen, alsmede een goede ventilatie van de werkplek en het gebruik van beschermende handschoenen en een veiligheidsbril.

8.2. Maatregelen ter beheersing van blootstelling

Voor voldoende ventilatie zorgen. Indien redelijkerwijs mogelijk, kan dit worden bereikt door het gebruik van verversingsventilatie en een goede algemene afzuiging.

Bescherming van de ogen:

Bril met laterale bescherming (EN 166).

Bescherming van de huid:

Het personeel moet antistatische kleding dragen, gemaakt van natuurlijke vezels of van synthetische vezels die bestand zijn tegen hoge temperaturen.

Bescherming van de handen:

Er bestaat geen materiaal of combinatie van materialen voor handschoenen die een onbeperkte weerstand tegen chemische stoffen of combinaties van producten kan garanderen.

Bij langdurige of herhaalde hantering chemicaliënbestendige handschoenen gebruiken.

Geschikt materiaal voor veiligheidshandschoenen (EN 374/EN 16523); NBR (Nitrilrubber): dikte >= 0.4 mm; permeatietijd >= 480 min.; FKM (Fluorrubber): dikte >= 0.4 mm; permeatietijd >= 480 min.

De keuze van geschikte handschoenen hangt niet alleen van het materiaal af, maar ook van andere kwaliteitskenmerken die van de ene tot de andere producent verschillen, en van hoe en wanneer het mengsel moet worden gebruikt.

Bescherming van de luchtwegen:

Als werknemers worden blootgesteld aan concentraties boven de blootstellingsgrenzen, moeten zij geschikte gecertificeerde ademhalingsapparatuur gebruiken.

Gecombineerd filterapparaat (EN 14387): duikbril met filter A-P2.

Controles van de blootstelling van het milieu

Zie rubriek 6.2

Hygiënische en technische maatregelen

Zie paragraaf 7.

RUBRIEK 9: Fysische en chemische eigenschappen

9.1. Informatie over fysische en chemische basiseigenschappen

Uitzicht: pasta-achtige vloeistof

Kleur: divers

Geur: styreen

Geurdrempel;: N.D.

Smelt/vriespunt: N.D.

Beginkookpunt en kookinterval: N.D.

Ontvlambaarheid: Het product is ingedeeld Flam. Liq. 3 H226

Boven/onderlimiet van ontvlambaarheid of ontploffing: N.D.

Vlampunt: 26.5 °C (79.7 °F) (EN ISO 13736)

Zelfontbrandingstemperatuur: N.D.

Ontledingstemperatuur: N.D.

pH: N.A. (Niet van toepassing vanwege de aard van het product)

Kinematische viscositeit: > 20.5 mm²/s (40 °C)

Densiteit: 1.50 ± 0.03 kg/l (Interne methode)

Densiteit dampen: N.D.

Dampspanning: N.D.

Inwateroplosbaarheid: Niet oplosbaar

Oplosbaarheid in olie: Geen gegeven ter beschikking

Verdelingscoëfficiënt (n-octanol/water): N.A.

Deeltjeskenmerken:

Deeltjesgrootte: N.A.

9.2. Overige informatie

Geleidingsvermogen: N.D.

Explosieve eigenschappen: N.D.

Verbrandingsbevorderende eigenschappen N.D.

Verdampingssnelheid: N.A.

VOS % (2010/75/EU): 21.01

Exclusief reactieve bestanddelen - VOS % = 4.12

RUBRIEK 10: Stabiliteit en reactiviteit

10.1. Reactiviteit

Stabiel in normale omstandigheden

10.2. Chemische stabiliteit

Stabiel in normale omstandigheden

10.3. Mogelijke gevaarlijke reacties

Contact met organische peroxiden veroorzaakt een snelle verharding van de massa met aanzienlijke warmteontwikkeling.

Door de inwerking van warmte of in geval van brand kunnen kooloxiden en dampen vrijkomen die schadelijk kunnen zijn voor de gezondheid.

Verwijderd houden van oxidatiemiddelen, sterk alkalische en sterk zure materialen om exotherme reacties te vermijden.

10.4. Te vermijden omstandigheden

De nabijheid van warmtebronnen vermijden.

De hoge temperatuur verkort de levensduur van het product aanzienlijk, waardoor het spontaan verhardt.

10.5. Chemisch op elkaar inwerkende materialen

Contact met oxiderende materialen vermijden. Het product kan vlamvatten.

Zie rubriek 10.3

10.6. Gevaarlijke ontledingsproducten

Bij juiste opslag en hantering zullen zich geen gevaarlijke ontledingsproducten ontwikkelen.

Zie rubriek 5.2

RUBRIEK 11: Toxicologische informatie

11.1. Informatie over gevarenklassen als omschreven in Verordening (EG) nr. 1272/2008

Toxicologische informatie van het product:

a) acute toxiciteit	Niet geclassificeerd
	Gebaseerd op beschikbare gegevens; aan de indelingscriteria is niet voldaan.
b) huidcorrosie/-irritatie	Het product is ingedeeld: Skin Irrit. 2(H315)
c) ernstig oogletsel/oogirritatie	Het product is ingedeeld: Eye Irrit. 2(H319)
d) sensibilisatie van de luchtwegen/de huid	Het product is ingedeeld: Skin Sens. 1(H317)
e) mutageniteit in geslachtscellen	Niet geclassificeerd
	Gebaseerd op beschikbare gegevens; aan de indelingscriteria is niet voldaan.
f) kankerverwekkendheid	Niet geclassificeerd
	Gebaseerd op beschikbare gegevens; aan de indelingscriteria is niet voldaan.
g) giftigheid voor de voortplanting	Het product is ingedeeld: Repr. 2(H361)
h) STOT bij eenmalige blootstelling	Niet geclassificeerd
	Gebaseerd op beschikbare gegevens; aan de indelingscriteria is niet voldaan.
i) STOT bij herhaalde blootstelling	Het product is ingedeeld: STOT RE 1(H372)
j) gevaar bij inademing	Niet geclassificeerd
	Gebaseerd op beschikbare gegevens; aan de indelingscriteria is niet voldaan.

Toxicologische informatie van de belangrijkste stoffen in het product:

styreen	a) acute toxiciteit	LD50 Oraal Rat 5000 mg/kg
		LC50 Damp van inademing Rat 11.8 mg/l 4u
titaniumdioxide	a) acute toxiciteit	LD50 Oraal Rat > 5000 mg/kg
		LC50 Stof van inademing Rat > 6.82 mg/l 4u
tolueen	a) acute toxiciteit	LD50 Oraal Rat 5000 mg/kg
		LD50 Huid Konijn 12267 mg/kg
		LC50 Damp van inademing Rat 25.7 mg/l 4u
xyleen	a) acute toxiciteit	ATE - Dermaal : 1100 mg/kg lg
		ATE - Inademing (Damp) : 11 mg/l
		LD50 Oraal Rat 3523 mg/kg
ethylacetaat	a) acute toxiciteit	LD50 Oraal Rat 4934 mg/kg
		LD50 Huid Konijn > 20000 mg/kg
		LC50 Damp van inademing Rat > 22.5 mg/l 6h
1,1'-(p-tolylimino)dipropaan-2-ol	a) acute toxiciteit	LD50 Oraal Rat 25 mg/kg
		LD50 Huid Rat > 2000 mg/kg
2,2'-[(4-methylfenyl)imino] bisethanol	a) acute toxiciteit	LD50 Oraal Rat 959 mg/kg
		LD50 Huid Rat > 2000 mg/kg
kobaltbis(2-ethylhexanoaat)	a) acute toxiciteit	LD50 Oraal Rat 3129 mg/kg
		LD50 Huid Rat > 2000 mg/kg
(2-methoxymethylethoxy) propanol	a) acute toxiciteit	LD50 Oraal Rat > 5000 mg/kg
		LD50 Huid Konijn > 9500 mg/kg
		LC0 Damp van inademing Rat > 275 ppm 7h

maleïnezuuranhydride	a) acute toxiciteit	LD50 Oraal Rat 1090 mg/kg
		LD50 Huid Konijn 2620 mg/kg
		LC50 Inademing Rat > 4.35 mg/l 1u
methanol	a) acute toxiciteit	ATE - Oraal : 100 mg/kg lg
		ATE - Dermaal : 300 mg/kg lg
		ATE - Inademing (Damp) : 3 mg/l
cyclohexaan	a) acute toxiciteit	LC50 Oraal Rat > 5000 mg/kg
		LD50 Huid Konijn > 2000 mg/kg
		LC50 Damp van inademing Rat > 32880 mg/m3 4u

11.2. Informatie over andere gevaren

Hormoonontregelende eigenschappen:

Geen hormoonontregelende stoffen die aanwezig zijn in de concentratie >= 0,1%

RUBRIEK 12: Ecologische informatie

Een normaal gebruik van het product maken en het product niet in het milieu lozen.

12.1. Toxiciteit

Ecotoxicologische informatie:

Lijst van de Eco-toxicologische eigenschappen van het product

Niet ingedeeld voor milieugevaren

Geen gegevens beschikbaar voor het product

Lijst van bestanddelen met ecotoxicologische eigenschappen

Bestanddeel	Ident. nr.	Ecotox info
styreen	CAS: 100-42-5 - EINECS: 202-851-5 - INDEX: 601-026-00-0	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 10 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 4.7 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 4.9 mg/l 72u
		b) Chronisch gevaar voor het aquatische milieu : EC10 Algen 0.28 mg/l 96u
titaniumdioxide	CAS: 13463-67-7 - EINECS: 236-675-5 - INDEX: 022-006-00-2	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen > 1000 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia > 1000 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 61 mg/l 72u
tolueen	CAS: 108-88-3 - EINECS: 203-625-9 - INDEX: 601-021-00-3	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 5.5 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 3.78 mg/l 48u
ethylacetaat	CAS: 141-78-6 - EINECS: 205-500-4 - INDEX: 607-022-00-5	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 230 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 165 mg/l 48u
1,1'-(p-tolylimino)dipropaan-2-ol	CAS: 38668-48-3 - EINECS: 254-075-1	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 17 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 28.8 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 245 mg/l 72u
		b) Chronisch gevaar voor het aquatische milieu : NOEC Algen 57.8 mg/l
2,2'-[(4-methylfenyl)imino]bisethanol	CAS: 3077-12-1 - EINECS: 221-	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen > 100 mg/l 96u

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		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 26.4 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen > 100 mg/l 72u
		b) Chronisch gevaar voor het aquatische milieu : NOEC Algen < 100 mg/l 72u
kobaltbis(2-ethylhexanoaat)	CAS: 136-52-7 - EINECS: 205-250-6	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 0.8 mg/l 96u - as mg Co/l
		a) Acuut gevaar voor het aquatische milieu : EC50 Zoetwater ongewervelde dieren 0.61 mg/l 48u - as mg Co/l
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 24.1 µg/l 72u - as µg Co/L
		b) Chronisch gevaar voor het aquatische milieu : NOEC Vissen 351.4 µg/l - as µg Co/L
		b) Chronisch gevaar voor het aquatische milieu : NOEC Zoetwater ongewervelde dieren 7.55 µg/l - as µg Co/L
		b) Chronisch gevaar voor het aquatische milieu : NOEC Algen 1.23 µg/l - as µg Co/L
(2-methoxymethylethoxy)propanol	CAS: 34590-94-8 - EINECS: 252-104-2	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen > 1000 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 1919 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 1000 mg/l 72u
maleïnezuuranhydride	CAS: 108-31-6 - EINECS: 203-571-6 - INDEX: 607-096-00-9	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 75 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 42.81 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 74.35 mg/l 72u
		b) Chronisch gevaar voor het aquatische milieu : NOEC Daphnia 10 mg/l 21d
methanol	CAS: 67-56-1 - EINECS: 200-659-6 - INDEX: 603-001-00-X	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 13500 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia > 10000 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 22000 mg/l 72u
cyclohexaan	CAS: 110-82-7 - EINECS: 203-806-2 - INDEX: 601-017-00-1	a) Acuut gevaar voor het aquatische milieu : LC50 Vissen 4.53 mg/l 96u
		a) Acuut gevaar voor het aquatische milieu : EC50 Daphnia 0.9 mg/l 48u
		a) Acuut gevaar voor het aquatische milieu : EC50 Algen 4.425 mg/l 72u
		b) Chronisch gevaar voor het aquatische milieu : NOEC Algen 0.925 mg/l 72u

12.2. Persistentie en afbreekbaarheid

Bestanddeel	**Persistentie/afbreekbaarheid**
styreen	Snel afbreekbaar
tolueen	Snel afbreekbaar
xyleen	Snel afbreekbaar
ethylacetaat	Snel afbreekbaar
1,1'-(p-tolylimino)dipropaan-2-ol	Snel afbreekbaar
2,2'-[(4-methylfenyl)imino]bisethanol	Niet snel afbreekbaar
(2-methoxymethylethoxy)propanol	Snel afbreekbaar
maleïnezuuranhydride	Snel afbreekbaar
methanol	Snel afbreekbaar
cyclohexaan	Snel afbreekbaar

12.3. Bioaccumulatie

Bestanddeel	Bioaccumulatie
xyleen	Niet bioaccumulatief

12.4. Mobiliteit in de bodem

Bestanddeel	Mobiliteit in de bodem
xyleen	Mobiel

12.5. Resultaten van PBT- en zPzB-beoordeling

Op grond van de beschikbare gegevens, bevat het product geen PBT/zPzB met een percentage ≥ 0.1%.

12.6. Hormoonontregelende eigenschappen

Geen hormoonontregelende stoffen die aanwezig zijn in de concentratie >= 0,1%

12.7. Andere schadelijke effecten

N.A.

RUBRIEK 13: Instructies voor verwijdering

13.1. Afvalverwerkingsmethoden

Indien mogelijk hergebruiken. Naar bevoegde vuilverwerkings- of vuilverbrandingsinrichtingen sturen in gecontroleerde toestand. Handelen in overeenstemming met de geldende lokale en nationale normen.

Niet in riolen of waterlopen terecht laten komen.

Verwijder verontreinigde containers in overeenstemming met de plaatselijke of nationale wettelijke bepalingen.

Als de houdbaarheidsdatum van het product is verstreken, moet het volgens de geldende voorschriften worden verwijderd.

RUBRIEK 14: Informatie met betrekking tot het vervoer

14.1. VN-nummer of ID-nummer

3269

Indien het product afzonderlijk zonder zijn katalysator wordt verzonden, krijgt het het UN-nummer 1866 toegewezen.

14.2. Juiste ladingnaam overeenkomstig de modelreglementen van de VN

ADR-Ladingnaam: POLYESTERHARS-KIT

IATA-Technische benaming: POLYESTER RESIN KIT

IMDG-Technische benaming: POLYESTER RESIN KIT

14.3. Transportgevarenklasse(n)

ADR-Wegtransport: 3

IATA-Klasse: 3

IMDG-Klasse: 3

14.4. Verpakkingsgroep

ADR-Verpakkingsgroep: III

IATA-Verpakkingsgroep: III

IMDG-Verpakkingsgroep: III

14.5. Milieugevaren

Zeemilieuvervuiler: Nee

Milieuverontreiniger: Nee

IMDG-EMS: F-E, S-D

14.6. Bijzondere voorzorgen voor de gebruiker

Weg en Spoor (ADR-RID)

ADR vrijstelling:

ADR-Etiket: 3

ADR - Gevaar-identificatienummer: -

ADR-Speciale Voorzorgsmaatregelen: 236 340

ADR-Code inzake beperkingen in tunnels:

Lucht (IATA):

IATA-Passegiersvliegtuig: 370

IATA-Cargovliegtuig: 370

IATA-Etiket: 3

IATA-Bijkomende gevaren: -

IATA-Erg: 3L

IATA-Speciale Voorzorgsmaatregelen: A66 A163

Zee (IMDG):

IMDG-Stuwage Code: Category A

IMDG-Stuwage Nota: -

IMDG-bijkomende gevaren: -

IMDG-Speciale Voorzorgsmaatregelen: 236 340

14.7. Zeevervoer in bulk overeenkomstig IMO-instrumenten

N.A.

RUBRIEK 15: Regelgeving

15.1. Specifieke veiligheids-, gezondheids- en milieureglementen en -wetgeving voor de stof of het mengsel

Richtl. 98/24/EG (Risico's verbonden met chemicaliën op het werk)
Richtl. 2000/39/EG (Beroepsmatige blootstellingsgrenswaarden)
Richtlijn 2010/75/EU
Verordening (EG) n. 1907/2006 (REACH)
Verordening (EG) n. 1272/2008 (CLP)
Verordening (EG) n. 790/2009 (ATP 1 CLP) en (EU) n. 758/2013
Verordening (EU) n. 2020/878
Verordening (EU) n. 286/2011 (ATP 2 CLP)
Verordening (EU) n. 618/2012 (ATP 3 CLP)
Verordening (EU) n. 487/2013 (ATP 4 CLP)
Verordening (EU) n. 944/2013 (ATP 5 CLP)
Verordening (EU) n. 605/2014 (ATP 6 CLP)
Verordening (EU) n. 2015/1221 (ATP 7 CLP)
Verordening (EU) n. 2016/918 (ATP 8 CLP)
Verordening (EU) n. 2016/1179 (ATP 9 CLP)
Verordening (EU) n. 2017/776 (ATP 10 CLP)
Verordening (EU) n. 2018/669 (ATP 11 CLP)
Verordening (EU) n. 2018/1480 (ATP 13 CLP)
Verordening (EU) n. 2019/521 (ATP 12 CLP)
Verordening (EU) n. 2020/217 (ATP 14 CLP)
Verordening (EU) n. 2020/1182 (ATP 15 CLP)
Verordening (EU) n. 2021/643 (ATP 16 CLP)
Verordening (EU) n. 2021/849 (ATP 17 CLP)
Verordening (EU) n. 2022/692 (ATP 18 CLP)

Beperkingen met betrekking tot het product of de stoffen erin overeenkomstig bijlage XVII van Verordening (EU) 1907/2006 (REACH) en de daarop volgende wijzigingen:

Beperkingen met betrekking tot het product: 3, 40

Beperkingen met betrekking tot de stoffen die het bevat: 30, 48, 57, 69, 75

Bepalingen met betrekking tot EU-richtlijn 2012/18 (Seveso III):

Seveso III categorie overeenkomstig bijlage 1, deel 1	Lage categorie drempel (ton)	Hoge categorie drempel (ton)
het product behoort tot de categorieën: P5c	5000	50000

Verordening (EU) nr. 649/2012 (PIC-verordening)

Geen stoffen vermeld

Duitse Water Hazard Class.

Klasse 2: gevaarlijk voor water.

SVHC stoffen:

Op grond van de beschikbare gegevens, bevat het product geen SVHC met een percentage ≥ 0.1%.

15.2. Chemischeveiligheidsbeoordeling

Geen chemische veiligheidsbeoordeling is uitgevoerd voor het mengsel

RUBRIEK 16: Overige informatie

Code	Beschrijving
EUH066	Herhaalde blootstelling kan een droge of een gebarsten huid veroorzaken.
EUH071	Bijtend voor de luchtwegen.
H225	Licht ontvlambare vloeistof en damp.
H226	Ontvlambare vloeistof en damp.
H300	Dodelijk bij inslikken.
H301	Giftig bij inslikken.
H302	Schadelijk bij inslikken.
H304	Kan dodelijk zijn als de stof bij inslikken in de luchtwegen terechtkomt.
H311	Giftig bij contact met de huid.
H312	Schadelijk bij contact met de huid.
H314	Veroorzaakt ernstige brandwonden en oogletsel.
H315	Veroorzaakt huidirritatie.
H317	Kan een allergische huidreactie veroorzaken.
H318	Veroorzaakt ernstig oogletsel.
H319	Veroorzaakt ernstige oogirritatie.
H331	Giftig bij inademing.
H332	Schadelijk bij inademing.
H334	Kan bij inademing allergie- of astmasymptomen of ademhalingsmoeilijkheden veroorzaken.
H335	Kan irritatie van de luchtwegen veroorzaken.
H336	Kan slaperigheid of duizeligheid veroorzaken.
H351	Verdacht van het veroorzaken van kanker bij inademing.
H360Fd	Kan de vruchtbaarheid schaden. Wordt ervan verdacht het ongeboren kind te schaden.
H361d	Mogelijk gevaar voor beschadiging van het ongeboren kind.
H370	Veroorzaakt schade aan organen.
H372	Veroorzaakt schade aan organen bij langdurige of herhaalde blootstelling.
H372	Veroorzaakt schade aan organen (gehoororganen) bij langdurige of herhaalde blootstelling.
H372	Veroorzaakt in het geval van een langdurige of herhaaldelijke blootstelling door inhalatie schade aan de organen.
H373	Kan schade aan organen veroorzaken bij langdurige of herhaalde blootstelling.
H373	Kan in het geval van een langdurige of herhaaldelijke blootstelling door inhalatie en inslikken schade aan de organen veroorzaken.
H400	Zeer giftig voor in het water levende organismen.
H410	Zeer giftig voor in het water levende organismen, met langdurige gevolgen.
H412	Schadelijk voor in het water levende organismen, met langdurige gevolgen.

