PUNKT 1: Identifikation af stoffet/blandingen og af selskabet/virksomheden

1.1. Produktidentifikator

Handelsnavn
Antifrogen N/1100 kg PE- Container MX II

Materialnummer: 107601

Kemisk karakterisering: Monoethylenglykol (1,2-Ethandiol) og inhibitorer

1.2. Relevante identificerede anvendelser for stoffet eller blandingen samt anvendelser, der frarådes

Relevante identificerede anvendelser for stoffet eller blandingen

Industrisektor:	Funktionsvæske
Anvendelsesområde:	Kølelage

Eksponeringsscenarier: se bilag

1.3. Nærmere oplysninger om leverandøren af sikkerhedsdatabladet

Virksomhedens navn
Clariant Produkte (Deutschland) GmbH
Brueningstr. 50
65929 Frankfurt am Main
Telefonnr. : +49 6196 757 60

Information om stoffet/blandingen
BU Industrial & Consumer Specialties
Product Stewardship
e-mail: SDS.Europe@clariant.com

1.4. Nødtelefon

00800-5121 5121 (24 h)

PUNKT 2: Fareidentifikation

2.1 Klassificering af stoffet eller blandingen

Klassificering (FORORDNING (EF) Nr. 1272/2008)

Akut toksicitet, Kategori 4	H302: Farlig ved indtagelse.
Specifik målorgantoksicitet - gentagen eksponering, Kategori 2	H373: Kan forårsage organskader ved længerevarende eller gentagen eksponering.

2.2 Mærkningselementer

Etikettering (FORORDNING (EF) Nr. 1272/2008)

Farepiktogrammer :

Signalord : Advarsel

Faresætninger : H302 Farlig ved indtagelse.
H373 Kan forårsage organskader ved længerevarende eller gentagen eksponering.

Sikkerhedssætninger :

Forebyggelse:

P260 Indånd ikke pulver/ røg/ gas/ tåge/ damp/ spray.
P264 Vask huden grundigt efter brug.
P280 Bær beskyttelseshandsker/ beskyttelsestøj/ øjenbeskyttelse/ ansigtsbeskyttelse.

Reaktion:

P314 Søg lægehjælp ved ubehag.
P337 + P313 Ved vedvarende øjenirritation: Søg lægehjælp.

Bortskaffelse:

P501 Indholdet/ beholderen bortskaffes i et godkendt affaldsmodtagelsesanlæg.

2.3 Andre farer

Stoffet opfylder hverken PBT- eller vPvB-kriterierne.EC og er hverken et .
Ingen yderligere risici er kendte udover dem som nævnes i mærkningen.

PUNKT 3: Sammensætning af/oplysning om indholdsstoffer

3.2 Blandinger

Farlige komponenter

Kemisk betegnelse	CAS-Nr. EF-Nr. Indeks-Nr. Registreringsnummer	Klassificering	Koncentration (% w/w)
1,2-Ethandiol	107-21-1 203-473-3 603-027-00-1 01-2119456816-28 01-2119456816-28-0000 01-2119456816-28-0003 01-2119456816-28-0038 01-2119456816-28-XXXX	STOT RE 2; H373 Acute Tox. 4; H302	>= 90 - <= 95

Til forklaring af forkortelser se punkt 16.

PUNKT 4: Førstehjælpsforanstaltninger

4.1 Beskrivelse af førstehjælpsforanstaltninger

Generelle anvisninger : Tilsmudset tøj tages straks af/fjernes.

Hvis det indåndes : Søg læge hvis symptomer opstår.

I tilfælde af hudkontakt	:	I tilfælde af kontakt, skyl straks huden med rigeligt vand.
I tilfælde af øjenkontakt	:	Kommer stoffet i øjnene, skyl straks med rigeligt vand og søg læge.
Ved indtagelse.	:	Søg omgående læge.

4.2 Vigtigste symptomer og virkninger, både akutte og forsinkede

Symptomer	:	Hidtil ingen kendte symptomer.
Risiko	:	Ingen kendte farer på nuværende tidspunkt.

4.3 Angivelse af om øjeblikkelig lægehjælp og særlig behandling er nødvendig

Behandling	:	Behandles symptomatisk.

PUNKT 5: Brandbekæmpelse

5.1 Slukningsmidler

Egnede slukningsmidler	:	Stråle af vandtåge Alkoholbestandigt skum Kulsyre (CO2) Tørt pulver

5.2 Særlige farer i forbindelse med stoffet eller blandingen

Specifikke farer ved brandbekæmpelse	:	Ved brand er farlige røggasser: Kulilte (CO). Nitrogenoxider (NOx)

5.3 Anvisninger for brandmandskab

Særlige personlige værnemidler, der skal bæres af brandmandskabet	:	Selvforsynet åndedrætsværn

PUNKT 6: Forholdsregler over for udslip ved uheld

6.1 Personlige sikkerhedsforanstaltninger, personlige værnemidler og nødprocedurer

Sikkerhedsforanstaltninger til beskyttelse af personer	:	Sørg for tilstrækkelig ventilation. Bær passende beskyttelsesudstyr.