Code	Gevarenklasse en gevarencategorie	Beschrijving
2.6/2	Flam. Liq. 2	Ontvlambare vloeistof, categorie 2
2.6/3	Flam. Liq. 3	Ontvlambare vloeistof, categorie 3
3.1/2/Oral	Acute Tox. 2	Acute toxiciteit (oraal), categorie 2
3.1/3/Dermal	Acute Tox. 3	Acute toxiciteit (dermaal), categorie 3
3.1/3/Inhal	Acute Tox. 3	Acute toxiciteit (bij inademing), categorie 3
3.1/3/Oral	Acute Tox. 3	Acute toxiciteit (oraal), categorie 3
3.1/4/Dermal	Acute Tox. 4	Acute toxiciteit (dermaal), categorie 4
3.1/4/Inhal	Acute Tox. 4	Acute toxiciteit (bij inademing), categorie 4
3.1/4/Oral	Acute Tox. 4	Acute toxiciteit (oraal), categorie 4
3.10/1	Asp. Tox. 1	Aspiratiegevaar, categorie 1
3.2/1B	Skin Corr. 1B	Huidcorrosie, categorie 1B
3.2/2	Skin Irrit. 2	Huidirritatie, categorie 2
3.3/1	Eye Dam. 1	Ernstig oogletsel, categorie 1
3.3/2	Eye Irrit. 2	Oogirritatie, categorie 2
3.4.1/1	Resp. Sens. 1	Sensibilisatie van de luchtwegen, categorie 1
3.4.2/1	Skin Sens. 1	Sensibilisatie van de huid, categorie 1

3.4.2/1A	Skin Sens. 1A	Sensibilisatie van de huid, categorie 1A
3.6/2	Carc. 2	Kankerverwekkendheid, Categorie 2
3.7/1B	Repr. 1B	Voortplantingstoxiciteit, Categorie 1B
3.7/2	Repr. 2	Voortplantingstoxiciteit, Categorie 2
3.8/1	STOT SE 1	Specifieke doelorgaantoxiciteit bij eenmalige blootstelling STOT eenm, Categorie 1
3.8/3	STOT SE 3	Specifieke doelorgaantoxiciteit bij eenmalige blootstelling STOT eenm, Categorie 3
3.9/1	STOT RE 1	Specifieke doelorgaantoxiciteit bij herhaalde blootstelling STOT herh, Categorie 1
3.9/2	STOT RE 2	Specifieke doelorgaantoxiciteit bij herhaalde blootstelling STOT herh, Categorie 2
4.1/A1	Aquatic Acute 1	Acuut aquatisch gevaar, Categorie 1
4.1/C1	Aquatic Chronic 1	Chronisch aquatisch gevaar (lange termijn), Categorie 1
4.1/C3	Aquatic Chronic 3	Chronisch aquatisch gevaar (lange termijn), Categorie 3

Indeling en procedure die gebruikt is om de indeling voor mengsels af te leiden overeenkomstig Verordening (EG) 1272/2008 [CLP]:

Indeling overeenkomstig Verordening (EG) nr. 1272/2008	Indelingsprocedure
2.6/3	Op basis van testgegevens
3.2/2	Berekeningsmethode
3.3/2	Berekeningsmethode
3.4.2/1	Berekeningsmethode
3.7/2	Berekeningsmethode
3.9/1	Berekeningsmethode

Dit document werd opgesteld door een bevoegd persoon inzake SDS die de juiste opleiding gevolgd heeft

Voornaamste bibliografische bronnen:

ECDIN - Gegevens- en informatienetwerk voor milieuchemicaliën - Gemeenschappelijk centrum voor onderzoek, Commissie van de Europese Gemeenschappen

SAX: GEVAARLIJKE EIGENSCHAPPEN VAN INDUSTRIËLE MATERIALEN - Achste editie - Van Nostrand Reinold

Veiligheidsinformatiebladen van de leveranciers van grondstoffen.

De hierin opgenomen informatie is gebaseerd op onze kennis op de bovenvermelde datum. Heeft uitsluitend betrekking op het aangegeven product en vormt geen speciale kwaliteitsgarantie.

De gebruiker is gehouden zich ervan te vergewissen of de informatie geschikt en compleet is met betrekking tot het specifieke gebruik dat de gebruiker ervan wil maken.

Deze kaart maakt elke voorgaande uitgave nietig en vervangt elke voorgaande uitgave.

Legenda van afkortingen en acroniemen die in het veiligheidsinformatieblad worden gebruikt:

ACGIH: American Conference of Governmental Industrial Hygienists (ACGIH)

ADR: Europese Overeenkomst betreffende het internationaal vervoer van gevaarlijke goederen over de weg.

ATE: Acute toxiciteitsschatting

ATEmix: Schatting van de acute toxiciteit (Mengsels)

BEI: Biologische blootstelling Index

CAS: Chemical Abstracts Service (divisie van American Chemical Society).

CAV: Anti-vergiftigingscentrum

CE: Europese Gemeenschap

CLP: Classificatie, Etikettering, Verpakking

CMR: Carcinogeen, mutageen en reprotoxisch

COV: Vluchtige organische stoffen

CSA: Chemische veiligheidsbeoordeling

CSR: Chemisch veiligheidsverslag

DNEL: Afgeleide dosis zonder effect.

EC50: Half maximale effectieve concentratie

ECHA: Europees Agentschap voor chemische stoffen

EINECS: Europese inventarisatie van bestaande commerciële chemische stoffen.

ES: Blootstellingsscenario

GefStoffVO: Verordening Gevaarlijke Stoffen, Duitsland

GHS: Wereldwijd geharmoniseerd systeem voor de indeling en etikettering van chemicaliën.

IARC: Internationaal Agentschap voor Kankeronderzoek

IATA: Vereniging voor internationaal luchtvervoer.

IC50: half-maximale remmende concentratie

IMDG: Internationale Maritieme Code voor Gevaarlijke goederen.
LC50: Letale concentratie, voor 50 procent van de testpopulatie.
LD50: Letale dosis, voor 50 procent van de testpopulatie.
LDLo: Letale dosis laag
N.A.: Niet van toepassing
N/A: Niet van toepassing
N/D: Niet bepaald/Niet beschikbaar
N.D.: Niet beschikbaar
NIOSH: National Institute for Occupational Safety and Health
NOAEL: Geen waargenomen schadelijk effect niveau
OSHA: Occupational Safety and Health Administration (VS).
PBT: Persistent, bioaccumulerend en toxisch
PGK: Verpakkingsinstructie
PNEC: Voorspelde nuleffectconcentratie.
PSG: Passagiers
RID: Reglement betreffende het internationaal vervoer van gevaarlijke goederen per spoor.
STEL: Korte termijn blootstellingslimiet
STOT: Specifieke doelorgaantoxiciteit
TLV: Maximaal Aanvaarde Concentratie
TLV-TWA: Maximaal Aanvaarde Concentratie voor de tijdgewogen gemiddelde 8-urige werkdag (ACGIH Standaard).
vPvB: Zeer persistent, zeer bioaccumulerend.
WGK: Duitse Water Hazard Class.

Paragrafen gewijzigd na vorige revisie:

- RUBRIEK 1: Identificatie van de stof of het mengsel en van de vennootschap/onderneming
- RUBRIEK 2: Identificatie van de gevaren
- RUBRIEK 3: Samenstelling en informatie over de bestanddelen
- RUBRIEK 8: Maatregelen ter beheersing van blootstelling/persoonlijke bescherming
- RUBRIEK 9: Fysische en chemische eigenschappen
- RUBRIEK 11: Toxicologische informatie
- RUBRIEK 12: Ecologische informatie
- RUBRIEK 13: Instructies voor verwijdering
- RUBRIEK 14: Informatie met betrekking tot het vervoer
- RUBRIEK 15: Regelgeving

Toluene

Identification of the exposure scenario
Product name: Toluene
CAS number: 108-88-3
EC number: 203-625-9
Review date: 02/03/2017

2 - INDUSTRIAL USES

Identified industrial uses of toluene and generic exposure scenario.
Table 1 lists the industrial uses identified for toluene.
If DUs wish to verify compliance with the ES, they should start with summary table 1 and, based on the textual description of the exposure scenarios, determine their own identified use, the PROC and the ERC associated with their specific activity.
DUs may identify the specific scenarios of their interest in section 2.2.1 for the environment, 2.2.2 for workers and 2.2.3 for consumers and verify the exposure and risk characterisation for the environment and for workers in section 2.3. The operating conditions described in each specific scenario do not necessarily apply to all sites. It may therefore be necessary to apply the graduated scaling method (appropriate adaptation to the actual conditions on site), in order to identify compliance with the conditions described in the exposure scenarios.

Table 1. Industrial contributing exposure scenarios identified for toluene

Identifier use: ES1 Manufacturing
Description: Manufacture of the substance or use as an intermediate, or as a process chemical or extraction agent. Includes recycling/recovery activities, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including on vessels/barges, tank wagons or tank trucks and large IBCs).
Sector of use (SU): 3, 8 , 9
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 15
Environmental Release Categories (ERC): 1

Identifier use: ES2 Distribution
Description: Loading (including on vessel/barges, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities.
Sector of use (SU): 3, 8, 9
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 9, 15
Environmental Release Categories (ERC): 1 (load) - 2 (repacking)

Identifier use: ES3 Use as an intermediate
Description: Use as an intermediate
Sector of use (SU): 3, 8, 9
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 15
Environmental Release Categories (ERC): 6a

Identifier use: ES5 Use in cleaning agents
Description: Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.
Sector of use (SU): 3, 10
Process categories (PROC): 2, 3, 4, 7, 8a, 8b, 10, 13
Environmental Release Categories (ERC): 4

Identifier use: ES7 Use as fuel
Description: Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Sector of use (SU): 3, 10
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 16
Environmental Release Categories (ERC): 7

Identifier use: ES10 Use in coatings
Description: Covers use in coatings (paints, inks, adhesives, etc.), including exposures during use (including materials receipt, storage, preparation and bulk and semi-bulk transfer, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Sector of use (SU): 3, 10
Process categories (PROC): 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15
Environmental Release Categories (ERC): 4

Identifier use: ES13 Use in oil field drilling and production operations
Description: Well drilling activities in oil and production fields (including drilling muds and well cleaning), including material transfers, on-site formulation, also wellhead operations, shaker room activities and related maintenance.
Sector of use (SU): 3, 10
Process categories (PROC): 1, 2, 3, 4, 8a, 8b
Environmental Release Categories (ERC): 4

Identifier use: ES14 Use in binders and release agents
Description: Covers the use as binders and release agents, including material transfers, mixing, application (including spraying and brushing), mould forming and casting and handling of waste.
Sector of use (SU): 3, 8, 9
Process categories (PROC): 1, 2, 3, 4, 6, 7, 8b, 10, 14
Environmental Release Categories (ERC): 5

Identifier use: ES16 Use as laboratory reagent
Description: Use of the substance within laboratory settings, including material transfers and equipment cleaning.
Sector of use (SU): 3, 10
Process categories (PROC): 10, 15
Environmental Release Categories (ERC): 2, 4

Identifier use: ES18 Use in functional fluids
Description: Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.
Sector of use (SU): 3, 8, 9
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 9
Environmental Release Categories (ERC): 7

Identifier use: ES20 Use in rubber production and processing
Description: Manufacture of tyres and general rubber articles, including processing of raw (cured) rubber, handling and mixing of rubber additives, vulcanising, cooling and finishing.
Sector of use (SU): 10
Process categories (PROC): 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 14, 15
Environmental Release Categories (ERC): 4, 6d

Identifier use: ES21 Formulation
Description: Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, material transfers, mixing, large and small scale packing, maintenance and associated laboratory activities.
Sector of use (SU): 3, 10
Process categories (PROC): 1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15
Environmental Release Categories (ERC): 2

2.1 INDUSTRIAL USES OF TOLUENE AND TOLUENE-CONTAINING PRODUCTS

Title: Industrial uses of toluene and toluene-containing products
Sectors of use: 3, 8, 9, 10
Process categories: 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 13, 14, 15
Environmental Release Categories: 1, 2, 4, 5, 6a, 6d, 7
Scope of the process: Industrial processes relevant to toluene and toluene-containing products

2.2 OPERATING CONDITIONS AND RISK MANAGEMENT MEASURES

2.2.1. Contributing scenario controlling exposure for the environment

Method used for evaluation: EUSES 2.1.1 with use of predefined ESVOC SpERC release fractions (see Table 3 for the specific versions of each scenario).

Operating conditions

Product features: Toluene is a liquid of medium volatility. The water solubility of this category is 573 mg/l; the vapour pressure is 4030 Pa at 20°C; the log Kow is 2.73. Toluene is readily biodegradable.
Frequency and duration of use: Issue days: 300 days/year
Quantity used: See table 2.
Environmental factors not influenced by risk management: See table 2.
Other given operational conditions affecting environmental exposure: See table 2.

Risk Management Measures

Local technical conditions and measures to reduce and limit discharges, air emissions and soil release:
Treat air emission to provide a typical removal efficiency of [TCR7]: for each scenario, see Table 2 Typical onsite wastewater treatment technology provides removal efficiency of 93.3% [TCR11]. (unless otherwise specified).
ES5, ES7, ES10, ES14: Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational measures to prevent/limit release from site:
ES1, ES2, ES3, ES5, ES7, ES10, ES14, ES16, ES18, ES20, ES21: Do not apply industrial sludge to natural soils [OMS2].
ES3: Sewage sludge should be incinerated, contained or reclaimed [OMS3].
ES13: Prevent environmental discharge consistent with regulatory requirements.
Conditions and measures for the domestic sewage treatment plan:
Estimated substance removal from wastewater via municipal sewage treatment 93.3 (%) [STP3]. (unless otherwise specified).
Assumed domestic sewage treatment plant flow 2000 (m^3/g) [STP5]. (unless otherwise specified).
Conditions and measures for external treatment of waste for disposal:
ES1: No waste of the substance is generated during production. [ETW4].
ES2, ES5,ES10 ES13, ES14, ES16, ES18, ES20, ES21: External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
ES3, ES7: This substance is consumed during use and no waste of the substance is generated [ETW5].
Conditions and measures for external recovery of waste:
ES1: No waste related to the substance [ERW2] is generated during production.
ES2, ES10, ES13, ES14, ES16, ES18, ES20, ES21: External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].
ES3, ES5, ES7: This substance is consumed during use and no waste of the substance is generated [EWR3].

2.2.2 Contributing scenario controlling exposure for workers

Product features: Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of the substance in the product: Covers a percentage substance in the product up to 100% (unless otherwise stated) [G13].
Frequency and duration of use/exposure: Covers a daily exposure up to 8 hours (unless otherwise specified) [G2].
Human factors not influenced by risk management: Not applicable.
Other given operating conditions affecting employee exposure:
Assumes use of the product at not more than 20°C above ambient temperature, unless otherwise specified [G15].
Assumes a good basic standard of occupational hygiene has been implemented [G1].
Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38].

Operational conditions and risk management measures affecting worker exposure

General measures (skin irritants) (G19):
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear suitable gloves (tested to EN374) if hand contact with substance is likely. Remove impurities/product spills as they occur. Immediately remove any contamination with skin. Provide basic staff training so that exposure is minimised and any skin problems are reported (E3).
In addition (where there is potential for further significant aerosol exposure): Other skin protection measures, such as impermeable overalls and visors, will be necessary during activities involving high dispersion with the possible release of aerosols.

General measures for assessing the inhalation risk - qualitative assessment:
Do not swallow. Implement a good basic standard of occupational hygiene. Avoid contact with contaminated tools and objects. Management/supervision in place to check that the RMMs implemented are being used correctly and OCs followed. Staff training on good practices. Adequate standard of personal hygiene.
For the operational conditions and risk management measures for each scenario, see Table 3.

2.2.3 Contributing scenario controlling consumer exposure

There is no consumer exposure for this scenario.

2.3 EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

2.3.1 Contributing scenario for estimating environmental exposure

Tool used for evaluation: EUSES 2.1.1 with use of predefined ESVOC SpERC release fractions (see Table 3 for the specific versions of each scenario).
When complying with the recommended risk management measures (RMMs) and operating conditions (OCs), exposure is not expected to exceed the PNECs and the risk characterisation ratios should be less than 1, as shown in table 2.

2.3.2 Contributing scenario for estimating worker exposure

Tool used for evaluation ECETOC TRA v2 (www.ecetoc.org/tra)
General parameters used:
Environment type: industrial
Dustiness: low (liquid substance)
Duration of exposure: > 4 hours/day, unless otherwise stated in the RMMs
Ventilation use: none, unless otherwise stated in the RMMs
Use of respiratory protection: none, unless otherwise stated in the RMMs
Use of skin protection: none, unless otherwise stated in the RMMs
Concentration in preparations: > 25%
When complying with the recommended risk management measures (RMMs) and operating conditions (OCs), exposure is not expected to exceed the DNELs and the risk characterisation ratios should be less than 1, as shown in table 3.

2.3.3 Contributing scenario for estimating consumer exposure

There is no consumer exposure for this scenario.

2.4. GUIDELINES FOR THE DU TO VERIFY COMPLIANCE WITH THE EXPOSURE SCENARIO

2.4.1 Guidelines for DU to verify compliance with the environmental exposure scenario

Confirm that the RMMs and OCs are as described or have equivalent efficiency.
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 [DSU1].
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].
Further details on scaling and control technologies are provided in SPERC factsheet.

2.4.2 Guidelines for DU to verify compliance with the contributing scenario for worker exposure estimation

Predicted exposures are not expected to exceed the DNEL when the RMMs and OCs outlined in Table 3 are implemented (G22).
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].
Risk characterisation ratios (RCRs) are calculated by comparing the estimated exposure levels with the corresponding DNELs (RCR = exposure level/DNEL).

Table 2.

identifiers			Operating Conditions and Risk Management Measures						Risk characterization					
		Quantity used	Dilution factors		RMM to be implemented									
	ERC/ SpERC	Tonnage per site t/ year	Fresh water	Sea water	Water treatment efficiency %	Air abatement efficiency %	Waste treatment total removal %	Domestic wastewater treatment flow m^3/d	RCR fresh water	RCR marine water	RCR freshwater sediments	RCR marine water sediments	RCR soil	RCR STP extension
ES1	ESVOC SpERC 1.1.v1 for air and soil	300000	40	100	>93.3%	90%	93.3%	2000	0.125	0.0495	0.125	0.0494	0.029	0.246
ES2	ESVOC SpERC 1.1b.v1	300000	10	100	>93.3%	90%	93.3%	2000	5.14E-02	5.11E-03	5.14E-02	5.11E-03	7.37E-02	2.46E-02
ES3	ESVOC SpERC 6.1a.v1	12000	10	100	>93.3%	80%	93.3%	2000	5.93E-01	5.93E-02	5.93E-01	5.93E-02	8.77E-01	2.95E-01
ES5	ESVOC SpERC 4.4a.v1	1500	10	100	>93.3%	70%	93.3%	2000	2.79E-03	2.52E-04	2.79E-03	2.52E-04	1.96E-03	3.59E-04
ES7	ESVOC SpERC 7.12a.v1	15000	10	100	>93.3%	95%	93.3%	2000	4.47E-03	4.20E-04	4.46E-03	4.19E-04	4.31E-03	1.20E-03
ES10	ESVOC SpERC 4.3a.v1	4500	10	100	>93.3%	90%	93.3%	2000	5.05E-01	5.05E-02	5.05E-01	5.05E-02	7.55E-01	2.52E-01
ES13	Discharge into the aquatic environment is restricted by law and industry prohibits it: OSPAR Commission 2009. Discharges, Spills and Emissions from Offshore Oil and Gas installations in 2007, including the assessment of data reported in 2006 and 2007.													
ES14	ESVOC SpERC 4.10a.v1	1500	10	100	>93.3%	80%	93.3%	2000	2.79E-03	2.52E-04	2.79E-03	2.52E-04	6.71E-03	3.59E-04
ES16	SPERC proposes evaluation using ERC	1500	10	100	>93.3%	0%	93.3%	2000	4.81E-01	4.81E-02	4.81E-01	4.81E-02	7.12E-01	2.40E-01
ES18	ESVOC SpERC 7.13a.v1	1500	10	100	>93.3%	0%	93.3%	2000	9.26E-03	8.99E-04	9.26E-03	8.99E-04	1.10E-02	3.59E-03
ES20	ESVOC SpERC 4.19.v1	6000	10	100	>93.3%	0%	93.3%	2000	2.90E-01	2.89E-02	2.90E-01	2.89E-02	4.28E-01	1.44E-01
ES21	ESVOC SpERC 2.2.v1	15000	10	100	>93.3%	0%	93.3%	2000	4.95E-01	4.95E-02	4.95E-01	4.94E-02	7.38E-01	2.46E-01

Table 3. OC, RMM, Risk Characterization - Workers - Industrial uses

Identifier: ES1 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Continuous; daily; 15 mins - 1 hour; Product temp. Outside. Process closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES2 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. With sample collection [CS56]. Product sampling [CS137].
OC and typical RMMs: Continuous; daily; 15 mins - 1 hour; Product temp. Outdood Process included. Outdoor placement. Closed/semi-closed sampling point.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES1 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].
OC and typical RMMs: Batch process; daily; 15 mins - 1 hour; Product temp. Indoor/Outdoor. Closed equipment, sample point included or with venting.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES1 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Indoor/Outdoor Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES1 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: In-Process Sampling [CS2].
OC and typical RMMs: Daily; <15 mins; Product temp. Indoor/Outdoor. Closed or ventilated sample points.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11] Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES1 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory activity [CS36].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Indoor; hood. PPE.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES1 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. (open systems) [CS108]. With potential for aerosol generation [CS138].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Indoor/Outdoor Transfers included. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Operate away from sources of emission or release of the substance. [E77]. If technical measures are not practical [G16], wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES1 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. (closed systems) [CS107].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Indoor/Outdoor. Transfers included. Transfer points with vents. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Operate activity away from sources of substance emission or release [E77] If technical measures are not practical [G16], wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES1 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Equipment cleaning and maintenance [CS39]
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Collection of line waste in containers. Indoor/Outdoor. Lines included. Retain drain downs in sealed storage pending disposal, use as a recycled material in subsequent formulations, or recycle. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.20 Additional exposure modifier: 0.2. Assumes LEV efficiency equivalent to SOP for drainage etc. before maintenance; additional LEV 80%.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.01.
RCR (all ways): 0.20

Identifier: ES2 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Product temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES2 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Continuous; Daily; 15 mins - 1 hour; Product temp. Process closed. No exposure.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES2 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. With sample collection [CS56]. Product sampling [CS137].
OC and typical RMMs: Continuous; Daily; 15 mins - 1 hour; Product temp. Outside. Process included. Closed/semi-closed sampling point.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES2 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].
OC and typical RMMs: batch process; Daily; 15 mins - 1 hour; Product at temp. environment. Outside. Closed equipment, sample point included or with venting.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES2 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Indoor/Outdoor. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics

RCR Inhalation: 0.39.
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES2 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: In-Process Sampling [CS2].
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Outside. Closed or ventilated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES2 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory activity [CS36].
OC and typical RMMs: Continuous; Daily; 15 mins - 1 hour; Product at temp. environment. Inside. Hood. PPE
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES2 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. (closed systems) [CS107]
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Outside. Potential exposure during interruption of connections. Transfers included. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES2 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. (open systems) [CS108]
OC and typical RMMs: Daily; 1 - 4 hours; Product at temp. environment. Outdood Potential exposure due to emission of vapours from opening tanks. Transfers included. Submerged load through tank opening. Collection of drops from loading arm. May require LEV and/or RPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Operate activity away from sources of substance emission or release [E77]. If technical measures are not practical [G16], wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES2 PROC9

Operating Conditions and Risk Management Measures

Contributing scenario: Drum and small package filling [CS6].
OC and typical RMMs: Continuous; Daily; 8 hours; Product temp. Outside. Transfers included. Transfer points with vents. Dedicated filling lines.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.69. Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES2 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Collection of line residues in a container. Lines included. Retain washes in sealed storage awaiting disposal or use as a recycled material in subsequent formulations. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.10 Additional exposure modifier 0.01. Assumes LEV efficiency equivalent to SOP for drainage etc. before maintenance.
Dermal RCR: 0.04
RCR (all ways): 0.13

Identifier: ES2 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Product temp. Outside. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES3

Human health assessment is not required for this use, use as an intermediate is included in the toluene production.

Identifier: ES5 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. (open systems) [CS108]
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Collection of line residues in a container. Transfers included. Transfer points with vents. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES5 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Automated process with (semi) closed systems [CS93]. Use in contained systems [CS38].
OC and typical RMMs: Daily; 8 hours. Process included. closed/semi-closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES5 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: Automated process with (semi) closed systems [CS93]. Use in contained systems [CS38]. Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Process included. closed/semi-closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES5 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Application of cleaning products in closed systems [CS101].
OC and typical RMMs: Daily; 8 hours. Process included. closed/semi-closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES5 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Filling of equipment from drums or containers [CS45]. Dedicated system [CS81].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Pumping from drums to equipment.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. If technical measures are not practical [G16], wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.69

Identifier: ES5 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Use in contained batch processes [CS37]. Heating treatment [OC129].
OC and typical RMMs: Daily; 1 - 4 hours. Temperature above boiling point. Outdood Equipment closed. Transfer points included or with vent.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics

RCR Inhalation: 0.20 TRA LEV efficiency 90%.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES5 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Degreasing small objects in cleaning station [CS41].
OC and typical RMMs: Daily; >4 hours; Environment. Local aspiration on open surfaces; eliminate leaks as soon as they occur. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69. Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES5 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning with low-pressure washers [CS42].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Specific training of workers. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69
Dermal RCR: 0.07
RCR (all ways): 0.76

Identifier: ES5 PROC7

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning with high pressure washers [CS44].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Specific training of workers. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 10 to 15 air changes per hour) [E40]. Limit substance content in the product to 5 % [OC17].

Risk characteristics

RCR Inhalation: 0.15 Ventilation dilution efficiency 70%. TRA factor RPE half mask.
Dermal RCR: 0.11
RCR (all ways): 0.26

Identifier: ES5 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Manual cleaning of surfaces. No spraying [CS60].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Collection of waste and cleaning cloths in a container.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.07
RCR (all ways): 0.76

Identifier: ES5 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins -1 hour; Product temp. Collection of line waste in containers. Indoor/Outdoor. Lines included. Retain drain downs in sealed storage pending disposal, use as a recycled material in subsequent formulations, or recycle. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.20 Additional exposure modifier: 0.2. Efficiency of LEVs equivalent to drainage SOP etc. is assumed. before maintenance; additional LEV (80%).
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES5 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; <15 mins. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES7 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES7 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Drum/Batch Transfers [CS8].
OC and typical RMMs: Daily; 1 -4 hours; Room temp. Pumping from drums to equipment.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES7 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Daily; >4 hours. Inside. Closed equipment; designed for easy maintenance. PPE.
No specific measure identified
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES7 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. Product sampling [CS137].
OC and typical RMMs: Daily; >4 hours. Inside. Closed equipment; designed for easy maintenance. PPE.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES7 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]. Batch process [CS55].
OC and typical RMMs: Daily; >4 hours. Inside. Closed equipment; designed for easy maintenance. PPE.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES7 PROC16

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. (closed systems) [CS107].
OC and typical RMMs: Daily; >4 hours, 100%. Equipment closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.10
Dermal RCR: 0.00
RCR (all ways): 0.10

Identifier: ES7 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].
OC and typical RMMs: Daily; >4 hours, 100%. Equipment closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.4
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES7 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Equipment Maintenance [CS5].
OC and typical RMMs: Daily; >4 hours, 100%. Operator training.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E55]. Wear coveralls to prevent skin exposure [PPE27].

Risk characteristics
RCR Inhalation: 0.20 Additional exposure modifier: 0.2. It is assumed that the SOPs reduce both inhalation and dermal exposure by up to 80%. (x0.2)
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.2.
RCR (all ways): 0.20

Identifier: ES7 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Cleaning of containers and vessels [CS103].
OC and typical RMMs: Infrequent; >4 hours. Procedures for entry into containers. Store drainage liquids in sealed containers pending disposal. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES7 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES7 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES10 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Continuous; Daily; 8 hours. Process included. Closed/semi-closed sampling point.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES10 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]. With sample collection [CS56]. Use in contained systems [CS38].
OC and typical RMMs: Continuous; Daily; 8 hours. Process included; closed/semi-closed sampling point.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES10 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Film formation. Forced drying (50-100°C). Stoving (>100°C). UV / EB radiation finish [CS94].
OC and typical RMMs: Process included.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES10 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Mixing operations (closed systems) [CS29]. General exposures (closed systems) [CS15].
OC and typical RMMs: -
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES10 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Film formation - air drying [CS95].
OC and typical RMMs: -
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES10 PROC5

Operating Conditions and Risk Management Measures
Contributing scenario: Preparation of material for application [CS96]. Mixing operations (open systems) [CS30].
OC and typical RMMs: Liquid/powder products - batch. Indoor/Outdoor.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES10 PROC7

Operating Conditions and Risk Management Measures
Contributing scenario: Spray application (automatic/robotic) [CS97].
OC and typical RMMs: Daily; >4 hours; Product temp. Spray booth with vents. Specific training of operators. PPE.
RMM to be implemented: Carry out in a vented booth or extracted enclosure [E57].

Risk characteristics
RCR Inhalation: 0.05 TRA LEV: 99% efficiency.
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.05.
RCR (all ways): 0.05

Identifier: ES10 PROC7

Operating Conditions and Risk Management Measures

Contributing scenario: Manual spray application.
OC and typical RMMs: Outside. Air mask/respirator.
RMM to be implemented: Carry out in a vented booth or extracted enclosure [E57]. Oppure, Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.1 Ventilation dilution efficiency 70%. TRA factor RPE half mask.
Dermal RCR: 0.011
RCR (all ways): 0.26

Identifier: ES10 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. Non-dedicated facility [CS82].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Collection of line waste in containers. Outdoor/Indoor. Transfers included. Transfer points with vents. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES10 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. Dedicated system [CS81].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Collection of line waste in containers. Outdoor/Indoor. Transfers included. Transfer points with vents. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES10 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Application by roller, spatula, flux [CS98].
OC and typical RMMs: Daily; >4 hours; Product at temp. environment. Range from 2-3% up to 40-50%. Aspiration localized to the rollers. Eliminate leaks as they occur. PPE. Large scale (open equipment).
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.07
RCR (all ways): 0.76

Identifier: ES10 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Immersion, dipping and pouring [CS4].
OC and typical RMMs: Daily; >4 hours; Environment. Local aspiration on open surfaces. Eliminate leaks as they occur. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES10 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory activity [CS36].
OC and typical RMMs: Small-scale business. Small amounts. Daily 15 min.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES10 PROC9

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. Kegs/Batch Transfers [CS8]. Transfer from / pour from containers [CS22].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Use goggles gloves.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES10 PROC14

Operating Conditions and Risk Management Measures

Contributing scenario: Production of preparations or articles by tabletting, compression, extrusion, pelettisation [CS100].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Use protective goggles and gloves.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.01
RCR (all ways): 0.70

Identifier: ES10 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Collection of line waste in containers. Indoor/Outdoor. Lines included. Retain drain downs in sealed storage pending disposal, use as a recycled material in subsequent formulations, or recycle. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.20 Additional exposure modifier: 0.2. Efficiency of LEVs equivalent to drainage SOP etc. is assumed. before maintenance; additional LEV (80%).
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.01.
RCR (all ways): 0.20

Identifier: ES10 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES10 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14].
OC and typical RMMs: Daily; 15 mins -1 hour; Product at temp. environment. Transfers included. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Oppure, Operate activity away from sources of substance emission or release [E77]. If technical measures are not feasible [G16]. Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES10 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Filling of equipment from drums or containers [CS45].
OC and typical RMMs: Daily; 15 mins -1 hour; Product at temp. environment. Pumping from drums to equipment.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES13 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Ground drilling operations [CS116].
OC and typical RMMs: Daily; 1 - 4 hours; Product at temp. environment. Inside. Closed equipment, sample point included or with venting.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES13 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Ground drilling operations [CS116].
OC and typical RMMs: Daily; 1 - 4 hours; Product at temp. environment. Outside.
RMM to be implemented: Make sure the operation is done outdoors [E69]

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES13 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Solid filtering operations - steam exposures [CS118].
OC and typical RMMs: Daily; >4 hours. Inside. Product temperature approx. 60°C. LEV.
RMM to be implemented: Ensure material transfers are under containment or extract ventilation [E66].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES13 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Solid filtering operations - aerosol exposures [CS119].
OC and typical RMMs: Daily; >4 hours. Inside. Product temperature approx. 60°C. LEV.
RMM to be implemented: Ensure material transfers are under containment or extract ventilation [E66].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES13 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Filtering operations of solids [CS117].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Localized aspiration.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES13 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Treatment and disposal of filtered solids [CS121].
OC and typical RMMs: Daily; 1 - 4 hours; Product at temp. environment. Outside. Base oil content 1-5%. Localized aspiration.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES13 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: In-Process Sampling [CS2].
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Indoor or outdoor Sample point enclosed or vented.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES13 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Daily; >4 hours; Product at temp. environment. Outside.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES13 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Pouring from small containers [CS9].
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Indoor or outdoor
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear suitable gloves tested to EN374 [PPE15].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES13 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16].
OC and typical RMMs: Daily; >4 hours; Product at temp. environment. Localized or external aspiration.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics
RCR Inhalation: 0.27 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.29

Identifier: ES13 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Collection of line waste in containers. Lines included. Retain washes in sealed storage pending disposal or use as a recycled material in subsequent formulations. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear suitable gloves tested to EN374 [PPE15].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES13 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Batch process [CS55].
OC and typical RMMs: Continuous; Daily; 8 hours. Process included. Closed/semi-closed sampling point.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 00

Identifier: ES13 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Batch process [CS55]. Product sampling [CS137].
OC and typical RMMs: Continuous; Daily; 8 hours. Process included. Closed/semi-closed sampling point.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES14 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES14 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3]. Product sampling [CS137].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES14 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3]. Batch process [CS55]. (closed systems) [CS107].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES14 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Pumping from drums to equipment.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 031

Identifier: ES14 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Mixing operations (closed systems) [CS29].
OC and typical RMMs: Daily; >4 hours. Mixers included or vented.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES14 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Mixing operations (open systems) [CS30].
OC and typical RMMs: Daily; >4 hours. Improved general ventilation.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES14 PROC14

Operating Conditions and Risk Management Measures
Contributing scenario: Stamping forming [CS31].
OC and typical RMMs: Daily; >4 hours; Room temp. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.01
RCR (all ways): 0.30

Identifier: ES14 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Casting operations [CS32].
OC and typical RMMs: Daily; 1 - 4 hours. High temperature, sufficient to create fumes. Improved general ventilation. PPE.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics
RCR Inhalation: 0.49 TRA LEV: 90% efficiency
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.05.
RCR (all ways): 0.49

Identifier: ES14 PROC7

Operating Conditions and Risk Management Measures
Contributing scenario: Machine spraying.
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Production line included or ventilated. Automation.
RMM to be implemented: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Risk characteristics
RCR Inhalation: 0.25 TRA LEV: 95% efficiency.
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.05.
RCR (all ways): 0.25

Identifier: ES14 PROC10

Operating Conditions and Risk Management Measures
Contributing scenario: Manual application by roller or brush [CS13].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.37

Identifier: ES14 PROC7

Operating Conditions and Risk Management Measures
Contributing scenario: Manual spraying
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. PPE, mask.
RMM to be implemented: Carry out in a vented booth or extracted enclosure [E57].

Risk characteristics
RCR Inhalation: 0.05 TRA LEV: 99% efficiency.
Dermal RCR: 0.11
RCR (all ways): 0.16

Identifier: ES14 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES14 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67]. With occasional controlled exposure [CS137]
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES16 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory [CS36]. On a small scale [CS61]. Handling of small amounts (<1000ml) for more than 4 hours/day - under hood.
OC and typical RMMs: Continuous; Daily; >4 hours; Room temp. Hood or ventilated glove box Selected disposable gloves.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 020

Identifier: ES16 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning [CS47]. Application by roller, brush [CS51]. Cleaning of containers and vessels [CS103]. Cleaning of equipment, glass etc. under general ventilation for 15 min - 1 hour/day.
OC and typical RMMs: Continuous; Daily; 15min - 1 hour/day; Room temp. Controlled general ventilation (10 air changes per hour). Selected disposable gloves.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.37

Identifier: ES18 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk transfer [CS14]
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES18 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. Product sampling [CS137].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES18 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14]. Batch process [CS55].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES18 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk transfer [CS14]
OC and typical RMMs: Daily; 15min - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES18 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Kegs/Batch Transfers [CS8]. Dedicated system [CS81].
OC and typical RMMs: Continuous; Daily; 15min - 1 hour; Room temp. Pumping from drums to tanks.
RMM to be implemented: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Risk characteristics

RCR Inhalation: 0.03 TRA LEV: 97% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.03

Identifier: ES18 PROC9

Operating Conditions and Risk Management Measures
Contributing scenario: Pelletizing [CS53]. (closed systems) [CS107].
OC and typical RMMs: Daily; >4 hours; Room temp. Operations included. Size of openings minimized.
RMM to be implemented: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Risk characteristics
RCR Inhalation: 0.10 TRA LEV: 90% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.10

Identifier: ES18 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Filling of equipment from drums or containers [CS45].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Pour carefully. Worker training.
RMM to be implemented: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Risk characteristics
RCR Inhalation: 0.10 TRA LEV: 90% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.10

Identifier: ES18 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Daily; >4 hours; Room temp.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.209

Identifier: ES18 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16].
OC and typical RMMs: Daily; >4 hours; Room temp. Ventilated area.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES18 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16].
OC and typical RMMs: Daily; >4 hours. (product at 80°C)
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES18 PROC9

Operating Conditions and Risk Management Measures
Contributing scenario: Rework rejected items [CS19].
OC and typical RMMs: Daily; >4 hours; Room temp. Working methods. Empty before the activity. Keep spills.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics
RCR Inhalation: 0.20 Additional exposure modifier: 0.2. Discharging SOPs are equal to an 80% reduction in LEVs (x0.2).
Dermal RCR: 0.02
RCR (all ways): 0.21

Identifier: ES18 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Equipment Maintenance [CS5].
OC and typical RMMs: Daily; 1 - 4 hours; Product temp. environment. Working methods. Empty before the activity. Keep spills. Gloves.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics
RCR Inhalation: 0.20 Additional exposure modifier: 0.2. Discharging SOPs are equal to an 80% reduction in LEVs (x0.2).
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES18 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Product temp. environment. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES18 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES20 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES20 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3]. Product sampling [CS137].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES20 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3]. Dedicated system [CS81].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. General ventilation. Minimize spills.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES20 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Bulk weighing [CS91].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Activity included.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES20 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Bulk weighing [CS91]. Product sampling [CS137].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Activity included.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES20 PROC9

Operating Conditions and Risk Management Measures
Contributing scenario: Small Scale Weighing [CS90].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. LEV. Minimize spills. Operator training.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES20 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Additive premixes [CS92].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. LEV. Minimize spills.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES20 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Additive premixes [CS92]
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. LEV. Minimize spills.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES20 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3]. Dedicated system [CS81].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Activity included.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES20 PROC9

Operating Conditions and Risk Management Measures
Contributing scenario: Material transfers [CS3].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Activity included.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.72

Identifier: ES20 PROC5

Operating Conditions and Risk Management Measures
Contributing scenario: Additive premixes [CS92]. Batch process [CS55].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. LEV. Minimize spills.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES20 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Calendering (including Banburys) [CS64].
OC and typical RMMs: Daily; >4 hours; High temperatures. LEV. Minimize area/size of openings.
RMM to be implemented: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].

Risk characteristics
RCR Inhalation: 0.49 TRA LEV: 90% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.05.
RCR (all ways): 0.49

Identifier: ES20 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Calendering (including Banburys) [CS64]
OC and typical RMMs: Daily; >4 hours. High temperatures. LEV. Minimize area/size of openings.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.07
RCR (all ways): 0.76

Identifier: ES20 PROC14

Operating Conditions and Risk Management Measures
Contributing scenario: Pressing uncured rubber blanks [CS73].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Good general ventilation
RMM to be implemented: Provide a good standard of general ventilation (not less than 10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.01
RCR (all ways): 0.30

Identifier: ES20 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Vulcanization [CS70].
OC and typical RMMs: Daily; > 4 hours. High temperatures. LEV at the points of issue. Minimize area/size of openings. Good general ventilation.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.66

Identifier: ES20 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Cooling cured articles [CS71].
OC and typical RMMs: Daily; > 4 hours; Room temp. LEV. Aspiration / hood.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.07
RCR (all ways): 0.76

Identifier: ES20 PROC15

Operating Conditions and Risk Management Measures
Contributing scenario: Laboratory activity [CS36]
OC and typical RMMs: Daily; >15 mins; Room temp. Localized aspiration at the filling point. PPE.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES20 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Equipment Maintenance [CS5].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Collection of line waste in containers. Lines included. Retain washes in sealed storage pending disposal or use as a recycled material in subsequent formulations. PPE.
RMM to be implemented: Drain or remove substance from equipment prior to break-in or maintenance [E81]

Risk characteristics
RCR Inhalation: 0.10 Additional exposure modifier: 0.1. Ninety percent LEV efficiency is assumed equivalent to the SOPs for drainage etc. before maintenance (0.1).
Dermal RCR: 0.04
RCR (all ways): 0.13

Identifier: ES21 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Processes closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES21 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]. With sample collection [CS56]. Product sampling [CS137].
OC and typical RMMs: Continuous; Daily; 15 mins - 1 hour. Process included. Closed/semi-closed sampling point.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES21 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Batch process. Equipment closed. Sample point enclosed or vented.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES21 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56]. With potential for aerosol generation [CS138].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Inside. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES21 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Batch processes at elevated temperatures [CS136].
OC and typical RMMs: Daily; 15 mins - 1 hour. High product temp. Equipment closed. Sample point enclosed or vented.
RMM to be implemented: Ensure material transfers are under containment or extract ventilation [E66]. Provide extract ventilation in points where emissions occur [E54].

Risk characteristics
RCR Inhalation: 0.20 TRA LEV: 90% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES21 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: In-Process Sampling [CS2].
OC and typical RMMs: Daily; <15 mins; Product temp. Closed or ventilated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES21 PROC15

Operating Conditions and Risk Management Measures
Contributing scenario: Laboratory activity [CS36].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Inside. Hood. PPE.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES21 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Collection of line waste in containers. Transfers included. Transfer points with vents. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES21 PROC5

Operating Conditions and Risk Management Measures

Contributing scenario: Mixing operations (open systems) [CS30]. With potential for aerosol generation [CS138].
OC and typical RMMs: Daily; 8 hours: Product at temp. environment. Inside. Batch process. LEV. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES21 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Transfer from / pour from containers [CS22]. manual [CS34].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Inside. Manual transfers. LEV, PPE, RPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.04
RCR (all ways): 0.72

Identifier: ES21 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Inside. Pumps for drums or dedicated drum handling equipment.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES21 PROC14

Operating Conditions and Risk Management Measures

Contributing scenario: Production of preparations or articles by tabletting, compression, extrusion, pelettisation [CS100].
OC and typical RMMs: Daily; 8 hours; Product at temp. environment. Inside. LEV, PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.01
RCR (all ways): 0.70

Identifier: ES21 PROC9

Operating Conditions and Risk Management Measures

Contributing scenario: Drum and small package filling [CS6].
OC and typical RMMs: Continuous; Daily; 8 hours; Product at temp. environment. Inside. Transfers included. Transfer points with vents.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES21 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 1 - 4 hours; Product at temp. environment. Inside. Collection of line waste in containers. Lines included. Retain drain downs in sealed storage pending disposal, use as a recycled material in subsequent formulations, or recycle. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance. [E55]

Risk characteristics

RCR Inhalation: 0.10 Additional exposure modifier: 0.1. Assumes LEV efficiency equivalent to SOP for drainage etc. before maintenance. RPE (0.1x).
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.10

Identifier: ES21 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67] With occasional controlled exposure [CS137]
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Samples collected at dedicated sample points.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

3 - PROFESSIONAL USES

Identified professional uses of Toluene and generic exposure scenario.
Table 4 lists the professional uses identified for toluene.
If DUs wish to verify compliance with the ES, they should start with summary table 4 and, based on the textual description of the exposure scenarios, determine their own identified use, the PROC and the ERC associated with their specific activity.
DU can identify the specific scenarios of their interest in section 3.2.1 for the environment, for workers 3.2.2 and 3.2.3 for the consumer, check in section 3.3 the exposure and risk characterization for the environment and for the workers. The operating conditions described in each specific scenario do not necessarily apply to all sites. It may therefore be necessary to apply the graduated scaling method (appropriate adaptation to the actual conditions on site), in order to identify compliance with the conditions described in the exposure scenarios.