6.2 Miljøbeskyttelsesforanstaltninger

Miljøbeskyttelsesforanstaltninger	:	Må ikke komme i kloak eller vandløb.

6.3 Metoder og udstyr til inddæmning og oprensning

Metoder til oprydning	:	Opsug med inaktivt absorberende materiale (f.eks. sand, silicagel, syre bindemiddel, universal bindemiddel, savsmuld).

Kan deponeres eller forbrændes i overensstemmelse med lokale foreskrifter.

6.4 Henvisning til andre punkter

Informationer til en mere sikker håndtering, se punkt 7., For personlig beskyttelse se punkt 8., For bortskafningsoplysninger se venligst afsnit 13.

PUNKT 7: Håndtering og opbevaring

7.1 Forholdsregler for sikker håndtering

Råd om sikker håndtering	:	Emballagen skal behandles og åbnes med forsigtighed. Sørg for tilstrækkelig ventilation.
Henvisning til brand- og eksplosionsbeskyttelse	:	De almindelige regler for brandforebyggelse skal følges.
Hygiejniske foranstaltninger	:	Holdes væk fra levnedsmidler og drikkevarer.

7.2 Betingelser for sikker opbevaring, herunder eventuel uforenelighed

Anvisninger ved samlagring	:	Må ikke opbevares sammen med alkali. Må ikke opbevares sammen med stærke oxidationsmidler.

7.3 Særlige anvendelser

Særlige anvendelser	:	Ingen andre anbefalinger

PUNKT 8: Eksponeringskontrol/personlige værnemidler

8.1 Kontrolparametre

Grænseværdier for erhvervsmæssig eksponering

Komponenter	CAS-Nr.	Ventil type (Påvirkningsform)	Kontrolparametre	Basis
1,2-Ethandiol	107-21-1	TWA	20 ppm 52 mg/m3	2000/39/EC
Yderligere oplysninger	Identificerer muligheden for væsentlig optagelse gennem huden, Vejledende			
		STEL	40 ppm 104 mg/m3	2000/39/EC
Yderligere oplysninger	Identificerer muligheden for væsentlig optagelse gennem huden, Vejledende			
		GV	10 ppm 26 mg/m3	DK OEL
Yderligere oplysninger	Betyder, at stoffet kan optages gennem huden., Vejledende liste over organiske opløsningsmidler, At stoffet har en EF-grænseværdi			
		GV (forstøvet)	10 mg/m3	DK OEL
Yderligere oplysninger	Betyder, at stoffet kan optages gennem huden., Vejledende liste over organiske opløsningsmidler, At stoffet har en EF-grænseværdi			

Afledte nuleffektniveauer (DNEL) i henhold til Forordning (EF) nr. 1907/2006:

Stoffets navn	Anvendelse	Eksponeringsvej	Potentielle sundhedseffekter	Værdi
1,2-Ethandiol CAS-Nr.: 107-21-1	Arbejdstagere	Hud	Langtids systemiske effekter	106 mg/kg legemsvægt/dag
Bemærkninger:	DNEL			
	Arbejdstagere	Indånding	Langtids lokale effekter	35 mg/m3
Bemærkninger:	DNEL			
	Offentligheden	Hud	Langtids systemiske effekter	53 mg/kg legemsvægt/dag
Bemærkninger:	DNEL			
	Offentligheden	Indånding	Langtids lokale effekter	7 mg/m3

Beregnet nuleffektkoncentration (PNEC) i henhold til Forordning (EF) nr. 1907/2006:

Stoffets navn	Delmiljø	Værdi
1,2-Ethandiol CAS-Nr.: 107-21-1	Ferskvand	10 mg/l
	saltvand	1 mg/l
	Vand (periodisk udslip)	10 mg/l
	Ferskvandssediment	37 mg/kg tør vægt
	Jord	1,53 mg/kg tør vægt
	Spildevandsbehandlingsanlæg	199,5 mg/l
	Havsediment	3,7 mg/kg tør vægt

8.2 Eksponeringskontrol

Personlige værnemidler

Beskyttelse af øjne : Alt efter risikoen, bær tilstrækkelig øjen beskyttelse (sikkerhedsbriller med side beskyttelse, eller lukket øjenværn, og hvis nødvendigt fuld maske.

Beskyttelse af hænder
Gennemtrængningstid : 480 min
Hanske tykhed : 0,7 mm
Bemærkninger : Langtidspåvirkning Uigennemtrængelige butylgummihandsker

Gennemtrængningstid : 30 min
Hanske tykhed : 0,4 mm
Bemærkninger : For korttids påvirkning (beskyttelse mod sprøjt): Handsker af nitrilgummi.

Bemærkninger : Denne type beskyttelseshandsker tilbydes af flere producenter. Vær opmærksom på producentens oplysninger specielt om minimum tykkelse og minimum gennembrudstid samt arbejdspladsens særlige betingelser.