Table 1. Contributing occupational exposure scenarios identified for toluene

Identifier use: ES4 Use in roads and construction
Description: Application of surface coatings and binders in road and construction activities, including paving, manual road surfacing and in the application of roofing and water-proofing membranes.
Sector of use (SU): 22
Process categories (PROC): 1, 2, 8a, 8b, 9, 10, 11, 13
Environmental Release Categories (ERC): 8d, 8f

Identifier use: ES6 Use in cleaning agents
Description: Covers the use as a component of cleaning products including transfer and unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase of cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand).
Sector of use (SU): 22
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 10, 11, 13
Environmental Release Categories (ERC): 8a, 8d

Identifier use: ES8 Use as fuel
Description: Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Sector of use (SU): 22
Process categories (PROC): 1, 2, 3, 4, 8a, 8b, 16
Environmental Release Categories (ERC): 9a, 9b

Identifier use: ES11 Use in coatings
Description: Covers the use in coatings (paints, inks, adhesives, etc.), including exposures during use (including materials receipt, storage, preparation and bulk and semi-bulk transfer, application by spray, roller, spreader and similar methods and film formation) and equipment cleaning, maintenance and associated laboratory activities.
Sector of use (SU): 22
Process categories (PROC): 1, 2, 3, 4, 5, 8a, 8b, 10, 11, 13, 15, 19
Environmental Release Categories (ERC): 8a, 8d

Identifier use: ES15 Use in binding and release agents
Description: Covers the use as binders and release agents, including material transfers, mixing, application by spraying and brushing and handling of waste.
Sector of use (SU): 22
Process categories (PROC): 1, 2, 3, 4, 6, 8a, 8b, 10, 11, 14
Environmental Release Categories (ERC): 8a, 8b, 8c, 8d, 8e, 8f

Identifier use: ES17 Use as laboratory reagent
Description: Use of the substance within laboratory settings, including material transfers and equipment cleaning.
Sector of use (SU): 22
Process categories (PROC): 10, 15
Environmental Release Categories (ERC): 8a

Identifier use: ES19 Use in functional fluids
Description: Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in professional equipment, including maintenance and related material transfers.
Sector of use (SU): 22
Process categories (PROC): 1, 2, 3, 8a, 9, 20
Environmental Release Categories (ERC): 9a, 9b

3.1 PROFESSIONAL USE OF TOLUENE AND PRODUCTS CONTAINING TOLUENE

Title: Professional uses of toluene and products containing toluene
Sectors of use: Professional (SU22)
Process categories: 1, 2, 3, 4, 5, 6, 7, 8a, 8b, 9, 10, 11, 13, 14, 15, 19, 20
Environmental Release Categories: 8a, 8b, 8c, 8d, 8e, 8f, 9a, 9b
Scope of the process: Professional processes relevant to toluene and toluene-containing products

3.2 OPERATING CONDITIONS AND RISK MANAGEMENT MEASURES

3.2.1. Contributing scenario controlling exposure for the environment

Method used for evaluation: EUSES 2.1.1 with use of predefined ESVOC SpERC release fractions (see Table 5 for the specific versions of each scenario).

Operating conditions

Product features: Toluene is a liquid of medium volatility. The water solubility of this category is 573 mg/l; the vapour pressure is 4030 Pa at 20°C; the log Kow is 2.73. Toluene is readily biodegradable.
Frequency and duration of use: Issue days: 365 days/year
Quantity used: See table 5.
Environmental factors not influenced by risk management: See table 5.
Other given operational conditions affecting environmental exposure: See table 5.

Risk Management Measures

Local technical conditions and measures to reduce and limit discharges, air emissions and soil release:
Treat air emission to provide a typical removal efficiency of >0% [TCR7]. Typical onsite wastewater treatment technology provides removal efficiency of 93.3% [TCR11].
ES6, ES8, ES17, ES19: Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational measures to prevent/limit release from site:
ES4, ES6, ES8, ES11, ES17, ES19: Do not apply industrial sludge to natural soils [OMS2].
ES15: Not applicable.
Conditions and measures for the domestic sewage treatment plan:
Estimated substance removal from wastewater via municipal sewage treatment 93.3 (%) [STP3].
Assumed domestic sewage treatment plant flow 2000 (m^3/g) [STP5].
Conditions and measures for external treatment of waste for disposal:
ES4, ES6, ES11, ES15, ES17, ES19: External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
ES8: This substance is consumed during use and no waste of the substance is generated [ETW5].
Conditions and measures for external recovery of waste:
ES4, ES6, ES11, ES15, ES17, ES19:: External recovery and recycling of waste should comply with applicable local and/or national regulations [ERW1].
ES8: This substance is consumed during use and no waste of the substance is generated [EWR3].

3.2.2 Contributing scenario controlling exposure for workers

Product features: Liquid, vapour pressure 0.5 - 10 kPa [OC4].
Concentration of the substance in the product: Covers a percentage substance in the product up to 100% (unless otherwise stated) [G13].
Frequency and duration of use/exposure: Covers a daily exposure up to 8 hours (unless otherwise specified) [G2].
Human factors not influenced by risk management: Not applicable.
Other given operating conditions affecting employee exposure:
Assumes use of the product at not more than 20°C above ambient temperature, unless otherwise specified [G15].
Assumes a good basic standard of occupational hygiene has been implemented [G1].
Users are advised to consider national Occupational Exposure Limits or other equivalent values [G38].

Operational conditions and risk management measures affecting worker exposure

General measures (skin irritants) (G19):
Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear suitable gloves (tested to EN374) if hand contact with substance is likely. Remove impurities/product spills as they occur. Immediately remove any contamination with skin. Provide basic staff training so that exposure is minimised and any skin problems are reported (E3).
In addition (where there is potential for further significant aerosol exposure): Other skin protection measures, such as impermeable overalls and visors, will be necessary during activities involving high dispersion with the possible release of aerosols.

General measures for assessing the inhalation risk - qualitative assessment:
Do not swallow. Implement a good basic standard of occupational hygiene. Avoid contact with contaminated tools and objects. Management/supervision in place to check that the RMMs implemented are being used correctly and OCs followed. Staff training on good practices. Adequate standard of personal hygiene.
For the operational conditions and risk management measures for each scenario, see Table 6.

3.2.3 Contributing scenario controlling consumer exposure

There is no consumer exposure for this scenario.

3.3 EXPOSURE ESTIMATION AND REFERENCE TO ITS SOURCE

3.3.1 Contributing scenario for estimating environmental exposure

Tool used for evaluation: EUSES 2.1.1 with use of predefined ESVOC SpERC release fractions (see Table 5 for the specific versions of each scenario).
When complying with the recommended risk management measures (RMMs) and operating conditions (OCs), exposure is not expected to exceed the PNECs and the risk characterisation ratios should be less than 1, as shown in Table 5.

3.3.2 Contributing scenario for estimating worker exposure

Tool used for evaluation ECETOC TRA v2 (www.ecetoc.org/tra)
General parameters used:
Environment type: professional
Dustiness: low (liquid substance)
Duration of exposure: > 4 hours/day, unless otherwise stated in the RMMs
Ventilation use: none, unless otherwise stated in the RMMs
Use of respiratory protection: none, unless otherwise stated in the RMMs
Use of skin protection: none, unless otherwise stated in the RMMs
Concentration in preparations: > 25%
When complying with the recommended risk management measures (RMMs) and operating conditions (OCs), exposure is not expected to exceed the DNELs and the risk characterisation ratios should be less than 1, as shown in table 6.

3.3.3 Contributing scenario for estimating consumer exposure

There is no consumer exposure for this scenario.

3.4. GUIDELINES FOR THE DU TO VERIFY COMPLIANCE WITH THE EXPOSURE SCENARIO

3.4.1 Guidelines for DU to verify compliance with the environmental exposure scenario

Confirm that the RMMs and OCs are as described or have equivalent efficiency.
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 [DSU1].
Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2].
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination [DSU3].
Further details on scaling and control technologies are provided in SPERC factsheet.

3.4.2 Guidelines for DU to verify compliance with the contributing scenario for worker exposure estimation

Predicted exposures are not expected to exceed the DNEL when the RMMs and OCs outlined in Table 3 are implemented (G22).
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels [G23].
Risk characterisation ratios (RCRs) are calculated by comparing the estimated exposure levels with the corresponding DNELs (RCR = exposure level/DNEL).

Table 2.

identifiers			Operating Conditions and Risk Management Measures						Risk characterization					
		Quantity used	Dilution factors		RMM to be implemented									
	ERC/ SpERC	Tonnage per site t/ year	Fresh water	Sea water	Water treatment efficiency %	Air abatement efficiency %	Waste treatment total removal %	Domestic wastewater treatment flow m^3/d	RCR fresh water	RCR marine water	RCR freshwater sediments	RCR marine water sediments	RCR soil	RCR STP extension
ES4	ESVOC SpERC 8.15.v1	6	10	100	>93.3%	>0%	93.3%	2000	2.86E-03	2.59E-04	2.86E-03	2.59E-04	1.33E-03	3.94E-04
ES6	ESVOC SpERC 8.4b.v1	3	10	100	>93.3%	>0%	93.3%	2000	2.07E-03	1.80E-04	2.07E-03	1.80E-04	6.42E-05	1.97E-06
ES8	ESVOC SpERC 9.12b.v1	30	10	100	>93.3%	>0%	93.3%	2000	2.07E-03	1.80E-04	2.07E-03	1.80E-04	6.36E-05	1.97E-06
ES11	ESVOC SpERC 8.3b.v1	30	10	100	>93.3%	>0%	93.3%	2000	6.01E-03	5.74E-04	6.01E-03	5.74E-04	6.45E-03	1.97E-03
ES15	ESVOC SpERC 8.10b.v1	3	10	100	>93.3%	>0%	93.3%	2000	3.05E-03	2.78E-04	3.05E-03	2.78E-04	1.57E-03	4.92E-04
ES17	ESVOC SpERC 8.17.v1	3	10	100	>93.3%	>0%	93.3%	2000	2.18E-02	2.15E-03	2.18E-02	2.15E-03	2.93E-02	9.85E-03
ES19	ESVOC SpERC 9.13b.v1	3	10	100	>93.3%	>0%	93.3%	2000	3.05E-03	2.78E-04	3.05E-03	2.78E-04	1.52E-03	4.92E-04

Table 6. OC, RMM, Risk Characterization - Workers - Professional use.

Identifier: ES4 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Kegs/Batch Transfers [CS8]. Non-dedicated facility [CS82].
OC and typical RMMs: Daily; > 4 hours; Product at temp. environment. Product transfer - non-dedicated systems.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.00
RCR (all ways): 0.59

Identifier: ES4 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Kegs/Batch Transfers [CS8]. Dedicated system [CS81].
OC and typical RMMs: Daily; > 4 hours. High product temperature. Product transfer - dedicated systems.
RMM to be implemented: Ensure material transfers are under containment or extract ventilation [E66].

Risk characteristics

RCR Inhalation: 0.49 TRA LEV: 90% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.49

Identifier: ES4 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Manual application by roller or brush [CS13].
OC and typical RMMs: Daily; >4 hours; Product at temp. environment. Outside.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.07
RCR (all ways): 0.21

Identifier: ES4 PROC11

Operating Conditions and Risk Management Measures

Contributing scenario: Spraying, machine mist application [CS25].
OC and typical RMMs: Daily; > 4 hours; Product at temp. environment. Outside. Mixed at 50% with diesel. Enclosed equipment, operator far from spraying point. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.14 TRA LEV: 80% efficiency. Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.02.
RCR (all ways): 0.14

Identifier: ES4 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Immersion, dipping and pouring [CS4].
OC and typical RMMs: Daily; > 4 hours; Product at temp. environment. Outside.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.04
RCR (all ways): 0.62

Identifier: ES4 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Collection of line waste in sealed containers pending disposal. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.04
RCR (all ways): 0.62

Identifier: ES4 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES4 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Product temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.39

Identifier: ES6 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Filling of equipment from drums or containers [CS45]. Dedicated system [CS81].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. (<10%) Manual transfer from small packs to equipment for application.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES6 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Automated process with (semi) closed systems [CS93]. Use in contained systems [CS38].
OC and typical RMMs: Daily; 8 hours. Process included; closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES6 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: Automated process with (semi) closed systems [CS93]. Use in contained systems [CS38]. Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour. Process included; closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES6 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Semi-automated process. (e.g.: semi-automatic application of floor care and maintenance products) [CS76].
OC and typical RMMs: Daily; 8 hours. Semi-included process; closed.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES6 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Filling of equipment from drums or containers [CS45]. Outdoor [OC9].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Outside. Manual transfer from small packs to equipment for application.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Avoid carrying out activities involving exposure for more than 4 hours [OC28].

Risk characteristics
RCR Inhalation: 0.82 Ventilation dilution effectiveness 30%. TRA duration factor 1-4 hours.
Dermal RCR: 0.04
RCR (all ways): 0.86

Identifier: ES6 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Manual cleaning of surfaces. Immersion, dipping and pouring [CS4].
OC and typical RMMs: Daily; >4 hours; Room temp. No local aspiration on open surfaces; eliminate leaks as soon as they occur. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.04
RCR (all ways): 0.62

Identifier: ES6 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning with low-pressure washers [CS42]. Application by roller, brush [CS51]. No spraying [CS60].
OC and typical RMMs: Daily; >4 hours; Room temp. Blends at 5% max. Specific training of workers. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.07
RCR (all ways): 0.21

Identifier: ES6 PROC11

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning with high pressure washers [CS44]. Spray application [CS10]. Indoor [OC8].
OC and typical RMMs: Daily; 8 hours; Room temp. Inside. Blends at 0.5% max. Specific training of workers. PPE.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.28
RCR (all ways): 0.97

Identifier: ES6 PROC11

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning with high pressure washers [CS44]. Spray application [CS10]. Outdoor [OC9].
OC and typical RMMs: Continuous; Daily; 8 hours; Room temp. Outside. Blends at 0.5% max. Specific training of workers. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.28
RCR (all ways): 0.97

Identifier: ES6 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Manual cleaning of surfaces. Spraying [CS10].
OC and typical RMMs: Daily; >4 hours; Room temp. Blends at 10% max. Waste is washed together with the wastewater, keep cleaning cloths in a container.
RMM to be implemented: Provide a basic standard of general ventilation. Natural ventilation is from doors, windows etc. Controlled ventilation means air is supplied or removed by a powered fan [E1]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.07
RCR (all ways): 0.21

Identifier: ES6 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Ad-hoc manual application via trigger sprays, dipping, etc. [CS27]. Application by roller, brush [CS51].
OC and typical RMMs: Daily; >4 hours; Room temp. In a workshop (with LEV). Waste is washed together with the wastewater, keep cleaning cloths in a container.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics

RCR Inhalation: 0.39. TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure. LEV reduction factor 0.05.
RCR (all ways): 0.40

Identifier: ES6 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Ad-hoc manual application via trigger sprays, dipping, etc. [CS27]. Application by roller, brush [CS51].
OC and typical RMMs: Daily; <1 hour; Room temp. Occasional use. Waste is washed together with the wastewater, keep cleaning cloths in a container.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.07
RCR (all ways): 0.21

Identifier: ES6 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Application of cleaning products in closed systems [CS101]. Outdoor [OC9].
OC and typical RMMs: Daily; 8 hours. Process included. closed/semi-closed.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES6 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning of medical devices [CS74].
OC and typical RMMs: Daily; 8 hours; Room temp. Process included. closed/semi-closed.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics

RCR Inhalation: 0.20 TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure. LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES6 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Collection of line waste in containers. Indoor/Outdoor. Lines included. Retain drain downs in sealed storage pending disposal, use as a recycled material in subsequent formulations, or recycle. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Assumes LEV efficiency equivalent to SOP for drainage etc. before maintenance. Additional LEV 80%.
Dermal RCR: 0.04.
RCR (all ways): 0.43

Identifier: ES6 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; <15 mins; Product temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES8 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Bulk product transfer [CS14].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES8 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Pumping from drums to equipment.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.01
RCR (all ways): 0.70

Identifier: ES8 PROC8b

Operating Conditions and Risk Management Measures
Contributing scenario: Immersion, dipping and pouring [CS4].
OC and typical RMMs: Daily; >4 hours. At 100%. Pumping to the vehicle.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.01
RCR (all ways): 0.70

Identifier: ES8 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Daily; >4 hours. Equipment closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES8 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: (closed systems) [CS15]. Product sampling [CS137].
OC and typical RMMs: Daily; > 4 hours. Equipment closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.39

Identifier: ES8 PROC3

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].
OC and typical RMMs: Daily; >4 hours. Blends up to 100%. Mixers included or vented.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES8 PROC16

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. (closed systems) [CS107].
OC and typical RMMs: Daily; >4 hours. At 100%. Equipment included.
RMM to be implemented: Handle substance within a closed system [E47]. No other specific measures identified [EI20].

Risk characteristics
RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES8 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; >4 hours. At 100%. PPE. Operator training.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E55].

Risk characteristics
RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Eighty percent LEV efficiency is assumed equivalent to the SOPs for drainage etc. before maintenance (x0.2).
Dermal RCR: 0.04
RCR (all ways): 0.43

Identifier: ES8 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning of containers and vessels [CS103].
OC and typical RMMs: Daily; >4 hours. At 100%. Procedures for entry into containers. Retain washes in sealed storage pending disposal. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2 Eighty percent LEV efficiency is assumed equivalent to the SOPs for drainage etc. before maintenance. Additional LEV 80% (x0.2).
Dermal RCR: 0.04
RCR (all ways): 0.43

Identifier: ES8 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: Store substance in a closed system [E84].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES11 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Continuous; Daily; 8 hours. Closed.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES11 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Filling of equipment from drums or containers [CS45].
OC and typical RMMs: Continuous. Closed.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES11 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: General exposures (closed systems) [CS15]. Use in contained systems [CS38].
OC and typical RMMs: Continuous; Daily; 8 hours. Process included. Closed/semi-closed sampling point.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES11 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: Preparation of material for application [CS96].
OC and typical RMMs: Continuous. Closed.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES11 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Film formation - air drying [CS95]. Outdoor [OC9].
OC and typical RMMs: Outdood
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES11 PROC4

Operating Conditions and Risk Management Measures

Contributing scenario: Film formation - air drying [CS95]. Indoor [OC8].
OC and typical RMMs: Daily; >4 hours; Product at temp. environment. Inside. Good general ventilation (equivalent to outdoor activity) with added LEV.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.29 Ventilation dilution efficiency 70%.
Dermal RCR: 0.02
RCR (all ways): 0.31

Identifier: ES11 PROC5

Operating Conditions and Risk Management Measures

Contributing scenario: Preparation of material for application [CS96]. Indoor [OC8].
OC and typical RMMs: Discontinuous Inside. Wit/without LEV.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.04
RCR (all ways): 0.62

Identifier: ES11 PROC5

Operating Conditions and Risk Management Measures

Contributing scenario: Preparation of material for application [CS96]. Outdoor [OC9].
OC and typical RMMs: Outside.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.82 Ventilation dilution effectiveness 30%. TRA duration factor 1-4 hours.
Dermal RCR: 0.04
RCR (all ways): 0.86

Identifier: ES11 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. Kegs/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product at temp. environment. Inside. Outside. Pumping from drums to equipment. With and without LEV.
RMM to be implemented: Use drum pumps or carefully pour from container [E64].

Risk characteristics

RCR Inhalation: 0.39 TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.40

Identifier: ES11 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. Drum/Batch Transfers [CS8].
OC and typical RMMs: Daily; 15 min - 1 hour, Product at temp. environment. Inside. Pumping from drums to equipment. With LEV.
RMM to be implemented: Use drum pumps or carefully pour from container [E64].

Risk characteristics

RCR Inhalation: 0.20 TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES11 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Application by roller, spatula, flux [CS98]. Indoor [OC8].
OC and typical RMMs: Inside.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.66

Identifier: ES11 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Application by roller, spatula, flux [CS98]. Outdoor. [OC9].
OC and typical RMMs: Outside. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.07
RCR (all ways): 0.21

Identifier: ES11 PROC11

Operating Conditions and Risk Management Measures

Contributing scenario: Manual [CS34]. Spray application [CS10]. Indoor [OC8].
OC and typical RMMs: Daily; >4 hours; Environment. Inside. Spray booth with vents Specific training of operators. PPE.
RMM to be implemented: Carry out in a vented booth or extracted enclosure [E57].

Risk characteristics

RCR Inhalation: 0.98 TRA LEV: 90% efficiency.
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.02.
RCR (all ways): 0.99

Identifier: ES11 PROC11

Operating Conditions and Risk Management Measures

Contributing scenario: Manual [CS34]. Spray application [CS10]. Outdoor. [OC9].
OC and typical RMMs: Outside. 4 hours. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics

RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.28
RCR (all ways): 0.97

Identifier: ES11 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Immersion, dipping and pouring [CS4]. Indoor [OC8].
OC and typical RMMs: Daily; >4 hours; Environment. Local aspiration on open surfaces. Eliminate leaks as they occur. PPE.
RMM to be implemented: Provide extract ventilation in points where emissions occur [E54].

Risk characteristics

RCR Inhalation: 0.39 TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.05.
RCR (all ways): 0.39

Identifier: ES11 PROC13

Operating Conditions and Risk Management Measures

Contributing scenario: Immersion, dipping and pouring [CS4]. Outdoor [OC9].
OC and typical RMMs: Daily; >4 hours; Environment. Outside. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.04
RCR (all ways): 0.17

Identifier: ES11 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory activity [CS36].
OC and typical RMMs: Daily; >4 hours; Environment.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00
RCR (all ways): 0.20

Identifier: ES11 PROC19

Operating Conditions and Risk Management Measures

Contributing scenario: Hand application - finger paints, pastels, adhesives [CS72]. Indoor [OC8].
OC and typical RMMs: Daily; >4 hours. Environment. Inside.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Make sure doors and windows are open [E72].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.37
RCR (all ways): 0.96

Identifier: ES11 PROC19

Operating Conditions and Risk Management Measures

Contributing scenario: Hand application - finger paints, pastels, adhesives [CS72]. Outdoor [OC9].
OC and typical RMMs: 15 min. Environment. Outside. PPE.
RMM to be implemented: Make sure the operation is performed outdoors [E69]. Wear suitable respiratory protection (conforming to EN140 with type A filter or better) and gloves (type EN374) if regular skin contact likely [PPE21].

Risk characteristics

RCR Inhalation: 0.14 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.37
RCR (all ways): 0.51

Identifier: ES11 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning and maintenance of equipment [CS39].
OC and typical RMMs: Daily; 15 mins - 1 hour; Product temp. Collection of line waste in containers. Indoor/Outdoor. Lines included. Retain washes in sealed storage pending disposal or use as a recycled material in subsequent formulations. PPE.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Eighty percent LEV efficiency is assumed equivalent to the SOPs for drainage etc. before maintenance. Additional LEV 80%.
Dermal RCR: 0.04
RCR (all ways): 0.43

Identifier: ES11 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; <15 mins; Product at temp. environment. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES15 PROC1

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. (closed systems) [CS107].
OC and typical RMMs: Daily; 1 - 4 hours: Ambient temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES15 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. (closed systems) [CS107]. Product sampling [CS137].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES15 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: Material transfers [CS3]. (closed systems) [CS107]. Batch process [CS55].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Transfers included. Clean lines before decoupling.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES15 PROC8b

Operating Conditions and Risk Management Measures

Contributing scenario: Drum/batch transfers[CS8]
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Pumping from drums to equipment.
RMM to be implemented: Transfer materials directly to mixing vessels [E45].

Risk characteristics

RCR Inhalation: 0.59 Additional exposure modifier: 0.6. Direct transfers assume to provide a reduction of 0.6x.
Dermal RCR: 0.02
RCR (all ways): 0.61

Identifier: ES15 PROC3

Operating Conditions and Risk Management Measures

Contributing scenario: Mixing operations (closed systems) [CS29].
OC and typical RMMs: Daily; > 4 hours. Mixers included or vented.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.49
Dermal RCR: 0.00
RCR (all ways): 0.49

Identifier: ES15 PROC4

Operating Conditions and Risk Management Measures
Contributing scenario: Mixing operations (open systems) [CS30].
OC and typical RMMs: Daily; > 4 hours.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%.
Dermal RCR: 0.02
RCR (all ways): 0.70

Identifier: ES15 PROC14

Operating Conditions and Risk Management Measures
Contributing scenario: Stamping forming [CS31].
OC and typical RMMs: Daily; >4 hours; Room temp. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.01
RCR (all ways): 0.60

Identifier: ES15 PROC6

Operating Conditions and Risk Management Measures
Contributing scenario: Casting operations [CS32]. (open systems) [CS108].
OC and typical RMMs: Daily; 1 - 4 hours. Temp. high enough to create fumes. Improved general ventilation. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.66

Identifier: ES15 PROC11

Operating Conditions and Risk Management Measures
Contributing scenario: Manual [CS34]. Spray application [CS10].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. Ventilated environment.
RMM to be implemented: Carry out in a vented booth or extracted enclosure [E57]. Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.59 Ventilation dilution efficiency 70%. TRA LEV: 80% efficiency.
Dermal RCR: 0.01 TRA dermal exposure LEV reduction factor 0.02.
RCR (all ways): 0.59

Identifier: ES15 PROC10

Operating Conditions and Risk Management Measures
Contributing scenario: Manual application by roller or brush [CS13].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. PPE.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics
RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.66

Identifier: ES15 PROC11

Operating Conditions and Risk Management Measures
Contributing scenario: Manual [CS34]. Spray application [CS10].
OC and typical RMMs: Daily; 1 - 4 hours; Room temp. PPE. Facial mask.
RMM to be implemented: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with type A filter or better [PPE22].

Risk characteristics
RCR Inhalation: 0.69 Ventilation dilution effectiveness 30%. TRA factor RPE half mask.
Dermal RCR: 0.28
RCR (all ways): 0.97

Identifier: ES15 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES15 PROC2

Operating Conditions and Risk Management Measures

Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific measures identified [EI18].
RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.39

Identifier: ES17 PROC15

Operating Conditions and Risk Management Measures

Contributing scenario: Laboratory activity [CS36]. On a small scale [CS61]. Handling of small amounts (<1000ml) for more than 4 hours/day - under hood.
OC and typical RMMs: Continuous; Daily; >4 hours; Room temp. Under hood or in ventilated glove box. Use disposable gloves.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics

RCR Inhalation: 0.20
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.01.
RCR (all ways): 0.20

Identifier: ES17 PROC10

Operating Conditions and Risk Management Measures

Contributing scenario: Cleaning [CS47]. Application by roller, brush [CS51]. Cleaning of containers and vessels [CS103]. Cleaning of equipment, glass etc. under general ventilation for 15 min - 1 hour/day.
OC and typical RMMs: Continuous; Daily; 15 min - 1 hour/day; Room temp. Controlled general ventilation (10 air changes per hour). Use disposable gloves.
RMM to be implemented: Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40].

Risk characteristics

RCR Inhalation: 0.59 Ventilation dilution efficiency 70%.
Dermal RCR: 0.07
RCR (all ways): 0.66

Identifier: ES19 PROC8a

Operating Conditions and Risk Management Measures

Contributing scenario: Drum/Batch Transfers [CS8]. Non-dedicated facility [CS82].
OC and typical RMMs: Daily; 15 mins - 1 hour; Room temp. Pumping from drums to equipment.
RMM to be implemented: Use drum pumps or carefully pour from container [E64].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Use of drum pumps equals 80% (x0.2).
Dermal RCR: 0.04
RCR (all ways): 0.43

Identifier: ES19 PROC9

Operating Conditions and Risk Management Measures

Contributing scenario: Transfer from / pour from containers [CS22].
OC and typical RMMs: Daily; >4 hours. Environment. Operations included. Size of openings minimized. LEV at the points of issue.
RMM to be implemented: Use drum pumps or carefully pour from container [E64].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Use of drum pumps equals 80% (x0.2).
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES19 PROC9

Operating Conditions and Risk Management Measures

Contributing scenario: Filling of equipment from drums or containers [CS45].
OC and typical RMMs: Daily; 1 - 4 hours. Environment. Pumping from drums to item/machinery.
RMM to be implemented: Use drum pumps or carefully pour from container [E64].

Risk characteristics

RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Use of drum pumps equals 80% (x0.2).
Dermal RCR: 0.02
RCR (all ways): 0.41

Identifier: ES19 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15].
OC and typical RMMs: Daily; > 4 hours. Environment.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES19 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (closed systems) [CS15]. Product sampling [CS137].
OC and typical RMMs: Daily; > 4 hours. Environment.
RMM to be implemented: No specific measures identified [EI18].

Risk characteristics
RCR Inhalation: 0.39 Handle substance within a predominantly closed system provided with extract ventilation [E49].
Dermal RCR: 0.00
RCR (all ways): 0.40

Identifier: ES19 PROC20

Operating Conditions and Risk Management Measures
Contributing scenario: General exposures (open systems) [CS16]. At high temperatures (product at 80°C).
OC and typical RMMs: Daily; >4 hours. Environment. (product at 80°C).
RMM to be implemented: Handle substance within a predominantly closed system provided with extract ventilation [E49].

Risk characteristics
RCR Inhalation: 0.20 TRA LEV: 80% efficiency.
Dermal RCR: 0.00 TRA dermal exposure LEV reduction factor 0.1.
RCR (all ways): 0.20

Identifier: ES19 PROC9

Operating Conditions and Risk Management Measures
Contributing scenario: Remanufacture of reject articles [CS19].
OC and typical RMMs: Daily; 1 - 4 hours. Environment. Working methods. Empty before operation. Keep spills.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics
RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Drainage SOPs are equivalent to a reduction of 80% (x0.2).
Dermal RCR: 0.00
RCR (all ways): 0.39

Identifier: ES19 PROC8a

Operating Conditions and Risk Management Measures
Contributing scenario: Equipment Maintenance [CS5]. Non-dedicated facility [CS82].
OC and typical RMMs: Daily; 1 -4 hours. Environment. Working methods. Empty before operation. Keep spills. Use gloves.
RMM to be implemented: Drain down system prior to equipment break-in or maintenance [E65].

Risk characteristics
RCR Inhalation: 0.39 Additional exposure modifier: 0.2. Drainage SOPs are equivalent to a reduction of 80% (x0.2).
Dermal RCR: 0.00
RCR (all ways): 0.39

Identifier: ES19 PROC1

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.00
Dermal RCR: 0.00
RCR (all ways): 0.00

Identifier: ES19 PROC2

Operating Conditions and Risk Management Measures
Contributing scenario: Storage [CS67]. Product sampling [CS137].
OC and typical RMMs: Daily; 8 hours; Room temp. Samples collected at dedicated sample points.
RMM to be implemented: No specific provision identified [EI18]

Risk characteristics
RCR Inhalation: 0.39
Dermal RCR: 0.00
RCR (all ways): 0.39

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: ≥ $2E^3$ m^3/day.

Conditions and measures for waste treatment (including the article of waste)
Waste treatment: Dispose of waste products or used containers according to local regulations.

Other conditions affecting environmental exposure
Water flow on the receiving surface: 18,000 m^3/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/

2,2'-[(4-methylphenyl)imino]bisethanol

Substance identification
CAS number: 3077-12-1
EC number: 221-359-1
Date - Version: 04/09/2019 - 06

USE IN CONSTRUCTION, PROFESSIONAL

1. TITLE SECTION

Structured short title: Wide dispersive use by professional workers, Construction (SU19)

Environmental release categories:
ERC8c: Wide dispersive external use resulting in being included in item (indoor)
ERC8f: Wide dispersive external use resulting in being included in item (outdoor)

Process categories
PROC3: Production or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions
PROC5: Mixing or blending in batch processes
PROC8a: Transfer of a substance or mixture (charging/discharging) at non-dedicated facilities
PROC10: Application with rollers or brushes
PROC19: Manual activities involving hand contact

Sector of use
SU19: Buildings

2. CONDITIONS OF USE AFFECTING EXPOSURE

2.1. Environmental exposure control: Wide dispersive external use resulting in being included in item (indoor, outdoor) - ERC8c, ERC8f

Amount used, frequency and duration of use(or duration of use)
Daily amount for wide dispersive uses: 11 g
Issue days per year:: 365

Organizational and technical measures and conditions
Process with efficient use of raw materials. The tools must be cleaned with an organic solvent.

Conditions and measures related to sewage treatment plant
Type of STP: Municipal wastewater treatment plant. Water: Minimum efficiency of 1.415%.
Sludge treatment STP:: Controlled application of sewage sludge on agricultural land
STP effluent: 2,000 m³/d

Conditions and measures for waste treatment (including the article of waste)
Waste treatment: Cleaning waste must be collected and disposed of as a solvent waste
Waste treatment methods: For general information about waste disposal see sect. 13

Other conditions affecting environmental exposure
Water flow on the receiving surface: 18,000 m³/d
Local fresh water dilution factor:: 10
Local seawater dilution factor: 100

2.2. Worker Exposure Control: General measures applicable to all activities

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Consider technical advances and update the process (including automation) to eliminate emissions.
Very high level of containment required, except for short-term exposures e.g. sampling.
Use only in closed systems.
If possible, keep equipment under negative pressure.
Check the entry of personnel into the work area.
Equipment cleaning and maintenance
Permit To Work (PTW) for cleaning and maintenance activities.
General cleaning of equipment and work area.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.
Ensure that procedures and training for contamination emergencies and disposal are in place.
Assumes a good basic standard of occupational hygiene is implemented.
Reporting any missed injury situation.
Sensitisers - Subject to relevant national legislation, pre-employment screening and appropriate health surveillance.

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1. Product causes serious eye damage.
Make sure that direct skin contact is avoided. Wear suitable protective clothing.
Use adequate eye protection.
Optional visor.
For more information, refer to Section 8 of the SDS (safety data sheet).

Amount used, frequency and duration of use(or duration of use)
Duration: Covers exposures up to 8 hours.

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Wear suitable gloves tested to EN374. Dermal - Minimum efficiency of 80%.
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

Additional good practice recommendations. Obligations under Article 37(4) of REACH not to be applied
On possible contact with the product (sampling, use, spills, product leaks, cleaning): Wear protective clothing, wear protective gloves, safety goggles and respiratory protection.
For more information, refer to Section 8 of the SDS (safety data sheet).

2.3. Worker Exposure Control: Mixing operations (PROC5)

Product features (article)
Concentration of the substance in the product: Covers exposures up to 5 hours.
Physical form of the product: liquid
Vapour pressure: 0.000623 pa (30 °C)

Amount used, frequency and duration of use(or duration of use)
Duration: Covers exposures up to 8 hours.

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.
Avoid splashing
Activity category: Operations in moving liquid surfaces.
Open surface: <0.3 m²

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90%.
For more information, refer to Section 8 of the SDS (safety data sheet).

Other conditions affecting worker exposure
Indoor and outdoor use: Outdoor near the buildings:
Temperature: Process temperature up to 30°C is assumed

Additional good practice recommendations. Obligations under Article 37(4) of REACH not to be applied
On possible contact with the product (sampling, use, spills, product leaks, cleaning): Wear protective clothing, wear protective gloves, safety goggles and respiratory protection.
For more information, refer to Section 8 of the SDS (safety data sheet).

2.4. Worker Exposure Control: Material Transfers, Non-Specialized site (PROC8a)

Product features (article)
Concentration of the substance in the product: Covers exposures up to 5 hours.
Physical form of the product: liquid
Vapour pressure: 0.000623 pa (30 °C)

Amount used, frequency and duration of use(or duration of use)
Duration: Covers exposures up to 4 hours.

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.
Activity category: Transfer of liquid products - liquid fall
Application rate: <100 L/min
Manipulation rate: Spray loading, in which the liquid nozzle remains at the top of the tank and the liquid descends, producing splashes.

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90%.
For more information, refer to Section 8 of the SDS (safety data sheet).

Other conditions affecting worker exposure
Indoor and outdoor use: Outdoor near the buildings:
Temperature: Process temperature up to 30°C is assumed

Additional good practice recommendations. Obligations under Article 37(4) of REACH not to be applied
On possible contact with the product (sampling, use, spills, product leaks, cleaning): Wear protective clothing, wear protective gloves, safety goggles and respiratory protection.
For more information, refer to Section 8 of the SDS (safety data sheet).

2.5. Worker Exposure Control: Roller application or brushing (PROC10)

Product features (article)
Concentration of the substance in the product: Covers exposures up to 5 hours.
Physical form of the product: liquid
Vapour pressure: 0.000623 pa (30 °C)

Amount used, frequency and duration of use(or duration of use)
Duration: Covers exposures up to 8 hours.

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.
Activity category: Spreading of liquids on workpiece surfaces
Application rate: > 3 m²/h
Worker distance: > 1 m

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Wear appropriate coveralls to avoid skin exposure.
Dermal - minimum efficiency of 90%.
For more information, refer to Section 8 of the SDS (safety data sheet).

Other conditions affecting worker exposure
Indoor and outdoor use: Outdoor near the buildings:
Temperature: Process temperature up to 30°C is assumed

Additional good practice recommendations. Obligations under Article 37(4) of REACH not to be applied
On possible contact with the product (sampling, use, spills, product leaks, cleaning): Wear protective clothing, wear protective gloves, safety goggles and respiratory protection.
For more information, refer to Section 8 of the SDS (safety data sheet).

2.6. Worker Exposure Control: Manual activities involving hand contact (PROC19)

Product features (article)
Concentration of the substance in the product: Covers exposures up to 5 hours.
Physical form of the product: liquid
Vapour pressure: 0.000117 hPa (30 °C)

Amount used, frequency and duration of use(or duration of use)
Duration: Covers exposures up to 1 hours.

Organizational and technical measures and conditions
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Only properly trained and authorised operators are allowed to handle the substance.
Procedures for handling the substance should be well documented and monitored.
Activity category: Mixing and loading
Application rate: < 0.1 L/min
Worker distance: > 1 m

Conditions and measures for personal protection, hygiene and health assessment
The product is a Skin Sens. Cat. 1
Product causes serious eye damage
Exposure to the substance should therefore be minimised through appropriate risk management measures.
Regarding general risk management measures, operating conditions and the personal protective equipment to be adopted when handling the substance or mixture, see section “Measures for the management of general risks applicable to all activities” in this exposure context.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Dermal - minimum efficiency of 90%.
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 30°C is assumed

Additional good practice recommendations. Obligations under Article 37(4) of REACH not to be applied
On possible contact with the product (sampling, use, spills, product leaks, cleaning): Wear protective clothing, wear protective gloves, safety goggles and respiratory protection.
For more information, refer to Section 8 of the SDS (safety data sheet).

3. Exposure assessment and reference to its origin

3.1. Environmental release and exposure: Wide dispersive external use resulting in being included in item (outdoor); Wide dispersive external use resulting in being included in item (outdoor) (ERC8c, ERC8f)

Release route: water
Release: 1.5%
Release estimation method: FEICA SPERC 8c.la.vl

Release route: air
Release: 0%
Release estimation method: FEICA SPERC 8c.la.vl

Release route: Soil
Release: 0.1%
Release estimation method: FEICA SPERC 8c.la.vl

3.2. Worker exposure: discontinuous process; Closed systems (PROC3)

Route of exposure combined routes
Health effect: Systemic
RCR: < 1
Calculation method: ECETOCTRA workerv3

Exposure routes: Eyes, dermal
Health effect: local
RCR: -
Calculation method: Qualitative evaluation

3.3. Worker exposure: Mixing operations (PROC5)

Route of exposure Inhalation
Health effect: Systemic
RCR: < 1
Calculation method: ART vl.5

Exposure routes: Dermal
Health effect: Systemic
RCR: < 1
Calculation method: ECETOCTRA workerv3

Exposure routes: combined routes
Health effect: Systemic
RCR: < 1
Calculation method: -

Exposure routes: Eyes, dermal
Health effect: local
RCR: -
Calculation method: Qualitative evaluation

3.4. Worker exposure: Material Transfers, Non-Specialized site (PROC8a)

Route of exposure Inhalation
Health effect: Systemic
RCR: < 1
Calculation method: ART vl.5

Exposure routes: Dermal
Health effect: Systemic
RCR: < 1
Calculation method: ECETOCTRA workerv3

Exposure routes: combined routes
Health effect: Systemic
RCR: < 1
Calculation method: -

Exposure routes: Eyes, dermal
Health effect: local
RCR: -
Calculation method: Qualitative evaluation

3.5. Worker exposure: Roller application or brushing (PROC10)

Route of exposure combined routes
Health effect: Systemic
RCR: < 1
Calculation method: ECETOCTRA workerv3

Exposure routes: Eyes, dermal
Health effect: local
RCR: -
Calculation method: Qualitative evaluation

3.6. Worker exposure: Activities involving hand contact (PROC19)

Route of exposure Inhalation
Health effect: Systemic
RCR: < 1
Calculation method: ECETOC TRA worker v3

Exposure routes: Dermal
Health effect: Systemic
RCR: < 1
Calculation method: RISKPFDERM v2.1

Exposure routes: combined routes
Health effect: Systemic
RCR: < 1
Calculation method: -

Exposure routes: Eyes, dermal
Health effect: local
RCR: -
Calculation method: Qualitative evaluation

4. Guidance for downstream users to assess whether they comply with the limits set by the exposure scenario

If the above conditions are met, the downstream user is considered to be working safely within the limits defined in this exposure scenario.
Other conditions should only be taken if the downstream user implements or recommends an exposure scenario that includes as a minimum level the conditions described in this exposure scenario.

Cobalt bis(2-ethylhexanoate)

Substance identification
CAS number: 136527
Date - Version: 16/10/2015 2.2

INDUSTRIAL USE Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment

9.0.2. Introduction to evaluation

9.0.2.1. ENVIRONMENT

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for the environment are described in the following table based on the hazard conclusions presented in section 7.

Table 2. Type of risk characterisation required for the environment

Protection goal	Type of risk characterisation	Hazard conclusion (see section 7)
Fresh water	Quantitative	PNEC water (freshwater) = 0.6 µg/L
Sediment (freshwater)	Quantitative	PNEC sediment (freshwater) = 9.5 mg/kg sediment dw
Sea water	Quantitative	PNEC water (marine water) = 2.36 µg/L
Sediment (marine water)	Quantitative	PNEC sediment (marine water) = 9.5 mg/kg sediment dw
Wastewater treatment plant	Quantitative	PNEC STP = 0.37 mg/l
Air	Not needed	No hazard identified
Farmland	Quantitative	PNEC soil = 10.9 mg/kg soil dw
Predator	Not needed	No potential for bioaccumulation

Comments on assessment approach

The regional concentrations are reported in section 10.2.1.2 (see Table 367, “Predicted regional exposure concentrations (Regional PEC)”). The local Predicted Exposure Concentrations (PECs) reported for each contributing scenario correspond to the sum of the local concentrations (Clocal) and the regional concentrations (PEC regional).

ADDED RISK APPROACH
Guidance on the how to deal with natural background issues is provided in the Appendix R.7.12-2 guidance document on the ‘Environmental risk for metals and metal compounds’ (ECHA, 2008). In order to deal with the presence of a natural background, various concepts have been developed, such as the Added Risk approach (Added RA) and the Total Risk approach (Total RA) concepts. In essence the Added RA assumes that species are fully adapted to the natural background concentration and therefore that only the anthropogenic added fraction should be regulated or controlled. The Total RA assumes that “exposure” and “effects” should be compared on the combination of the natural background and the added anthropogenic concentrations.

According to the FOREGS database, natural background concentrations in the different environmental compartments are very close or even below their respective PNEC values. Indeed, the median background concentration in the EU surface waters (i.e. 0.44 µg/l) is very close to the realistic worst case PNECtotal of 0.71 µg/l; the median background concentration in the EU freshwater sediment (i.e. 16.5 mg/kg) is above the PNECtotal of 11.2 mg/kg; the median background concentration in the EU soils (i.e. 16.1 mg/kg) is above the PNECtotal of 10.1 mg/kg. In those situations where it is expected that background metals concentrations are a significant portion of the derived PNEC, the Added Risk Approach should be applied, therefore the added risk approach was selected in this CSR.

In the present environmental exposure assessment, the use of the added risk approach implies that the PECadd values have been calculated from cobalt emissions due to anthropogenic activities. Thus, the PECadd is the anthropogenic part of the cobalt concentration in the environment. The predicted cobalt concentrations in the environment with EUSES, which is based on the anthropogenic emissions, therefore reflect the “added” part of the cobalt concentration in the environment. Measured cobalt concentrations could also serve as the basis for the derivation of added environmental exposure concentrations. However, it is known from literature that the natural background concentrations of metals may substantially vary seasonally over different geographic regions, therefore hampering the establishment of a “default background concentration” and therefore also the “added risk approach”.
In the environmental effects assessment, the use of the added risk approach implies that the PNECadd has been derived from toxicity data that are based on the added cobalt concentration in the tests.
Finally, in the environmental risk characterisation, the use of the added risk approach implies the evaluation of the PECadd / PNECadd ratios.

9.0.2.2. MAN VIA ENVIRONMENT

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for man via the environment are described in the following table based on the hazard conclusions reported and justified in section 5.11.

Table 3. Type of risk characterisation required for man via the environment

Route of exposure and type of effects	Exposure concentration	Hazard conclusion (see section 5.11)
Inhalation: Systemic Long Term	Not needed	No hazard identified
Oral: Systemic Long Term	Quantitative	DNEL (Derived No Effect Level) = 55.8 µg/kg bw/day

For a detailed description of the methodology used for the indirect exposure assessment for men via the environment and the evaluation of data, please refer to the document attached in IUCLID section 13. A brief description is given below:

The sources of human exposure to cobalt handled under indirect exposure via the environment are food, water and air. The assessment has been based on cobalt, since this is the toxic species.

Cobalt is released to the environment through air effluents and wastewater from manufacture, formulation, processing, use and disposal of cobalt containing products.

Cobalt is also a naturally occurring element. Therefore, its presence in the environment, and thereby also indirect in water, food and beverages produced from agricultural goods, may also be attributed to natural sources. Furthermore, cobalt constitutes 4% by weight of vitamin B12, an essential human nutrient.