Åndedrætsværn	:	Åndedrætsværn ved utilstrækkelig udsugning eller længerevarende påvirkning. Helmaske i henhold til DIN EN 136 Filter A (organiske gasser og dampe) i henhold til DIN EN 141 Anvendelse af filterudrustning forudsætter at den omgivende atmosfære indeholder mindst 17 vol.% ilt. og at den højst tilladelige gaskoncentration, i regel 0,5 vol.%, ikke overskrides. Gældende regler skal iagttages, f.eks. EN 136 / 141 / 143 / 371 / 372 såvel som nationale regler.
Beskyttelsesforanstaltninger	:	Undgå indånding af dampe. Undgå kontakt med huden og øjnene.

PUNKT 9: Fysiske og kemiske egenskaber

9.1 Oplysninger om grundlæggende fysiske og kemiske egenskaber

Udseende	:	Væske
Farve	:	gul
Lugt	:	Svagt mærkbar
Lugttærskel	:	ikke bestemt
pH-værdi	:	ca. 8 (20 °C) Koncentration: 100 g/l Metode: DIN 19268
Smeltepunkt	:	-32 °C Metode: DIN 51583
Kogepunkt	:	ca. 165 °C (1.013 hPa) Metode: ASTM D 1120 166 °C (1.013 hPa) Metode: ASTM D 1120
Flammepunkt	:	119 °C Metode: ASTM D6450 (closed cup)
Fordampningshastighed	:	ikke bestemt
Antændelighed (fast stof, luftart)	:	Ikke anvendelig
Forbrændingstal	:	Ikke anvendelig
Højeste eksplosionsgrænse / Øvre brændpunktsgrænse	:	ikke bestemt

Laveste eksplosionsgrænse / Nedre brændpunktsgrænse	:	3 %(V) Oplysningerne refererer til opløsningsmidlet.
Damptryk	:	< 0,01 kPa (20 °C) Metode: Kalkuleret efter Syracuse.
Relativ dampvægtfylde	:	ikke bestemt
Massefylde	:	1,1138 g/cm3 (20 °C) Metode: DIN 51757
Bulk massefylde	:	Ikke anvendelig
Opløselighed		
Vandopløselighed	:	helt blandbar (20 °C)
Opløselighed i andre opløsningsmidler	:	ikke bestemt Opløsningsmiddel: Fedt
Fordelingskoefficient: n-oktanol/vand	:	Ikke anvendelig
Selvantændelsestemperatur	:	> 400 °C Metode: DIN 51794
Dekomponeringstemperatur	:	> 300 °C Metode: DSC Måling under kvælstofgas Ingen spaltning indtil 300 °C.
Viskositet		
Viskositet, dynamisk	:	20,3 mPa.s (20 °C)
Viskositet, kinematisk	:	20,3 mm2/s (20 °C) Metode: DIN 51562
Eksplosive egenskaber	:	Ikke eksplosiv Metode: Ekspert vurdering
Oxiderende egenskaber	:	Stoffet eller blandingen er ikke klassificeret som oxiderende. Metode: Ekspert vurdering

9.2 Andre oplysninger

Overfladespænding	:	33,8 mN/m
Molekylvægt	:	Ikke anvendelig
Korrosionsrate for metal	:	< 6,25 mm/a
Minimums antændelsesenergi	:	ikke bestemt

Partikel størrelse	:	Ikke anvendelig
Selvantænding	:	Ikke anvendelig

PUNKT 10: Stabilitet og reaktivitet

10.1 Reaktivitet

se afsnit 10.3 Risiko for farlige reaktioner

10.2 Kemisk stabilitet

Stabil under normale forhold.
vandsugende

10.3 Risiko for farlige reaktioner

Farlige reaktioner	:	Reagerer med alkali (lud). Reagerer med oxidationsmidler. Stabil

10.4 Forhold, der skal undgås

Forhold, der skal undgås	:	Ingen kendte.

10.5 Materialer, der skal undgås

Materialer, der skal undgås	:	Ikke kendt

10.6 Farlige nedbrydningsprodukter

Hvis håndteret og opbevaret korrekt, er der ingen kundskab om farlige nedbrydnings produkter.

PUNKT 11: Toksikologiske oplysninger

11.1 Oplysninger om toksikologiske virkninger

Akut toksicitet

Produkt:

Akut oral toksicitet	:	Estimat for akut toksicitet: 519,54 mg/kg Metode: Beregningsmetode
Akut toksicitet ved indånding	:	LC50 (Rotte, han og hun): > 2,5 mg/l Ekspositionsvarighed: 6 h Test atmosfære: støv/tåge Bemærkninger: Informationen refererer til hovedkomponenten.
Akut dermal toksicitet	:	LD50 (Mus, han og hun): > 3.500 mg/kg Bemærkninger: Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Akut oral toksicitet	:	LD50 (Rotte, han og hun): 22.000 mg/kg Metode: Andet GLP: nej
Akut toksicitet ved indånding	:	LC50 (Rotte, han og hun): > 2,5 mg/l Ekspositionsvarighed: 6 h Test atmosfære: støv/tåge Metode: Andet GLP: ja
Akut dermal toksicitet	:	LD50 (Mus, han og hun): > 3.500 mg/kg Metode: Andet GLP: ja

Hudætsning/-irritation

Produkt:

Arter	:	Kanin
Resultat	:	Ingen hudirritation
Bemærkninger	:	Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Arter	:	Kanin
Ekspositionsvarighed	:	20 h
Metode	:	Andet
Resultat	:	Ingen hudirritation
GLP	:	nej

Alvorlig øjenskade/øjenirritation

Produkt:

Bemærkninger	:	ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Arter	:	Kanin
Ekspositionsvarighed	:	24 h
Metode	:	Andet
Resultat	:	Ingen øjenirritation
GLP	:	nej

Respiratorisk sensibilisering eller hudsensibilisering

Produkt:

Testtype	:	Guinea pig maximization test
Arter	:	Marsvin

Metode	:	Magnusson/Kligman
Resultat	:	Ikke sensibiliserende
Bemærkninger	:	Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Testtype	:	Maksimeringstest
Eksponeringsvej	:	Hud
Arter	:	Marsvin
Metode	:	OECD test guideline 406
Resultat	:	Ikke en hudsensibilisator.
GLP	:	ja

Vurdering	:	Farlig ved indtagelse.

Kimcellemutagenicitet

Produkt:

Kimcellemutagenicitet-Vurdering	:	Baseret på bedømmelsen af forskellige afprøvninger bedømmes produktet som værende ikke mutagent. Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Genotoksicitet in vitro	:	Testtype: Ames test Testsystem: Salmonella typhimurium Koncentration: 33 - 5000 µg/plate Metabolisk aktivering: med eller uden metabolisk aktivitet Metode: OECD test guideline 471 Resultat: negativ GLP: ja Testtype: Ames test Testsystem: Escherichia coli Koncentration: 33 - 5000 µg/plate Metabolisk aktivering: med eller uden metabolisk aktivitet Metode: OECD test guideline 471 Resultat: negativ GLP: ja Testtype: Kromosom forkokortelses test in vitro Testsystem: ovarieceller fra kinesisk hamster Metabolisk aktivering: med eller uden metabolisk aktivitet Metode: Andet Resultat: negativ GLP: ja Testtype: In vitro-test for genmutation i pattedyrceller Testsystem: lymfomaceller fra mus

Metabolisk aktivering: med eller uden metabolisk aktivitet
Metode: OECD test guideline 476
Resultat: negativ
GLP: ja

Genotoksicitet in vivo : Testtype: Dominant lethal assay
Arter: Rotte (han og hun)
Stamme: Fischer F344
Anvendelsesrute: oral (foder)
Ekspositionsvarighed: 3 generation
Dose: 40 - 200 - 1000 mg/kg
Metode: Andet
Resultat: negativ
GLP: nej

Kimcellemutagenicitet-Vurdering : Baseret på bedømmelsen af forskellige afprøvninger bedømmes produktet som værende ikke mutagent.

Kræftfremkaldende egenskaber

Produkt:

Kræftfremkaldende egenskaber - Vurdering : Ingen beviser for kræftfremkaldende effekt i dyreforsøg.

Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Arter : Mus, han og hun
Anvendelsesrute : oral (foder)
Ekspositionsvarighed : 2 a
Dose : 6250-12500-25000-50000 ppm
Gruppe : ja
Behandlingens hyppighed : daily
NOAEL : 1.500 mg/kg legemsvægt/dag
Metode : Andet
GLP : ja

Kræftfremkaldende egenskaber - Vurdering : Ikke klassificerbart som et humant kræftfremkaldende stof.

Reproduktionstoksicitet

Produkt:

Reproduktionstoksicitet - Vurdering : Dyreeksperimentalt blev der ikke observeret henvisninger til reproduktionstoksisk effekt.

Reproduktionstoksicitet: ingen forvented.

Informationen refererer til hovedkomponenten.

Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Virkninger på fertilitet	:	Testtype: Undersøgelse over tre generationer Arter: Rotte, han og hun Stamme: Fischer F344 Anvendelsesrute: oral (foder) Dose: 40 - 200 - 1000 Generel toksicitet forældre: NOAEL: > 1.000 mg/kg legemsvægt Generel toksicitet F1: NOAEL: > 1.000 mg/kg legemsvægt Generel toksicitet F2: NOAEL: > 1.000 mg/kg legemsvægt Metode: Andet GLP: nej
Virkning på fosterudvikling	:	Testtype: forsøg med forplantings- og udviklingstoksicitet Arter: Rotte, hun Stamme: Sprague-Dawley Anvendelsesrute: oral (gavage) Dose: 150 - 500 - 1000 - 2500 mg/kg Varighed af hver enkelt behandling: 9 d Generel toksicitet hos mødre: NOEL: 1.500 mg/kg legemsvægt Fosterbeskadigelse: NOEL: 150 mg/kg legemsvægt Metode: Andet GLP: ja
Reproduktionstoksicitet - Vurdering	:	Reproduktionstoksicitet: ingen forvented. Ingen teratogene effekter forventes.