Cobalt is also a naturally occurring element. Therefore, its presence in the environment, and thereby also indirect in water, food and beverages produced from agricultural goods, may also be attributed to natural sources. Furthermore, cobalt constitutes 4% by weight of vitamin B12, an essential human nutrient.

The concentrations in environmental compartments and intake media which are used to derive the daily intake are preferably based on monitored data, since the alternative route by modelling of environmental concentrations is associated with much higher uncertainties and also difficult to apply for metals. In deviation from the TGD food basket approach for the exposure route “ingestion of food”, an assessment of measured and publicly available data on cobalt in the diet was performed and the following study designs have been considered: duplicate meal studies, total diet studies and market basket studies.

In duplicate meal studies, duplicate samples of meals, snacks and beverages are collected and analysed. In total diet studies, food items are processed for consumption and are analysed individually or in food groups. Cobalt intake is calculated as the product of the cobalt level in the food and the corresponding amount consumed. In market basket studies, individual food items are sampled from retail outlets (according to typical daily market basket determined from national databases) and subsequently analysed. Based on these cobalt levels and on estimated consumption, total cobalt intake is calculated.

EXPOSURE FROM FOOD

All available published dietary intake studies are based on cobalt levels in food and consumption patterns. As duplicate meal studies were only available for special subpopulations the exposure assessment of cobalt via the diet for adults has been based on the UK total diet study from 1994.
- typical exposure: the median value, i.e. 12 µg Co/day
- worst-case: the 97.5th percentile, i.e 19 µg Co/day

EXPOSURE VIA DRINKING WATER
The concentrations in drinking water are normally taken from regional and local environmental exposure assessment. However, these values refer to surface waters, which are normally not used directly for human consumption. Therefore, cobalt concentrations in drinking water in Europe (regional) are based on measured data which are more precise. An assessment of publicly available data on cobalt in drinking water was performed. The most recent and very comprehensive data source is from Reimann & Birke 2010. In a wide geographical distribution of water sources across 40 European countries, the bottled mineral, drinking and tap waters are characterized. The median (0.023 µg/L) derived in this dataset has been used as a typical cobalt concentration in drinking water in Europe.

EXPOSURE VIA AIR
Cobalt concentrations in air were taken from (a) calculated industrial site emission data (local) and (b) ambient monitoring data (regional), which were taken from the environmental risk assessment.

9.0.2.3. WORKERS

Scope and type of assessment

The scope of exposure assessment and type of risk characterisation required for workers are described in the following table based on the hazard conclusions presented in section 5.11

Table 4. Type of risk characterisation required for workers

Route	Type of effect	Type of risk characterisation	Hazard conclusion (see section 5.11)
Inhalation	Systemic Long Term	Not needed	No hazard identified
	Systemic Acute	Not needed	No hazard identified
	Local Long Term	Quantitative	DNEL (Derived No Effect Level) = 235.1 µg/m³
	Local Acute	Not needed	No hazard identified
Dermal	Systemic Long Term	Not needed	No hazard identified
	Systemic Acute	Not needed	No hazard identified
	Local Long Term	Qualitative	Medium hazard (no threshold derived)
	Local Acute	Qualitative	Medium hazard (no threshold derived)
Eye	Local	Qualitative	Low hazard (no threshold derived)

Comments on assessment approach related to toxicological hazard:

QUANTITATIVE EXPOSURE ASSESSMENT
Please refer to IUCLID Section 13 for a detailed description of the specific methodologies used for the worker contributing scenarios below.

QUALITATIVE RISK CHARACTERISATION FOR LOCAL EFFECTS ON THE SKIN AND FOR THE EYES
In addition to the quantitative risk characterisation, demonstrating that pre-scribed operational conditions and risk management measures effectively control exposure well below the respective chronic DNELs, residual exposure concentrations may theoretically still cause local effects. As a precautionary measure, it is therefore pre-scribed to use personal protective equipment in situations in which such residual exposure concentrations cannot be excluded. The risk of local effects is therefore adequately controlled.

Comments on assessment approach related to physicochemical hazard:

No physicochemical hazards identified.

9.11. EXPOSURE SCENARIO 11: Use at industrial site - Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment

Market sector: Plastics industry (polymer preparations and compounds)

Product Categorie

PC32 : Polymer Preparations and Compounds

Sectors of use

SU10 : Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU12 : Manufacture of plastics products, including compounding and conversion

CONTRIBUTIVE SCENARIOS ENVIRONMENT

ERC5 : Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES1 STP discharge
ERC5 : Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES2 Direct discharge
ERC5 : Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES3 Marine discharge

CONTRIBUTIVE SCENARIOS WORKERS

Raw material handling - PROC26, PROC8b, PROC15
Handling of liquids - PROC9, PROC8b
Further processing - PROC14, PROC2, PROC4, PROC5, PROC8b
Final handling of massive objects - PROC24, PROC21
Handling of liquid UP resin - PROC5, PROC1, PROC3, PROC4, PROC8b, PROC10, PROC15
Spraying of liquid UP resins - PROC7
Cleaning & Maintenance - PROC8a, PROC26

Subsequent service life exposure scenarios:

ES15 : Service life (consumers) - Service life of cured composite material/coating (UP resin)
ES18 : Service life (worker at industrial site) - Handling of plastic articles (including e.g. PET) in industrial settings
ES19 : Service life (professional worker) - Handling of plastic articles (including e.g. PET) in professional settings

9.11.1. ENVIRONMENTAL CONTRIBUTING SCENCARIO Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES1 STP discharge

9.11.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

Daily use at site: ≤ 0.022 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 6,24 ton/year
For the generic exposure scenario a tonnage covering 100% of the sector tonnages was selected.
Number ofrelease days per year: 278 days/year
The selected number of production days per year is the median value based on data from 21 companies.

Technical and organizational conditions and measures

Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant

Municipal STP: Yes
Discharge rate ofSTP: ≥ 2E3 m^3/g
Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to treatment of waste (including article waste)

Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure

Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 1.8E4 m^3/g
Final dilution factor: ≥ 10

9.11.1.2. Releases

The local releases to the environment are reported in the following table.

Table 58. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	2E-4%	Eurométaux, 2012, version 2.1 Although ERC5 is selected for this use it is assumed that most releases will occur during the formulation step of Co compounds in a mixture.
		Final release factor	2E-4%	
		Local release rate:	4.48E-5 kg/day	
Air	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1
		Final release factor	0.005%	
		Local release rate:	0.001 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%

A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 59. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Fresh water	Local PEC	0.10 µg/l	0.17
Sediment (freshwater)	Local PEC	4.31 mg/kg dw	0.45
Sewage treatment plant	Local PEC	0.00001 mg/l	< 0.01
Air	Local PEC	2.6 ng/m³	No environmental hazard
Agricultural land	Local PEC	0.01 mg/kg dw	< 0.01
Man via Environment - Inhalation	Local PEC	2.6 ng/m³	< 0.01
Man via environment - Oral	Exposure via food consumption	0.32 µg/kg/g	0.034

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:

The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.

Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.

The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.

For the risk characterisation the following DNELs based on cobalt were used:

DNEL inhalation, local, long-term of 6.3 µg Co/m³

DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day

As such a combined RCR cannot be provided (local and systemic effects).

9.11.2. ENVIRONMENTAL CONTRIBUTING SCENCARIO Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES1 Direct discharge

9.11.2.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

Daily use at site: ≤ 0.022 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 6,24 ton/year
For the generic exposure scenario a tonnage covering 100% of the sector tonnages was selected.
Number ofrelease days per year: 278 days/year
The selected number of production days per year is the median value based on data from 21 companies.

Technical and organizational conditions and measures

Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant

Municipal STP: No [Water Efficacy: 0%]

Conditions and measures related to treatment of waste (including article waste)

Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure

Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 1.8E4 m^3/g
Final dilution factor: ≥ 10

9.11.2.2. Releases

The local releases to the environment are reported in the following table.

Table 60. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	2E-4%	Eurométaux, 2012, version 2.1 Although ERC5 is selected for this use it is assumed that most releases will occur during the formulation step of Co compounds in a mixture.
		Final release factor	2E-4%	
		Local release rate:	4.48E-5 kg/day	
Air	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1
		Final release factor	0.005%	
		Local release rate:	0.001 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%

A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 61. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Fresh water	Local PEC	0.12 µg/l	0.20
Sediment (freshwater)	Local PEC	5.06 mg/kg dw	0.53
Wastewater treatment plant	Local PEC	0.0003 mg/l	< 0.01
Man via Environment - Inhalation	Local PEC	-	-
Man via environment - Oral	Exposure via food consumption	0.321 µg/kg/g	0.034

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:

The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2. Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.

The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.

For the risk characterisation the following DNELs based on cobalt were used:

DNEL inhalation, local, long-term of 6.3 µg Co/m³

DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day

As such a combined RCR cannot be provided (local and systemic effects).

9.11.3. ENVIRONMENTAL CONTRIBUTING SCENCARIO Production and industrial use of plastics, UPR, PET and FRP as a catalyst, oxygen scavenger and/or pigment ES1 Marine discharge

9.11.3.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

Daily use at site: ≤ 0.022 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 6,24 ton/year
For the generic exposure scenario a tonnage covering 100% of the sector tonnages was selected.
Number ofrelease days per year: 278 days/year
The selected number of production days per year is the median value based on data from 21 companies.

Technical and organizational conditions and measures

Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant

Municipal STP: No [Water Efficacy: 0%]

Conditions and measures related to treatment of waste (including article waste)

Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure

Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 1.98E5 m^3/d
Final dilution factor: ≥ 100

9.11.3.2. Releases

The local releases to the environment are reported in the following table.

Table 62. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	2E-4%	Eurométaux, 2012, version 2.1 Although ERC5 is selected for this use it is assumed that most releases will occur during the formulation step of Co compounds in a mixture.
		Final release factor	2E-4%	
		Local release rate:	4.48E-5 kg/day	
Air	Release factor (SpERC for formulation of metal compounds in plastics and rubbers)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1
		Final release factor	0.005%	
		Local release rate:	0.001 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 63. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Sea water	Local PEC	0.02 µg/l	0.01
Sediment (marine water)	Local PEC	0.66 mg/kg dw	0.07
Air	Local PEC	2.6 ng/m³	No environmental hazard
Agricultural land	Local PEC	0.01 mg/kg dw	< 0.01
Man via Environment - Inhalation	Local PEC	2.6 ng/m³	< 0.01
Man via environment - Oral	Exposure via food consumption	0.317 µg/kg/d	0.033

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:

The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.

Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.

The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.

For the risk characterisation the following DNELs based on cobalt were used:

DNEL inhalation, local, long-term of 6.3 µg Co/m³

DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day

As such a combined RCR cannot be provided (local and systemic effects).

9.11.4. WORKER CONTRIBUTING SCENARIO 1: Raw material handling (PROC26, also covering PROC8b, PROC15 below)

9.11.4.1. Conditions of use

Task(s) covered with this contributing scenario: Loading/unloading, weighing, mixing dissolution (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)
Physical form of substance: Solid - Measured HH (Analogous data)
Maximum emission potential of the substance: High (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Integrated local exhaust ventilation: Upper confidence limit (industrial use) (High efficiency) [Effectiveness Inhal: 90%] - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

Respiratory protective equipment (RPE): RPE with minimum APF = 20 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P3 with mask according to EN 140, EN 1827 or filtering half mask (FF P3) according to EN 149 or combination of P2 filter with face piece according to EN 12941 or EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 95%] - Measured HH (Analogous data)
General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress. In cases where direct contact with the substance cannot be avoided, a protective suit conforming to EN 13982 should be worn.

9.11.4.2. Exposure and risks for workers

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

Table 64. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	110 µg/m³ Measured HH (Analogous data)	0.468
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.5. WORKER CONTRIBUTING SCENARIO 2: Raw material handling (PROC8b as covered in 9.11.4.)

9.11.5.1. Conditions of use

Task(s) covered with this contributing scenario: Loading/unloading, weighing, mixing dissolution.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.4 above.

9.11.6. WORKER CONTRIBUTING SCENARIO 3: Raw material handling (PROC15 as covered in 9.11.4.)

9.11.6.1. Conditions of use

Task(s) covered with this contributing scenario: Sampling.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.4 above.

9.11.7. WORKER CONTRIBUTING SCENARIO 4: Handling of liquids (PROC9, also covering PROC 8b below)

9.11.7.1. Conditions of use

Task(s) covered with this contributing scenario: Filling of liquids (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics
Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%] - External Tool (MEASE)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

Amount used (or contained in articles), frequency and duration of use/exposure
Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - External Tool (MEASE)

Technical and organizational conditions and measures
Process temperature: Environment - External Tool (MEASE)

Conditions and measures related to personal protection, hygiene and health evaluation.
General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.11.7.2. Exposure and risks for workers

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

Table 65. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	10 µg/m³ Measured HH (Analogous data)	0.043
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.8. WORKER CONTRIBUTING SCENARIO 5: Handling of liquids (PROC8b as covered in 9.11.7.)

9.11.8.1. Conditions of use

Task(s) covered with this contributing scenario: Filling of liquids.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.7 above.

9.11.9. WORKER CONTRIBUTING SCENARIO 6: Further processing (PROC14, also covering PROC2, PROC4, PROC5, PROC8b below)

9.11.9.1. Conditions of use

Task(s) covered with this contributing scenario: Extrusion (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Maximum process temperature: 180°C - Measured HH (Analogous data)
Level of containment: Closed process: Closed pipe system, closed reaction vessels - Measured HH (Analogous data)
Integrated local exhaust ventilation: Upper confidence limit (industrial use) (High efficiency) [Effectiveness Inhal: 90%] Vapour extraction units in the tank - Measured HH (Analogous data)
Level of automation: Semi-automated process - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

Respiratory protective equipment (RPE): RPE with minimum APF = 20 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%] - Measured HH (Analogous data)
General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.11.9.2. Exposure and risks for workers

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

Table 66. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	25 µg/m³ Measured HH (Analogous data)	0.106
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.10. WORKER CONTRIBUTING SCENARIO 7: Further processing (PROC2 as covered in 9.11.9.)

9.11.10.1. Conditions of use

Task(s) covered with this contributing scenario: Use of oxygen scavengers, mixing, blending.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.9 above.

9.11.11. WORKER CONTRIBUTING SCENARIO 8: Further processing (PROC4 as covered in 9.11.9.)

9.11.11.1. Conditions of use

Task(s) covered with this contributing scenario: Use of oxygen scavengers, mixing, blending.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.9 above.

9.11.12. WORKER CONTRIBUTING SCENARIO 9: Further processing (PROC5 as covered in 9.11.9.)

9.11.12.1. Conditions of use

Task(s) covered with this contributing scenario: Use of oxygen scavengers, mixing, blending.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.9 above.

9.11.13. WORKER CONTRIBUTING SCENARIO 10: Further processing (PROC8b as covered in 9.11.9.)

9.11.13.1. Conditions of use

Task(s) covered with this contributing scenario: Use of oxygen scavengers, mixing, blending.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.9 above.

9.11.14. WORKER CONTRIBUTING SCENARIO 11: Final handling of massive objects (PROC24, also covering PROC21 below)

9.11.14.1. Conditions of use

Task(s) covered with this contributing scenario: Abrasive processing (sanding, grinding, cutting, drilling) (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Physical form of substance: Bound in article Cobalt bound into plastic matrix. - Measured HH (Analogous data)
Maximum emission potential of the substance: Medium (abrasion based) (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if processes resulting in lower abrasion are being conducted in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
General ventilation: Lower confidence limit (industrial use) (Standard efficiency) [Effectiveness Inhal: 17%] Air Exchange Rate = 5/h - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.11.14.2. Exposure and risks for workers

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

Table 67. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	144 µg/m³ Measured HH (Analogous data)	0.612
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.15. WORKER CONTRIBUTING SCENARIO 12: Final handling of massive objects (PROC21 as covered in 9.11.14.)

9.11.15.1. Conditions of use

Task(s) covered with this contributing scenario: Abrasive processing (sanding, grinding, cutting, drilling).
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.14 above.

9.11.16. WORKER CONTRIBUTING SCENARIO 20: Handling of liquid UP resin (PROC5, also covering PROC1, PROC3, PROC4, PROC8b, PROC10, PROC15 below)

9.11.16.1. Conditions of use

Task(s) covered with this contributing scenario: Mixing, formulating (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.11.16.2. Exposure and risks for workers

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

Table 68. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	5 µg/m³ Measured HH (Analogous data)	0.021
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.17. WORKER CONTRIBUTING SCENARIO 14: Handling of liquid UP resin (PROC1 as covered in 9.11.16.)

9.11.17.1. Conditions of use

Task(s) covered with this contributing scenario: Mixing, formulating, impregnation, moulding.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.18. WORKER CONTRIBUTING SCENARIO 15: Handling of liquid UP resin (PROC3 as covered in 9.11.16.)

9.11.18.1. Conditions of use

Task(s) covered with this contributing scenario: Mixing, formulating, impregnation, moulding.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.19. WORKER CONTRIBUTING SCENARIO 16: Handling of liquid UP resin (PROC4 as covered in 9.11.16.)

9.11.19.1. Conditions of use

Task(s) covered with this contributing scenario: Mixing, formulating, impregnation, moulding.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.20 WORKER CONTRIBUTING SCENARIO 17 Handling of liquid UP resin (PROC8b as covered in 9.11.16.)

9.11.20.1. Conditions of use

Task(s) covered with this contributing scenario: Transfer of liquids.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.21. WORKER CONTRIBUTING SCENARIO 18: Handling of liquid UP resin (PROC10 as covered in 9.11.16.)

9.11.21.1. Conditions of use

Task(s) covered with this contributing scenario: Low energy spreading (brushing, rolling).
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.22. WORKER CONTRIBUTING SCENARIO 19: Handling of liquid UP resin (PROC15 as covered in 9.11.16.)

9.11.22.1. Conditions of use

Task(s) covered with this contributing scenario: Laboratory activities.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.16 above.

9.11.23. WORKER CONTRIBUTING SCENARIO 20: Spraying of liquid UP resins (PROC7)

9.11.23.1. Conditions of use

Task(s) covered with this contributing scenario: Spraying (automatic robot spraying or manual spraying).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Medium - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: 60 - 240 min [Effectiveness Inhal: 40%; Dermal: 40%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Level of containment: Closed process - Measured HH (Analogous data)
General ventilation: Lower confidence limit (industrial use) (Standard efficiency) [Effectiveness Inhal: 17%] Air Exchange Rate = 5/h - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.11.23.2. Exposure and risks for workers

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

Table 69. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	75 µg/m³ Measured HH (Analogous data)	0.319
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.24. WORKER CONTRIBUTING SCENARIO 21: Cleaning & Maintenance (PROC8a, also covering PROC26 below)

9.11.24.1. Conditions of use

Task(s) covered with this contributing scenario: Manual cleaning, repair and maintenance operations; Removal of residuals from e.g. filters/overspill or as waste. Maintenance and repair work only at facilities which are not in operation. Minor cleaning tasks may be conducted under operation (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Physical form of substance: Solid, powder - Measured HH (Analogous data)
Maximum emission potential of the substance: High (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Process pressure: Environment - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

Respiratory protective equipment (RPE): RPE with minimum APF = 40 (APF = assigned protection factor according to EN 529. At minimum combination of particle filter class P3 with face piece according to EN 136, EN 12941 or EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 97.5%] - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress. Chemical protective suit according to EN 13982 (In cases where direct contact with the substance cannot be avoided, a protective suit conforming to EN 13982 should be worn.)

9.11.24.2. Exposure and risks for workers

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

Table 70. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	144 µg/m³ Measured HH (Analogous data)	0.612
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.11.25. WORKER CONTRIBUTING SCENARIO 22: Cleaning & Maintenance (PROC26 as covered in 9.11.24.)

9.11.25.1. Conditions of use

Task(s) covered with this contributing scenario: Manual cleaning, repair and maintenance operations; Removal of residuals from e.g. filters/overspill or as waste. Maintenance and repair work only at facilities which are not in operation. Minor cleaning tasks may be conducted under operation.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.11.24 above.

9.12. EXPOSURE SCENARIO 12: Use by professional worker - Use of plastics, UPR, PET and/or FRP in professional settings

Market sector: Plastics industry (polymer preparations and compounds)

Product Categorie
PC32 : Polymer Preparations and Compounds

CONTRIBUTIVE SCENARIOS ENVIRONMENT
Use of plastics, UPR, PET and/or FRP in professional settings - ERC8f, ERC8c

CONTRIBUTIVE SCENARIOS WORKERS
Handling of liquid UP resins - PROC8a
Handling of liquid UP resins - PROC5
Handling of liquid UP resins - PROC10
Spraying of liquid UP resins - PROC11

Subsequent service life exposure scenarios:
ES15 : Service life (consumers) - Service life of cured composite material/coating (UP resin)
ES19 : Service life (professional worker) - Handling of plastic articles (including e.g. PET) in professional settings

9.12.1. ENVIRONMENTAL CONTRIBUTING SCENCARIO 1: Use of plastics, UPR, PET and/or FRP in professional settings

9.12.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
Daily wide dispersive use: 5.5E-5 ton/day
The tonnage and further exposure is always expressed in cobalt.

Conditions and measures related to sewage treatment plant
Municipal STP: Yes
Discharge rate ofSTP: ≥ 2E3 m³/g
Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to treatment of waste (including article waste)
Special considerations for waste treatment operations: No (low amount) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.) Fraction of daily/annual use expected in waste: 60% of all articles, 40% is recycled.
EC, 2010) Appropriate waste codes: 20 01 34, 20 01 40, 20 03 01, 20 03 07, …
Suitable disposal: Waste from end-of-life articles can be disposed of as municipal waste, except when they are separately regulated, like electronic devices, batteries, vehicles, etc. Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference Document on the Best available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002). A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure
Discharge rate of effluent: ≥ 2E3 m³/g
Receiving surface water flow rate: ≥ 1.8E4 m³/g
Flow rate of receiving surface should be sufficiently high to dilute the effluent concentration of the STP below the PNEC for water and sediment.

9.12.1.2. Releases

The local releases to the environment are reported in the following table.