Enkel STOT-eksponering

Produkt:

Bemærkninger	:	ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Vurdering	:	Stoffet eller blandingen er ikke klassificeret som et specifikt målorgan toksisk stof, enkelt eksponering.

Gentagne STOT-eksponeringer

Produkt:

Bemærkninger	:	ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Målorganer	:	Nyre
Vurdering	:	Kan forårsage organskader ved længerevarende eller

gentagen eksponering.

Toksicitet ved gentagen dosering

Produkt:

Arter	:	Rotte, han og hun
NOAEL	:	200 mg/kg
Anvendelsesrute	:	oral (gavage)
Metode	:	OECD test guideline 407
Bemærkninger	:	Informationen refererer til hovedkomponenten.

Arter	:	Rotte, han
NOAEL	:	150 mg/kg
Anvendelsesrute	:	oral (foder)
Metode	:	OECD test guideline 408
Bemærkninger	:	Informationen refererer til hovedkomponenten.

Arter	:	Hund, han
NOAEL	:	2,22 mg/kg
Anvendelsesrute	:	Hud
Metode	:	OECD test guideline 410
Bemærkninger	:	Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Arter	:	Rotte, han
NOAEL	:	150 mg/kg legemsvægt/dag
Anvendelsesrute	:	oral (foder)
Ekspositionsvarighed	:	16 w
Antal ekspositioner	:	daily
Dose	:	50 - 150 - 500 - 1000 mg/kg
Gruppe	:	ja
Metode	:	OECD test guideline 408
GLP	:	Ingen information tilgængelig.

Arter	:	Hund, han
NOAEL	:	2.200 - 4.400 mg/kg legemsvægt/dag
Anvendelsesrute	:	Hud
Ekspositionsvarighed	:	4 w
Antal ekspositioner	:	daily
Dose	:	2 - 4 mL/kg bw
Gruppe	:	ja
Metode	:	OECD test guideline 410
GLP	:	ja

Aspiration giftighed

Produkt:

ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Ingen aspirationsgiftighedsklassifikation

Yderligere oplysninger

Produkt:

Bemærkninger	:	Nyreskade kan forekomme.
Bemærkninger	:	Forgiftninger påvirker det centrale nervesystem.
Bemærkninger	:	Klassificeringen er foretaget efter beregningsmetoden i CLP forordning 1272/2008/EF.

PUNKT 12: Miljøoplysninger

12.1 Toksicitet

Produkt:

Toksicitet overfor fisk	:	LC0 (Leuciscus idus (Guldemde)): 1.000 mg/l LL50 (Danio rerio (zebra fisk)): > 100 mg/l Ekspositionsvarighed: 96 h Testtype: Statisk test Metode: OECD test guideline 203 GLP: ja Bemærkninger: Analog til et produkt af lignende sammensætning.
Toksicitet for dafnier og andre hvirvelløse vanddyr	:	EC50 (Daphnia magna (Stor dafnie)): > 100 mg/l Ekspositionsvarighed: 48 h Metode: OECD TG 202 Bemærkninger: Informationen refererer til hovedkomponenten.
Toksicitet overfor alger	:	EC50 (Selenastrum capricornutum (grøn alge)): 6.500 - 13.000 mg/l Ekspositionsvarighed: 96 h Bemærkninger: Informationen refererer til hovedkomponenten.
Giftighed overfor mikroorganismer	:	EC20 (aktivt slam): > 1.995 mg/l Ekspositionsvarighed: 30 min Metode: ISO 8192 Bemærkninger: Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Toksicitet overfor fisk	:	LC50 (Pimephales promelas (Tykhovedet elritse)): 72.860 mg/l

Ekspositionsvarighed: 96 h
Testtype: Statisk test
Analytisk overvågning: ja
Metode: EPA
GLP: nej
Bemærkninger: Angivelsen af den toksiske virkning referer til normalkoncentrationen.

Toksicitet for dafnier og andre hvirvelløse vanddyr : EC50 (Daphnia magna (Stor dafnie)): > 100 mg/l
Ekspositionsvarighed: 48 h
Testtype: Statisk test
Analytisk overvågning: ja
Metode: OECD TG 202
GLP: ja

Toksicitet overfor alger : EC50 (Pseudokirchneriella subcapitata (grønalger)): 6.500 - 13.000 mg/l
Slutpunkt: Vækstrate
Ekspositionsvarighed: 7 d
Testtype: Statisk test
Analytisk overvågning: ingen data tilgængelige
Metode: EPA
GLP: Ingen information tilgængelig.

Giftighed overfor mikroorganismer : EC20 (aktiveret slam, husholdnings): > 1.995 mg/l
Slutpunkt: Bakterietoksicitet (Åndedrætsbesvær)
Ekspositionsvarighed: 0,5 h
Analytisk overvågning: nej
Metode: ISO 8192
GLP: nej

Toksicitet overfor fisk (Kronisk toksicitet) : Kronisk toksicitetsværdi: 2.629 mg/l
Slutpunkt: Andet
Ekspositionsvarighed: 30 d
Arter: Fisk
Metode: Andet
GLP: nej
Bemærkninger: Værdien er angivet baseret på en SAR/AAR fremgangsmåde vha. OECD Toolbox, DEREK, VEGA QSAR modeller (CAESAR modeller), etc.

Toksicitet for dafnier og andre hvirvelløse vanddyr (Kronisk toksicitet) : NOEC: 8.590 mg/l
Slutpunkt: Formeringshastighed
Ekspositionsvarighed: 7 d
Arter: Ceriodaphnia spec.
Testtype: Semi-statisk test
Analytisk overvågning: ja
Metode: Andet
GLP: Ingen information tilgængelig.
Bemærkninger: Angivelsen af den toksiske virkning referer til normalkoncentrationen.

12.2 Persistens og nedbrydelighed

Produkt:

Biologisk nedbrydelighed : Bionedbrydning: 90 - 100 %
Ekspositionsvarighed: 10 d
Metode: OECD TG 301 A
Bemærkninger: I henhold til hensigtsmæssig OECD test let biologisk nedbrydelig.
Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Biologisk nedbrydelighed : Testtype: aerob
Inoculum: aktivt slam
Koncentration: 53 mg/l
Resultat: Let bionedbrydeligt.
Bionedbrydning: 90 - 100 %
Beslægtet med: Oploest organisk kulstof (DOC)
Ekspositionsvarighed: 10 d
Metode: OECD TG 301 A
GLP: ja

12.3 Bioakkumuleringspotentiale

Produkt:

Bioakkumulering : Bemærkninger: ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Bioakkumulering : Bemærkninger: Der forventes ingen bioaccumulering da logPow er lavt.

Fordelingskoefficient: n-oktanol/vand : log Pow: -1,36
Metode: skønsmæssig
GLP: nej

12.4 Mobilitet i jord

Produkt:

Spredning til forskellige miljøer : Bemærkninger: ingen data tilgængelige

Komponenter:

1,2-Ethandiol:

Spredning til forskellige miljøer : Adsorption/jord
Medium: vand - jord
log Koc: 0
Metode: andet (beregnet)

12.5 Resultater af PBT- og vPvB-vurdering

Produkt:

Vurdering	:	Stoffet opfylder hverken PBT- eller vPvB-kriterierne.EC og er hverken et .. Bemærkninger: Informationen refererer til hovedkomponenten.

Komponenter:

1,2-Ethandiol:

Vurdering	:	Dette stof anses ikke for at være persistent, bioakkumulerbart og toksiske (PBT)..

12.6 Andre negative virkninger

Produkt:

Yderligere økologisk information	:	Ved korrekt brug sker der ingen skade på rensningsanlægget. Klassificeringen er foretaget efter beregningsmetoden i CLP forordning 1272/2008/EF.

Komponenter:

1,2-Ethandiol:

Skæbne og veje i miljøet	:	Ikke tilgængeligt.
Yderligere økologisk information	:	Må ikke komme i grundvand/overfladevand/kloakanlæg.

PUNKT 13: Bortskaffelse

13.1 Metoder til affaldsbehandling

Produkt	:	Bortskaffes under overholdelse af gældende bestemmelser.
Forurenet emballage	:	Ikke forurenede emballager kan genanvendes. Emballager, der ikke kan renses, betragtes som affald og bortskaffes som indholdet.

PUNKT 14: Transportoplysninger

Punkt 14.1. til 14.5.

ADR	Ikke farligt gods
ADN	Ikke farligt gods
RID	Ikke farligt gods
IATA	Ikke farligt gods
IMDG	Ikke farligt gods

14.6.Særlige forsigtighedsregler

Se dette sikkerhedsdatablad punkt 6 til 8.

14.7. Bulktransport i henhold til bilag II i MARPOL 73/78 og i henhold til IBC-kode (International Bulk Chemicals Code)

Ingen bulktransport i henhold til IBC-koden.

PUNKT 15: Oplysninger om regulering

15.1 Særlige bestemmelser/særlig lovgivning for stoffet eller blandingen med hensyn til sikkerhed, sundhed og miljø

Flygtige organiske forbindelser : Direktiv 1999/13/EF omkring begrænsning af emissioner af flygtige organiske forbindelser
Ifølge recepten indeholder produktet ingen VOC-dele således som det beskrives i direktiv1999/13/EF.

Direktiv 2004/42/EF
Ifølge recepten indeholder produktet ingen VOC-dele således som det beskrives i direktiv 2004/42/EF

Andre regulativer:

Foruden de i dette afsnit nævnte oplysninger/foreskrifter findes der ingen yderligere information tilgængelig om sikkerheds-, sundheds- eller miljøbeskyttelse.

15.2 Kemikaliesikkerhedsvurdering

For et eller flere af stofferne i dette produkt findes en kemikaliesikkerhedsvurdering (SCA) tilgængelig.