Table 71. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor	Initial release factor	0%	There are no intended cobalt releases due to service life of plastics, UPR, PET and/or FRP, the non-intended releases are negligible and pose no threat to the environment.
		Final release factor	0%	
		Local release rate:	0 kg/day	
Air	Release factor	Initial release factor	0%	Not relevant
		Final release factor	0%	
Soil	Release factor	Final release factor	0%	Not relevant

Releases to waste
Release factor to waste from the process: 60%
Fraction of daily/annual use expected in waste: 60% of all articles, 40% is recycled. (EC, 2010).
Note that the 60% does not specifically apply to this use but applies to all professional, consumer or service life uses from cobalt.
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

The exposure concentrations and risk characterisation ratios (RCR) for the service life are negligible and pose no threat to the environment.
Emission data from municipal STPs have been collected for Belgium (via VMM) and The Netherlands (WATSON database). For Belgium 6 data points are available between 2011 and 2013. Only one data point is above the DL, the effluent concentration of the STP above the DL is 3 µg Co/L. For the Netherlands 272 data points are available between 2005 and 2012. Only 69 data points are above the DL, the median effluent concentration is below the DL and the 90th percentile is 2.69 µg Co/L. These concentrations are a factor 100 below the PNEC for STP of 370 µg Co/L.

9.12.2. WORKER CONTRIBUTING SCENARIO 1: Handling of liquid UP resins (PROC8a, also covering PROC5, PROC10 below)

9.12.2.1. Conditions of use

Task(s) covered with this contributing scenario: Transfer of liquids (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - External Tool (MEASE)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. - External Tool (MEASE)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress. In cases where direct contact with the substance cannot be avoided, a protective suit conforming to EN 13982 should be worn.

9.12.2.2. Exposure and risks for workers

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

Table 72. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	5 µg/m³ External Tool (MEASE)	0.021
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.12.3. WORKER CONTRIBUTING SCENARIO 2: Handling of liquid UP resins (PROC 5 as covered in 9.12.2.)

9.12.3.1. Conditions of use

Task(s) covered with this contributing scenario: Mixing, formulating, impregnation, moulding.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.12.2 above.

9.12.4. WORKER CONTRIBUTING SCENARIO 3: Handling of liquid UP resins (PROC10 as covered in 9.12.2.)

9.12.4.1. Conditions of use

Task(s) covered with this contributing scenario: Low energy spreading (brushing, rolling).
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.12.2 above.

9.12.5. WORKER CONTRIBUTING SCENARIO 4: Spraying of liquid UP resins (PROC11)

9.12.5.1. Conditions of use

Task(s) covered with this contributing scenario: Manual spraying.

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Medium - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Generic local exhaust ventilation: Lower confidence limit (professional use) (Standard efficiency) [Effectiveness Inhal: 72%]

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.12.5.2. Exposure and risks for workers

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

Table 73. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	150 µg/m³ Measured HH (Published data)	0.638
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.28. EXPOSURE SCENARIO 28: Use at industrial site - Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment

Market sector: Paints, inks and/or coatings

Product Categorie
PC9a : Coatings and Paints, Thinners, paint removers
PC18 : Ink and Toners

Sectors of use
SU10 : Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

CONTRIBUTIVE SCENARIOS ENVIRONMENT
ERC5 : Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES1 STP discharge
ERC5 : Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES2 Direct discharge
ERC5 : Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES3 Marine discharge

CONTRIBUTIVE SCENARIOS WORKERS
Preparation and industrial application of coatings, paints and inks - PROC13
Preparation and industrial application of coatings, paints and inks - PROC8b
Preparation and industrial application of coatings, paints and inks - PROC10
Spraying of coatings, paints and inks - PROC7
Cleaning & Maintenance - PROC8a

Subsequent service life exposure scenarios:
ES32 : Service life (consumers) - Service life of dried paints
ES33 : Service life (consumers) - Service life of dried paints
ES31 : Service life (professional worker) - Handling/Manipulation of dried paints or coatings in professional settings

9.28.1. ENVIRONMENTAL CONTRIBUTING SCENCARIO 1: Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES1 STP discharge

9.28.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
Daily use at site: ≤ 0,013 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 3 ton/year
For the generic exposure scenario a tonnage demonstrating safe use was selected since no information from the sector was available.
Number ofrelease days per year: 225 days/year
The selected number of production days per year is based on general information from the sector.

Technical and organizational conditions and measures
Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant
Municipal STP: Yes
Discharge rate ofSTP: ≥ 2E3 m^3/g
Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to treatment of waste (including article waste)
Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure
Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 1.98E5 m^3/d
Final dilution factor: ≥ 100

9.28.1.2. Releases

The local releases to the environment are reported in the following table.

Table 146. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.01%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.01%	
		Local release rate:	0.001 kg/day	
Air	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.005%	
		Local release rate:	6.665E-4 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 147. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Fresh water	Local PEC	0.10 µg/l	0.17
Sediment (freshwater)	Local PEC	4.36 mg/kg dw	0.46
Wastewater treatment plant	Local PEC	0.0004 mg/l	< 0.01
Air	Local PEC	0.11 ng/m³	No environmental hazard
Agricultural land	Local PEC	0.02 mg/kg dw	< 0.01
Man via Environment - Inhalation	Local PEC	0.11 ng/m³	< 0.01
Man via environment - Oral	Exposure via food consumption	0.32 µg/kg/g	0.034

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:
The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.
Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.
The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.
For the risk characterisation the following DNELs based on cobalt were used:
DNEL inhalation, local, long-term of 6.3 µg Co/m³
DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day
As such a combined RCR cannot be provided (local and systemic effects).

9.28.2. ENVIRONMENTAL CONTRIBUTING SCENCARIO 2: Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES2 Direct discharge

9.28.2.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

Daily use at site: ≤ 0,013 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 3 ton/year
For the generic exposure scenario a tonnage demonstrating safe use was selected since no information from the sector was available.
Number ofrelease days per year: 225 days/year
The selected number of production days per year is based on general information from the sector.

Technical and organizational conditions and measures

Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant

Municipal STP: No [Water Efficacy: 0%]

Conditions and measures related to treatment of waste (including article waste)

Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure

Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 3.98E5 m^3/d
Final dilution factor: ≥ 100

9.28.2.2. Releases

The local releases to the environment are reported in the following table.

Table 148. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.01%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.01%	
		Local release rate:	0.001 kg/day	
Air	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.005%	
		Local release rate:	6.665E-4 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 149. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Fresh water	Local PEC	0.10 µg/l	0,17
Sediment (freshwater)	Local PEC	4.34 mg/kg dw	0.46
Air	Local PEC	0.11 ng/m³	No environmental hazard
Agricultural land	Local PEC	0.01 mg/kg dw	< 0.01
Man via Environment - Inhalation	Local PEC	0.11 ng/m³	< 0.01
Man via environment - Oral	Exposure via food consumption	0.320 µg/kg/d	0.034

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:
The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.
Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.
The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.
For the risk characterisation the following DNELs based on cobalt were used:
DNEL inhalation, local, long-term of 6.3 µg Co/m³
DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day
As such a combined RCR cannot be provided (local and systemic effects).

9.28.3. ENVIRONMENTAL CONTRIBUTING SCENCARIO 3: Use of coatings, paints and inks using cobalt bis(2-ethylhexanoate) as drier or pigment ES2 Marine discharge

9.28.3.1. Conditions of use

Amount used, frequency and duration of use (or from service life)

Daily use at site: ≤ 0,013 ton/day
The tonnage and further exposure is always expressed in cobalt.
Annual use at a site: ≤ 3 ton/year
For the generic exposure scenario a tonnage demonstrating safe use was selected since no information from the sector was available.
Number ofrelease days per year: 225 days/year
The selected number of production days per year is based on general information from the sector.

Technical and organizational conditions and measures

Risk management measures: One or more of the following measures should be present to reduce emissions to water: Chemical precipitation, Sedimentation, Filtration, Electrolysis, Reverse osmosis or Ion exchange.
Risk management measures: One or more of the following measures should be present to reduce emissions to air: Electrostatic precipitators, Wet electrostatic precipitators, Cyclones, but as primary collector, Fabric or bag filters, Ceramic/Metal mesh filters or Wet scrubbers.

Conditions and measures related to sewage treatment plant

Municipal STP: No [Water Efficacy: 0%]

Conditions and measures related to treatment of waste (including article waste)

Special considerations for waste treatment operations: No (low amount) (Particular risks from waste treatment unlikely due to small fraction of used substance entering into the waste stage. Waste disposal according to national/local legislation is sufficient.)
Wastes from onsite risk management measures and solid or liquid wastes from production, use and cleaning processes should be disposed of separately or/and with other cobalt compounds waste to hazardous waste incineration plants or hazardous waste landfills as hazardous waste. Releases to the floor, water and soil are to be prevented. If the cobalt content of the waste is elevated enough, internal or external recovery/recycling might be considered. Appropriate waste codes for cobalt carboxylates: 01 03 07*, 06 05 02*, 06 03 13*, 06 03 15*, 06 04 05*, 06 05 02*, 08 01 11*, 08 01 13*, 08 01 21 *, 08 03 12*, 15 01 10*, 15 02 02*, 16 03 03*, 1603 05*, 16 07 09*, 16 10 GU*, 19 GU 13*, 19 0117*, 19 02 04*, 19 02 08*, 19 02 09*, 19 08 13*, ... Suitable disposal: Keep separate and dispose of to either: Hazardous waste incineration operated according to Council Directive 2008/98/EC on waste, Directive 2000/76/EC on the incineration of waste and the Reference Document on the Best Available Techniques for Waste Incineration of August 2006. Hazardous landfill operated under Directive 1999/31/EC. A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure

Discharge rate of effluent: ≥ 2E3 m^3/g
Receiving surface water flow rate: ≥ 1.98E5 m^3/d
Final dilution factor: ≥ 100

9.28.3.2. Releases

The local releases to the environment are reported in the following table.

Table 150. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.01%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.01%	
		Local release rate:	0.001 kg/day	
Air	Release factor (SpERC for formulation of metal compounds)	Initial release factor	0.005%	Eurométaux, 2012, version 2.1 The selection of the formulation SpERC is based on the assumption that during that step most emissions will occur compared to the application step.
		Final release factor	0.005%	
		Local release rate:	6.665E-4 kg/day	
Soil	Release factor	Final release factor	0%	No direct release to soil.

Releases to waste

Release factor to waste from the process: 0.1%
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

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

Table 151. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Sea water	Local PEC	0.02 µg/l	0.01
Sediment (marine water)	Local PEC	0.90 mg/kg dw	0.09
Air	Local PEC	0.11 ng/m³	No environmental hazard
Agricultural land	Local PEC	0.01 mg/kg dw	< 0.01
Man via Environment - Inhalation	Local PEC	0.11 ng/m³	< 0.01
Man via environment - Oral	Exposure via food consumption	0.317 µg/kg	0.033

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:
The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.
Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.
The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.
For the risk characterisation the following DNELs based on cobalt were used:
DNEL inhalation, local, long-term of 6.3 µg Co/m³
DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day
As such a combined RCR cannot be provided (local and systemic effects).

9.28.4. WORKER CONTRIBUTING SCENARIO 1: Preparation and industrial application of coatings, paints and inks (PROC 13, also covering PROC 8b, PROC 10 below)

9.28.4.1. Conditions of use

Task(s) covered with this contributing scenario: Dipping, pouring (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: Not restricted [Effectiveness Inhal: 0%; Dermal: 0%] - External Tool (MEASE)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%]

Technical and organizational conditions and measures

Process temperature: Environment - External Tool (MEASE)
Minimum room volume: ≥ 300 m³ - External Tool (MEASE)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. - External Tool (MEASE)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.28.4.2. Exposure and risks for workers

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

Table 152. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	10 µg/m³ External Tool (MEASE)	0.043
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.28.5. WORKER CONTRIBUTING SCENARIO 2: Preparation and industrial application of coatings, paints and inks (PROC8b as covered in 9.28.4.)

9.28.5.1. Conditions of use

Task(s) covered with this contributing scenario: Loading of equipment, spreading, cleaning of equipment.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.28.4 above.
9.28.6. WORKER CONTRIBUTING SCENARIO 3: Preparation and industrial application of coatings, paints and inks (PROC10 as covered in 9.28.4.)
9.28.6.1. Conditions of use
Task(s) covered with this contributing scenario: Low energy spreading (brushing, rolling).
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.28.4 above.

9.28.7. WORKER CONTRIBUTING SCENARIO 4: Spraying of coatings, paints and inks (PROC7)

9.28.7.1. Conditions of use

Task(s) covered with this contributing scenario: Spraying.

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Medium (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Level of containment: Closed process
Minimum room volume: ≥ 300 m³
General ventilation: Lower confidence limit (industrial use) (Standard efficiency) [Effectiveness Inhal: 17%] Air Exchange Rate = 5/h

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.28.7.2. Exposure and risks for workers

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

Table 153. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	75 µg/m³ Measured HH (Analogous data)	0.319
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.28.8. WORKER CONTRIBUTING SCENARIO 5: Cleaning & Maintenance (PROC8a)

9.28.8.1. Conditions of use

Task(s) covered with this contributing scenario: Immediate removal of wet splashes.

Product (article) characteristics

Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - External Tool (MEASE)

Technical and organizational conditions and measures

Process temperature: Environment System not in operation - External Tool (MEASE)
Process pressure: Environment System not in operation - External Tool (MEASE)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.28.8.2. Exposure and risks for workers

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

Table 154. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	50 µg/m³ External Tool (MEASE)	0.213
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.29. EXPOSURE SCENARIO 29: Use by professional worker - Use of coatings, paints and inks

Market sector: Paints, inks and/or coatings

Product Categorie
PC9a : Coatings and Paints, Thinners, paint removers
PC18 : Ink and Toners

CONTRIBUTIVE SCENARIOS ENVIRONMENT
Use of coatings, paints and inks - ERC8f, ERC8c

CONTRIBUTIVE SCENARIOS WORKERS
Use of coatings, paints and inks - PROC19
Use of coatings, paints and inks - PROC8a
Use of coatings, paints and inks - PROC5
Non-spraying operations with coatings, paints and inks - -PROC8a
Non-spraying operations with coatings, paints and inks - PROC10
Spraying of coatings, paints and inks - PROC11

Subsequent service life exposure scenarios:
ES31 : Service life (professional worker) - Handling/Manipulation of dried paints or coatings in professional settings
ES32 : Service life (consumers) - Service life of dried paints
ES33 : Service life (consumers) - Service life of printed matter

9.29.1. ENVIRONMENTAL CONTRIBUTING SCENCARIO 1: Use of coatings, paints and inks

9.29.1.1. Conditions of use

Amount used, frequency and duration of use (or from service life)
Daily wide dispersive use: 5.5E-4 ton/day
The tonnage and further exposure is always expressed in cobalt.

Conditions and measures related to sewage treatment plant
Municipal STP: Yes
Discharge rate ofSTP: ≥ 2E3 m³/g
Application of the STP sludge on agricultural soil: Yes

Conditions and measures related to treatment of waste (including article waste)
Special considerations for waste treatment operations: No (low amount) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.) Fraction of daily/annual use expected in waste: 60% of all articles, 40% is recycled.
EC, 2010) Appropriate waste codes: 20 01 34, 20 01 40, 20 03 01, 20 03 07, …
Suitable disposal: Waste from end-of-life articles can be disposed of as municipal waste, except when they are separately regulated, like electronic devices, batteries, vehicles, etc. Disposal of wastes is possible via incineration (operated according to Directive 2000/76/EC on the incineration of waste) or landfilling (operated according to Reference Document on the Best available Techniques for Waste Industries of August 2006 and Council Directive 1999/31/EC and Council Decision 19 December 2002). A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

Other conditions affecting environmental exposure
Discharge rate of effluent: ≥ 2E3 m³/g
Receiving surface water flow rate: ≥ 1.8E4 m³/g

9.29.1.2. Releases

The local releases to the environment are reported in the following table.

Table 155. Local releases to the environment

Release	Release factor estimation method	Explanation / Justification		
Water	ERC based	Initial release factor	1%	-
		Final release factor	1%	-
		Local release rate:	0.006 kg/day	-
Air	Release factor	Initial release factor	0%	-
		Final release factor	0%	No or negligible release to the air, the substance is not volatile.
Soil	ERC based	Final release factor	0.5%	-

Releases to waste

Release factor to waste from the process: 0.1%
A detailed assessment has been performed and is reported in the Waste report (ARCHE, 2011)

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

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.
Table 156. Exposure concentrations and risks for the environment

Protection goal	Exposure concentration		Risk characterization
Fresh water	Local PEC	0.12 µg/l	0.20
Sediment (freshwater)	Local PEC	5.06 mg/kg dw	0.53
Wastewater treatment plant	Local PEC	0.0003 mg/l	< 0.01
Man via Environment - Inhalation	Local PEC	-	-
Man via environment - Oral	Exposure via food consumption	0.321 µg/kg	0.034

Conclusion on risk characterisation

MAN VIA ENVIRONMENT:
The use of EUSES to predict the concentration in food is difficult to apply for metals and associated with much higher uncertainties than using measured data. Therefore, deviations from the TGD food basket approach for the exposure route "ingestion of food", have been applied as shortly described in section 9.0.2.2.
Furthermore, the exposure assessment is based on the cobalt ion, as this is the toxic species.
The oral exposure concentration in µg/kg bw/day has been derived by taking 2L of drinking water (PEC freshwater taken from the local environmental exposure assessment) + the worst case exposure of 19 µg Co/d from food (97.5th percentile from the 1994 UK total diet study (please refer to section 9.0.2.2) and a default body weight of 60kg into account.
For the risk characterisation the following DNELs based on cobalt were used:
DNEL inhalation, local, long-term of 6.3 µg Co/m³
DNEL oral, systemic, long-term of 9.5 µg Co/kg bw/day
As such a combined RCR cannot be provided (local and systemic effects).

9.29.2. WORKER CONTRIBUTING SCENARIO 1: Mixing of coatings, paints and inks (PROC19, also covering PROC8a, PROC5 below)

9.29.2.1. Conditions of use

Task(s) covered with this contributing scenario: Manual operations (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - External Tool (MEASE)
Maximum emission potential of the substance: Very low (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if materials of lower dustiness are being handled in parallel) are thus automatically covered in this assessment.) - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

Technical and organizational conditions and measures

Indoor or outdoor use: Indoors and outdoors - External Tool (MEASE)
General ventilation: Lower confidence limit (professional use) (Standard efficiency) [Effectiveness Inhal: 0%] Outdoors: natural ventilation indoors: air-circulated areas ACR = 5 h-1 - External Tool (MEASE)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. - External Tool (MEASE)
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.29.2.2. Exposure and risks for workers

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

Table 157. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	5 µg/m³ External Tool (MEASE)	0.021
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.29.3. WORKER CONTRIBUTING SCENARIO 2: Mixing of coatings, paints and inks (PROC8a as covered in 9.29.2.)

9.29.3.1. Conditions of use

Task(s) covered with this contributing scenario: Loading of equipment.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.29.2 above.
9.29.4. WORKER CONTRIBUTING SCENARIO 3: Mixing of coatings, paints and inks (PROC8a as covered in 9.29.2.)
9.12.4.1. Conditions of use
Task(s) covered with this contributing scenario: Mixing.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.29.2 above.

9.29.5. WORKER CONTRIBUTING SCENARIO 4: Non-spraying operations with coatings, paints and inks (PROC8a, also covering PROC10 below)

9.29.5.1. Conditions of use

Task(s) covered with this contributing scenario: Cleaning of application equipment (also covering tasks as given for PROC(s) as included in heading above).

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - External Tool (MEASE)
Maximum emission potential of the substance: Medium - External Tool (MEASE)
Physical form of substance: Solution - External Tool (MEASE)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - External Tool (MEASE)

Technical and organizational conditions and measures

Process temperature: Environment - External Tool (MEASE)
Generic local exhaust ventilation: Lower confidence limit (professional use) (Standard efficiency) [Effectiveness Inhal: 72%] Outdoors: natural ventilation indoors: air-circulated areas ACR = 5 h-1 - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Eye protection to be worn to protect from eye irritation. Due to the eye irritating properties of the substance, direct contact with the eyes is to be avoided including hand to eye transfer after touching contaminated surfaces. Suitable eye protection equipment (e.g. goggles or visors) must be worn, unless contact of the substance with the eyes can be excluded. Such exclusion is determined by: (i) the physical appearance of the substance in the specific type of application (e.g. wetting the substance can effectively prevent from the emission of dust), (ii) the emission potential resulting from the nature of the process (e.g. splashes, emission of dust can be excluded in a closed process) and (iii) applied exposure prevention measures (segregation of the emission source or separation of the worker from the emission source). Additionally, face protection may be required to be worn in such cases as appropriate.
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.29.5.2. Exposure and risks for workers

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

Table 158. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	5 µg/m³ External Tool (MEASE)	0.021
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation

The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

9.29.6. WORKER CONTRIBUTING SCENARIO 5: Non-spraying operations with coatings, paints and inks (PROC10 as covered in 9.29.5.)

9.29.6.1. Conditions of use

Task(s) covered with this contributing scenario: Painting, brushing, spreading and roller applications.
The exposure assessment and risk characterisation for this PROC is covered in a workplace-assessment (as described in IUCLID Section 13: "Methodology applied in the occupational exposure scenarios for cobalt and cobalt compounds") in chapter 9.29.5 above.

9.29.7. WORKER CONTRIBUTING SCENARIO 6: Spraying of coatings, paints and inks (PROC 11)

9.29.7.1. Conditions of use

Task(s) covered with this contributing scenario: Spraying.

Product (article) characteristics

Content in preparation: < 1% [Effectiveness Inhal: 90%; Dermal: 90%] - Measured HH (Analogous data)
Maximum emission potential of the substance: Medium (abrasion based) (Only the highest emission potential (EP) is reported. Lower EPs (e.g. if processes resulting in lower abrasion are being conducted in parallel) are thus automatically covered in this assessment.) - Measured HH (Analogous data)
Physical form of substance: Solution - Measured HH (Analogous data)

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

Maximum duration of exposure: > 240 min (not restricted) [Effectiveness Inhal: 0%; Dermal: 0%] - Measured HH (Analogous data)

Technical and organizational conditions and measures

Process temperature: Environment - Measured HH (Analogous data)
Minimum room volume: ≥ 100 m³ - Measured HH (Analogous data)
Generic local exhaust ventilation: Lower confidence limit (professional use) (Standard efficiency) [Effectiveness Inhal: 72%] Outdoors: natural ventilation indoors: air-circulated areas ACR = 5 h-1 - Measured HH (Analogous data)
Indoor or outdoor use: Indoors and outdoors - Measured HH (Analogous data)

Conditions and measures related to personal protection, hygiene and health evaluation.