PUNKT 16: Andre oplysninger

Fuld tekst af H-sætninger

H302	:	Farlig ved indtagelse.
H373	:	Kan forårsage organskader ved længerevarende eller gentagen eksponering ved indtagelse.

Fuld tekst af andre forkortelser

Acute Tox.	:	Akut toksicitet
STOT RE	:	Specifik målorgantoksicitet - gentagen eksponering
2000/39/EC	:	Kommissionens direktiv 2000/39/EF om etablering af den første liste over vejledende grænseværdier for erhvervsmæssig eksponering
DK OEL	:	Grænseværdier for stoffer og materialer
2000/39/EC / TWA	:	Grænseværdier - otte timer
2000/39/EC / STEL	:	Korttidsgrænseværdi
DK OEL / GV	:	Gennemsnitværdier

ADN - Europæisk konvention om international transport af farligt gods ad indre vandveje; ADR - Europæisk konvention om international transport af farligt gods ad vej; AICS - Australiens fortegnelse over kemiske stoffer; ASTM - Det amerikanske forbund for testning af materialer, ASTM; bw - Kropsvægt; CLP - CLP-forordningen om klassificering, mærkning og emballering; Forordning (EF) Nr. 1272/2008; CMR - Kræftfremkaldende, mutagent eller reproduktionstoksisk

stof; DIN - Standard fra det tyske standardiseringsinstitut; DSL - Liste over indenlandske stoffer (Canada); ECHA - Det europæiske kemikalieagentur; EC-Number - EU-nummer; ECx - Koncentration forbundet med x % respons; ELx - Belastningsgrad forbundet med x % respons; EmS - Nødplan; ENCS - Eksisterende og nye kemiske stoffer (Japan); ErCx - Koncentration forbundet med x % vækstrate respons; GHS - Det globale harmoniserede system; GLP - God laboratoriepraksis; IARC - Det Internationale Agentur for Kræftforskning; IATA - Den Internationale Luftfartssammenslutning, IATA; IBC - Den internationale kode for konstruktion og udrustning af skibe, som fører farlige kemikalier i bulk; IC50 - Halv maksimal inhiberende koncentration; ICAO - Organisationen for International Civil Luftfart, ICAO; IECSC - Fortegnelse over eksisterende kemikalier i Kina; IMDG - Det internationale regelsæt for søtransport af farligt gods; IMO - Den Internationale Søfartsorganisation; ISHL - Lov om industriel sikkerhed og sundhed (Japan); ISO - International standardiseringsorganisation; KECI - Koreas fortegnelse over eksisterende kemikalier; LC50 - Dødelig koncentration for 50 % af en testpopulation; LD50 - Dødelig dosis for 50 % af en testpopulation (gennemsnitlig dødelig dosis); MARPOL - Den internationale konvention om forebyggelse af forurening fra skibe; n.o.s. - Andet ikke angivet; NO(A)EC - Koncentration for ingen observeret (negativ) virkning; NO(A)EL - Niveau for ingen observeret (negativ) virkning; NOELR - Belastningsgrad for ingen observeret virkning; NZIoC - New Zealands fortegnelse over kemikalier; OECD - Organisationen for Økonomisk Samarbejde og Udvikling; OPPTS - Afdelingen for kemisk sikkerhed og forebyggelse af forurening; PBT - Persistent, bioakkumulativt og giftigt stof; PICCS - Fillippinernes fortegnelse over kemikalier og kemiske stoffer; (Q)SAR - (Kvantitativt) forhold mellem struktur og aktivitet; REACH - Europa-parlamentets og Rådets forordning (EF) nr. 1272/2008 om registrering, vurdering og godkendelse af samt begrænsninger for kemikalier; RID - Reglement for international befordring af farligt gods med jernbane; SADT - Selvaccelererende dekompositionstemperatur; SDS - Sikkerhedsdatablad; SVHC - særligt problematisk stof; SVHC - særligt problematisk stof; TCSI - Taiwans fortegnelse over kemiske stoffer; TRGS - Teknisk forskrift for farlige stoffer; TSCA - Lov om kontrol af giftige stoffer (USA); UN - Forenede Nationer; vPvB - Meget persistent og meget bioakkumulativ

Yderligere oplysninger

Andre oplysninger : De gældende nationale og lokale forskrifter skal overholdes.

Klassifikation af præparatet:		**Klassifikationsprocedure:**
Acute Tox. 4	H302	Beregningsmetode
STOT RE 2	H373	Beregningsmetode

Denne information videregiver vor nuværende viden og udgør en generel beskrivelse af vore produkter og mulige anvendelser. Clariant påtager sig intet ansvar for at oplysningerne er fuldstændige, korrekte, tilstrækkelige eller fejlfrie, og heller intet ansvar for hvordan informationen anvendes. I hvert enkelt tilfælde har brugeren af produktet ansvar for at vurdere et Clariant-produkts egnethed til formålet. Såvidt der ikke skriftligt er aftalt andet, ophæver eller ændrer intet i denne information det som angives i Clariants generelle salgsbetingelser (Clariant's General Terms and Conditions of Sale), Forpligtelser overfor tredie part skal iaggtages. Clariant forbeholder sig ret til at ændre informationen med henblik på nye legale krav og ændret viden om produktet. Sikkerhedsdatablad med information om sikkerhedsforanstaltninger og råd om sikker håndtering og lagring af Clariants produkter udleveres på anmodning, og sendes i overensstemmelse med gældene legale krav sammen med leverancer. For yderligere information, kontakt venligst Clariant.