General good occupational hygiene practices: General good occupational hygiene practices are required. Required good occupational hygiene practices to ensure a safe handling of the substance involve measures (e.g. shower and change clothes at end of work shift) to avoid any contamination of private households via the work-home-interface and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating and smoking in the workplace. In general, inhalation and ingestion should be avoided. Unless otherwise stated below, certified working clothing and shoes should be worn during work. Any contaminated clothing should not be taken home. Good general ventilation in the workplace should be ensured. Dust should not be blown off (e.g. from dried splashes) with compressed air. Regular training in workplace hygiene practice and proper use of personal protective equipment (if relevant) is required. - Measured HH (Analogous data)
Respiratory protective equipment (RPE): RPE with minimum APF = 10 (APF = assigned protection factor according to EN 529. At minimum any combination of particle filter class P2 with mask according to EN 140, EN 1827 or EN 136 or filtering half mask (FF P2) according to EN 149 or combination of P1 filter with face piece according EN 12942 or any RPE providing higher APFs according to EN 529 is required.) [Effectiveness Inhal: 90%]
Gloves: Gloves protecting from sensitizing properties to skin, continuous supervision of workers required. Due to the skin sensitizing effect of the substance, protective gloves according to EN 374 have to be worn at all workplaces unless any exposure to the substance can be excluded when taking into account the nature of the conducted process, applied exposure prevention measures and physical appearance of the substance of concern in the specific type of application (e.g. protecting from splashes by containment of emission source). Gloves have to be changed according to manufacturer's information or when damaged, whatever is teh earlier. Additionally, face protection is required to be worn as appropriate. This level of protection is to be achieved by continuous supervision and training of workers wearing gloves.
Eye protection: Protection of eyes from physical stress (If thermal or mechanical stress of the eyes cannot be excluded due to the nature of the process, suitable eye protection is to be worn. Additionally, face protection is required to be worn in such cases as appropriate.)
Certified safety clothing and shoes: Certified safety clothing including coveralls and safety shoes are to be worn as appropriate. Face protection may be worn if the type of process is associated with the risk of face injuries due to thermal or mechanical stress.

9.29.7.2. Exposure and risks for workers

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

Table 159. Exposure concentrations and risks for workers

Route of exposure and type of effects	Exposure concentration	Risk characterization RCR
Inhalation, local, long-term	75 µg/m³ Measured HH (Published data)	0.319
Dermal, local, long-term	-	Qualitative (see below)
Dermal, local, acute	-	Qualitative (see below)
Eye, local	-	Qualitative (see below)

Conclusion on risk characterisation
The risk characterisation for local dermal and local eye effects is given in Section 9.0.2.3

Xylene

Identification of the exposure scenario
Product name: Xylene
Reach registration number: 01-2119488216-32-XXXX
CAS number: 1330-20-7
EC number: 215-535-7
Review date: 14/02/2022 rev. 3.0

USE IN COATINGS - INDUSTRIAL USE

1. Title of the exposure scenario

Process purpose: Includes use in coatings (varnishes, inks, adhesives, etc.), including exposure during application (including material receipt, storage, bulk and semi-bulk preparation and transfer, application by spray, roller, manual spraying, dip, flow, fluid layers in production lines and in film formation) and system cleaning, maintenance and related laboratory activities.
Main sector: SU3 Industrial uses

Environment

Environmental Release Categories [ERC]: ERC4 Use of non-reactive processing aid at industrial site (no inclusion into or onto article).
Specific Environmental Release Category [SPERC]: ESVOC SPERC 4.3a.v1

Worker

Process categories:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC 3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Production of chemicals with the possibility of exposure.
PROC5 Mixing or blending in batch processes
PROC7 Industrial spraying.
PROC8a Transfer of a substance or preparation (charging/discharging) at non-dedicated facilities.
PROC8a Transfer of substance or mixture (charging/discharging) at non-dedicated facilities.
PROC10 Application with rollers or brushes.
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles.

2. Other conditions of use affecting exposure (Industrial - Environment 1)

Products features

Form: Liquid, vapor pressure 0.5 - 10 kPa at STP
Easily biodegradable.

Amounts used:

Annual amount per site: 2500 tonnes

Frequency and duration of use

Issue days: 300 days/year

Additional operating conditions relating to environmental exposure

Emission factor - air
Air release rate produced by the process (initial release prior to risk management measures): 0.98
Emission factor - water
Waste water release rate produced by the process (initial release prior to risk management measures): 0.007
Emission factor - soil
Soil release rate produced by the process (initial release prior to risk management measures): 0

Environmental factors that are not influenced by risk management

Dilution

Local fresh water dilution factor: 10
Local seawater dilution factor: 100

Risk management measures

Sewage Treatment Plant Data (STP)

Estimated substance removal from waste water via domestic sewage treatment: 95.8%
Assumed domestic sewage treatment plant flow: 2000 m³/day

Local technical conditions and measures to reduce and limit discharges and air emissions

Air:

Treat air emission to provide a typical removal efficiency of > 90%.

Water:

Avoid releasing the undiluted substance into local waste water or recover it on site. The typical on-site purification technique has a removal efficiency of 95.8%.

Ground:

Soil emission controls are not applicable as there is no direct release to soil.

Conditions and measures for external treatment of waste

Sludge treatment:

Do not spread industrial sludge on natural soils. Sewerage sludge should be burned, stored or regenerated.
Waste treatment:
No waste of the substance is formed during production.

2. Other conditions of use affecting exposure (Workers - Health 1)

Products features

Form:

Liquid, vapor pressure 0.5 - 10 kPa at STP
Concentration information: Includes concentrations up to 100%, unless otherwise indicated.

Quantities used

Not applicable.

Frequency and duration of use

Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting worker exposure

Temperature: (unless stated differently) assumes use at not more than 20°C above ambient temperature.
Ventilation Rate: Ensure a sufficient amount of controlled ventilation (10 to 15 air changes per hour). Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and process-level (source) measures to prevent releases

Technical protective measures:

Handle substance within a closed system. Provide supplementary ventilation to points where emissions occur. Ensure material transfers are managed using closed or air exhaust systems. Drain or remove substance from equipment before opening or servicing PROC7 Industrial spraying: spraying (automatic/robotic) should be carried out in a ventilated booth with laminar air flow.

Risk management measures:

PROC7 Industrial spraying.
Manual spraying.
Wear respiratory protection in accordance with EN 140 with filter type A or better.

3. Verification of exposure (Environment 1)

Environmental exposure:

Predicted exposures are not expected to exceed the specific risks (listed in chapter 8 of the safety datasheet), when the risk management measures/operational conditions outlined in section 2 are implemented.
Maximum allowable site tonnage (Msafe), based on release following total waste water treatment removal: 9874 kg/day

3. Exposure Verification (Health 1)

Exposure

Predicted workplace exposures are not expected to exceed the DNEL when risk identification measures are implemented.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Required removal efficiency for waste water can be achieved using on-site/off-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

USE IN COATINGS - PROFESSIONAL USE

1. Title of the exposure scenario

Process purpose: Includes use in coatings (varnishes, inks, adhesives, etc.), including exposure during application (including material receipt, storage, bulk and semi-bulk preparation and transfer, application by spray, roller, brush and manual spraying or similar processes and film formation) and system cleaning, maintenance and related laboratory activities.
Main sector: SU22 Professional uses

Environment

Environmental Release Categories [ERC]:
ERC8a Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor).
ERC8d Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor).
ERC8c Widespread use leading to inclusion into/onto article (indoor).
ERC8f Widespread use leading to inclusion into/onto article (outdoor).
Specific Environmental Release Category [SPERC]: ESVOC SPERC 8.3b.v1

Worker

Process categories:
PROC1 Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions.
PROC2 Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions.
PROC 3 Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions.
PROC4 Production of chemicals with the possibility of exposure.
PROC5 Mixing or blending in batch processes
PROC8a Transfer of a substance or preparation (charging/discharging) at non-dedicated facilities.
PROC8a Transfer of substance or mixture (charging/discharging) at non-dedicated facilities.
PROC10 Application with rollers or brushes.
PROC11 Non-industrial spray application.
PROC13 Treatment of articles by dipping and pouring.
PROC15 Use as laboratory reagent.
PROC19 Manual activities with direct contact.
PROC24 High (mechanical) energy work-up of substances bound in/on materials and/or articles.

2. Other conditions of use affecting exposure (Industrial - Environment 1)

Products features

Form: Liquid, vapor pressure 0.5 - 10 kPa at STP Easily biodegradable.

Quantities used

Annual amount per site: 10 tonnes

Frequency and duration of use

Issue days: 365 days/year

Additional operating conditions relating to environmental exposure

Emission factor - air
Air release rate produced by the process (initial release prior to risk management measures): 0.98
Emission factor - water
Waste water release rate produced by the process (initial release prior to risk management measures): 0.01
Emission factor - soil
Soil release rate produced by the process (initial release prior to risk management measures): 0.01

Environmental factors that are not influenced by risk management

Dilution
Local fresh water dilution factor: 10
Local seawater dilution factor: 100

Risk management measures
Sewage Treatment Plant Data (STP)
Estimated substance removal from waste water via domestic sewage treatment 95.8%
Assumed domestic sewage treatment plant flow: 2000 m³/day

Local technical conditions and measures to reduce and limit discharges and air emissions
Air: Treat air emission to provide a typical removal efficiency of 0%.
Water: The typical on-site purification technique has a removal efficiency of 95.8%.

Conditions and measures for external treatment of waste
Waste treatment: External treatment and disposal of waste should comply with applicable local and/or national regulations.

2. Other conditions of use affecting exposure (Workers - Health 1)

Products features
Form:
Liquid, vapor pressure 0.5 - 10 kPa at STP
Concentration information:
Includes concentrations up to 100%, unless otherwise indicated.

Quantities used
Not applicable.

Frequency and duration of use
Covers daily exposures up to 8 hours (unless stated differently).

Other operational conditions affecting worker exposure
Temperature:
(unless stated differently) assumes use at not more than 20°C above ambient temperature.
Ventilation Rate:
Provide a good standard of controlled ventilation (10 to 15 air changes per hour) or ensure operation is undertaken outdoors. Assumes a good basic standard of occupational hygiene is implemented.

Technical conditions and process-level (source) measures to prevent releases
Technical protective measures:
Handle substance within a closed system. Provide supplementary ventilation to points where emissions occur. Ensure material transfers are managed using closed or air exhaust systems. Clean/flush equipment prior to opening or maintenance. Transport on closed roads. PROC11 Non-industrial spray application. Indoor use. Perform in a laminar flow ventilated booth. PROC15 Use as laboratory reagents handle under fume hood or extract air.

Organizational measures to prevent/limit releases, dispersion and exposure
Organizational measures
Avoid activities with an exposure of more than 4 hours.
Hand Application - Finger Paints, Chalks, Stickers:
Limit the amount of substance in the mixture to 5%.

Risk management measures
Wear protective gloves according to EN 374, resistant to solvents.
PROC10 Application with rollers or brushes.
PROC11 Non-industrial spray application. Outdoor use.
PROC13 Treatment of articles by dipping and pouring. Outdoor use.
Wear respiratory protection in accordance with EN 140 with filter type A or better.

3. Verification of exposure (Environment 1)

Environmental exposure
Predicted exposures are not expected to exceed the specific risks (listed in chapter 8 of the safety datasheet), when the risk management measures/operational conditions outlined in section 2 are implemented.
Maximum allowable site tonnage (Msafe), based on release following total waste water treatment removal: 5969 kg/day

3. Exposure Verification (Health 1)

Exposure

Predicted workplace exposures are not expected to exceed the DNEL when risk identification measures are implemented.

4. Guidance to check compliance with the exposure scenario (Environment 1)

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

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.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

Required removal efficiency for waste water can be achieved using on-site/off-site technologies, either alone or in combination.

Further details on scaling and control technologies are provided in SpERC factsheet (http://cefic.org/en/reach-for-industries-libraries.html).

4. Guidance to check compliance with the exposure scenario (Health 1)

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

styrene

Substance identification
Chemical Name: styrene
CAS 100-42-5
Date - Version: 30/03/2022

Section 1 - TITLE OF THE EXPOSURE SCENARIO

Exposure scenario for the worker
Construction of FRP systems in professional applications, using UP/VE resins and/or formulated resins (gel coat, binder paste, filler, etc.) (ES8)

Use descriptors list
SU0: Other

Process categories
PROC3: Fabbricazione o formulazione di sostanze chimiche in processi a lotti chiusi, con occasionale esposizione controllata o processi con condizioni di contenimento equivalenti
PROC4: Production of chemicals with the possibility of exposure
PROC5: Mixing or blending in batch processes
Formulation of PTSI for the purpose of drying the raw materials, the formulation process and for optimal shelf life
PROC8a: Transfer of a substance or preparation (charging/discharging) at non-dedicated facilities
PROC10: Roller application or brushing
Formulation of PTSI for the purpose of drying the raw materials, the formulation process and for optimal shelf life
PROC11: Non-industrial spraying applications

Section 2 - OPERATING CONDITIONS AND RISK MANAGEMENT MEASURES

2.1.Exposure resulting from contributing exposure and control of worker exposure - Manufacture or formulation of chemicals in closed batch processes, with occasional controlled exposure or processes with equivalent containment conditions

Product features
Concentration of substance in a mixture: Includes substance shares in the product up to 25%
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: > 4 hours, 5 days a week.

Human factors not influenced by risk management
Exposed skin areas 240 cm²

Other operational conditions affecting worker exposure
Outdoor use: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.2.Exposure resulting from contributing exposure and control of worker exposure - Production of chemicals with the possibility of exposure

Product features
Concentration of substance in a mixture: Limit the substance content in the mixture to 50%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: 1 - 4 hours, 5 days a week.

Human factors not influenced by risk management
Exposed skin areas 480 cm²

Other operational conditions affecting worker exposure
Outdoor use: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator (effectiveness: 95%). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.3.Exposure resulting from contributing exposure and control of worker exposure - Mixing or blending in batch processes

Product features
Concentration of substance in a mixture: It covers percentages of substance in the product up to 100%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: 15 - 60 min, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 480 cm²

Other operational conditions affecting worker exposure
Indoor use
Ventilation conditions: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use drum pumps. Pour carefully from the containers. Close with lid immediately after use. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Use a full facepiece respirator - gas/vapour filter (BS EN 136 mask and BS EN 14387 filter), type A1 filter (organic vapours, BP>65°C), with 95% efficiency (APF 20). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.4.Exposure resulting from contributing exposure and control of worker exposure - Formulation of PTSI for the purpose of drying the raw materials, the formulation process and for optimal shelf life

Product features
Concentration of substance in a mixture: It covers percentages of substance in the product up to 100%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: 15 - 60 min, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 960 cm²

Other operational conditions affecting worker exposure
Indoor use
Ventilation conditions: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use drum pumps. Pour carefully from the containers. Close with lid immediately after use. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator (effectiveness: 95%). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.5.Exposure resulting from contributing exposure and control of worker exposure - Transfer of a substance or a preparation (filling/emptying) at non-dedicated facilities

Product features
Concentration of substance in a mixture: It covers percentages of substance in the product up to 100%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: 15 - 60 min, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 960 cm²

Other operational conditions affecting worker exposure
Indoor use
Ventilation conditions: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use drum pumps. Pour carefully from the containers. Close with lid immediately after use. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator (effectiveness: 95%). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.6.Exposure resulting from contributing exposure and control of worker exposure - Application with rollers or brushes

Product features
Concentration of substance in a mixture: Limit the substance content in the mixture to 50%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: > 4 hours, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 960 cm²

Other operational conditions affecting worker exposure
Indoor use
Ventilation conditions: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use drum pumps. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Use a power-assisted respirator with full face mask/safety helmet (BS EN 12941), type A1 filter (organic vapours, BP>65°C), with 97.5% efficiency (APF 40). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.7.Exposure resulting from contributing exposure and control of worker exposure - Formulation of PTSI for the purpose of drying the raw materials, the formulation process and for optimal shelf life

Product features
Concentration of substance in a mixture: Limit the substance content in the mixture to 50%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: > 4 hours, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 960cm²

Other operational conditions affecting worker exposure
Indoor use
Ventilation conditions: 30%

Other relevant operating conditions
Handicraft
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use long handled tools. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Use a power-assisted respirator with full face mask/safety helmet (BS EN 12941), type A1 filter (organic vapours, BP>65°C), with 97.5% efficiency (APF 40). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.8.Exposure resulting from contributing exposure and control of worker exposure - Formulation of PTSI for the purpose of drying the raw materials, the formulation process and for optimal shelf life

Product features
Concentration of substance in a mixture: Limit the substance content in the mixture to 50%.
Physical form of the product: Liquid
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: > 4 hours, 5 days a week

Human factors not influenced by risk management
Exposed skin areas 960 cm²

Other operational conditions affecting worker exposure
Indoor use

Other relevant operating conditions
Handicraft
Ventilation conditions: 30%
Risk Management Measures (RMM)

Technical conditions and process-level (source) measures to prevent releases
Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers
Local ventilation with a minimum efficiency of 80%
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure
Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments
Use long handled tools. Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Use a power-assisted respirator with full face mask/safety helmet (BS EN 12941), type A1 filter (organic vapours, BP>65°C), with 97.5% efficiency (APF 40). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

2.9.Exposure resulting from contributing exposure and control of worker exposure - Non-industrial spraying applications

Product features

Concentration of substance in a mixture: Limit the substance content in the mixture to 50%.
Physical form of the product: Liquid
Vapor pressure: Unknown.
Dustiness: The dustiness of the product is qualified as medium.
Amounts used: Unknown.
Frequency and duration of use: > 4 hours, 5 days a week

Human factors not influenced by risk management

Exposed skin areas 1500 cm²

Other operational conditions affecting worker exposure

Indoor use.
Ventilation conditions: 30%

Other relevant operating conditions

Handicraft.
Risk Management Measures (RMM).

Technical conditions and process-level (source) measures to prevent releases

Automate the operation if possible. To be handled in closed systems, if possible.

Technical conditions and measures to control dispersion from source towards workers

Local ventilation with a minimum efficiency of 80%.
Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.

Organisational measures to prevent/limit emissions, release and exposure

Allow access only to authorized persons. Ensure workers are trained to minimise exposure. Ensure safe working systems or equivalent risk management procedures are in place. Supervise the implementation of risk management measures and compliance with the required operational conditions. Evaluate the need for health risk surveillance.

Conditions and measures relating to personal protection, hygiene and health assessments

Drain transfer lines before disconnecting. Shut down and clean systems before opening or servicing. Use adequate eye protection. Wear suitable chemical resistant gloves: APF 10 90% Wear suitable overalls to avoid skin exposure. Wear suitable respirator. Use a power-assisted respirator with face mask (BS EN 12942), type A1 filter (organic vapours, BP >65°C), P3 filter (aerosol EN143) with 97.5% efficiency (APF 40). For activities lasting > 1 hour, a continuous flow compressed air line breathing apparatus with hood/helmet is recommended (BS EN 14594) (APF 200). Clean up spills immediately. This material and its container must be disposed of safely. Avoid inhaling the product. Handle under hood or extract air.

Section 3 - EXPOSURE ESTIMATION

Environment

Section	PEC	RCR (PEC/PNEC)
Fresh water	4.35E-04 mg/l	0.015553
Freshwater sediment	1.69E-02 mg/k dry weight	0.015553
Sea water	4.20E-05 mg/l	0.002969
Marine sediment	1.61E-03 mg/ k dry weight	0.002969
Farmland	2.33E-03 mg/k dry weight	0.011634
Wastewater treatment plant	2,35E-03 mg/l	0.000469

The quantitative risk characterization for this environmental exposure was calculated using EasyTRA.

Health

	Exposure level	RCR	Note
Dermal - Long-term - systemic effects	0.041143 mg/kg KW/day	0.000101	PROC3
Inhalation - Long-term - systemic effects	45.565 mg/m³	0.536062	PROC3
Combination of pathways, long-term systemic effects	6.55 mg/kg KW/day	0.536163	PROC3
Dermal - Long-term - systemic effects	0.205714 mg/kg KW/ day	0.000507	PROC4
Inhalation - Long-term - systemic effects	2.278 mg/m³	0.026803	PROC4
Combination of pathways, long-term systemic effects	0.53118 mg/kg KW/day	0.02731	PROC4
Dermal - Long-term - systemic effects	0.274286 mg/kg KW/ day	0.000676	PROC5
Inhalation - Long-term - systemic effects	0.607536 mg/m³	0.007147	PROC5
Combination of pathways, long-term systemic effects	0.361077 mg/kg KW/ daqy	0.007823	PROC5
Dermal - Long-term - systemic effects	0.274286 mg/kg KW/ day	0.000676	PROC8a
Inhalation - Long-term - systemic effects	0.607536 mg/m³	0.007147	PROC8a
Combination of pathways, long-term systemic effects	0.361077 mg/kg KW/ daqy	0.007823	PROC8a
Dermal - Long-term - systemic effects	0.274286 mg/kg KW/ day	0.000676	PROC8a
Inhalation - Long-term - systemic effects	0.607536 mg/m³	0.007147	PROC8a
Combination of pathways, long-term systemic effects	0.361077 mg/kg KW/ daqy	0.007823	PROC8a
Dermal - Long-term - systemic effects	1.371 mg/kg KW/daqy	0.003378	PROC10
Inhalation - Long-term - systemic effects	0.759421 mg/m³	0.008934	PROC10
Combination of pathways, long-term systemic effects	1.48 mg/kg KW/daqy	0.012312	PROC10
Dermal - Long-term - systemic effects	1.371 mg/kg KW/daqy	0.003378	PROC10
Inhalation - Long-term - systemic effects	0.759421 mg/m³	0.008934	PROC10
Combination of pathways, long-term systemic effects	1.48 mg/kg KW/daqy	0.012312	PROC10
Dermal - Long-term - systemic effects	1.371 mg/kg KW/daqy	0.003378	PROC10
Inhalation - Long-term - systemic effects	0.759421 mg/m³	0.008934	PROC10
Combination of pathways, long-term systemic effects	1.48 mg/kg KW/daqy	0.012312	PROC10
Dermal - Long-term - systemic effects	5.357 mg/kg KW/daqy	0.013195	PROC11
Inhalation - Long-term - systemic effects	3.797 mg/m³	0,044672	PROC11
Combination of pathways, long-term systemic effects	5.9 mg/kg KW/daqy	0.057867	PROC11

The quantitative risk characterization for this worker exposure was calculated using EasyTRA.

Section 4 - GUIDANCE FOR DOWNSTREAM USERS

Indications for the downstream user to assess whether he works within the limits established by ES

Recommendations are 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.
If scaling reveals a condition of unsafe use (i.e. RCR > 1), additional risk management measures or a site-specific chemical safety assessment are required.