Exposure scenario

Number	Title
ES 1	**Industrial use; Use as an intermediate** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15 - ERC6a Ethane-1,2-diol
ES 2	**Industrial use; Use of non-reactive processing aid at industrial site (no inclusion into or onto article)** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC15 - ERC4 Ethane-1,2-diol
ES 3	**Industrial use; Distribution of substance** PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15 - ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7 Ethane-1,2-diol
ES 4	**Industrial use; Formulation [mixing] of preparations and/or re-packaging** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15 - ERC2 Ethane-1,2-diol
ES 5	**Industrial use; Use in polymer production** PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC15 - ERC6c Ethane-1,2-diol
ES 6	**Industrial use; Coatings and paints, thinners, paint removers** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC10, PROC13, PROC15 - ERC4 Ethane-1,2-diol
ES 7	**Professional use; Coatings and paints, thinners, paint removers, Adhesives, sealants, Foaming, Use in polymer processing** PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19 - ERC8a, ERC8c, ERC8d, ERC8f Ethane-1,2-diol
ES 8	**Consumer use; Coatings and paints, thinners, paint removers, Surface treatment** PC9a, PC15, PC18, PC31, PC24, PC34 - ERC8a, ERC8c, ERC8d, ERC8f Ethane-1,2-diol
ES 9	**Industrial use; Use in cleaning agents** PROC1, PROC2, PROC3, PROC4, PROC7, PROC8a, PROC8b, PROC10, PROC13 - ERC4 Ethane-1,2-diol
ES 10	**Professional use; Use in cleaning agents**

	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC10, PROC11, PROC13 - ERC8a, ERC8d Ethane-1,2-diol
ES 11	**Consumer use; Use in cleaning agents** PC35 - ERC8a, ERC8d Ethane-1,2-diol
ES 12	**Industrial use; Use in lubricants** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17, PROC18 - ERC4, ERC7 Ethane-1,2-diol
ES 13	**Industrial use; Metal working fluids** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC17 - ERC4 Ethane-1,2-diol
ES 14	**Professional use; Metal working fluids** PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC17 - ERC8a, ERC8d Ethane-1,2-diol
ES 15	**Professional use; Use in agrochemicals** PROC1, PROC2, PROC4, PROC8a, PROC8b, PROC9, PROC11, PROC13 - ERC8a, ERC8d Ethane-1,2-diol
ES 16	**Industrial use; Use in functional fluids** PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9 - ERC7 Ethane-1,2-diol
ES 17	**Professional use; Use in functional fluids** PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9, PROC20 - ERC9a, ERC9b Ethane-1,2-diol
ES 18	**Consumer use; Heat transfer fluids, Hydraulic fluids** PC16, PC17 - ERC9a, ERC9b Ethane-1,2-diol
ES 19	**Professional use; Anti-freeze and de-icing products** PROC1, PROC2, PROC8a, PROC8b, PROC11 - ERC8d Ethane-1,2-diol
ES 20	**Consumer use; Anti-freeze and de-icing products** PC4 - ERC8d Ethane-1,2-diol
ES 21	**Industrial use, Professional use; Use in laboratories** PROC15 - ERC8a Ethane-1,2-diol
ES 22	**Industrial use; Use in water treatment agents**

	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC13 - ERC3, ERC4 Ethane-1,2-diol
ES 23	**Consumer use; Adhesives, sealants** PC1 - ERC8c, ERC8f Ethane-1,2-diol
ES 24	**Industrial use; Manufacture of substance, Adhesives, sealants, Foaming, Use in coatings, Use in polymer production** PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15 - ERC2, ERC3, ERC5, ERC6c Ethane-1,2-diol
ES 25	**Consumer use; Insulation foams** PC32 - ERC8c, ERC8f Ethane-1,2-diol

1. ES 1: Industrial use; Use as an intermediate

1.1. Title section

Environment		
CS1:	Industrial use (Use of intermediate)	ERC6a
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Use as laboratory reagent)	PROC15

1.2. ES 1 Conditions of use affecting exposure

1.2.1 ES 1 - CS 1: Control of environmental exposure: Industrial use (Use of intermediate) (ERC6a)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

1.2.2 ES 1 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

1.2.3 ES 1 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

1.2.4 ES 1 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Note : Chemical production where opportunity for exposure arises
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

1.2.5 ES 1 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

1.2.6 ES 1 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.

Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 90 %
Personal protective measures : If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

1.2.7 ES 1 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

1.2.8 ES 1 - CS 8: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics
Concentration of the Substance in : <= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

1.3. ES 1 Exposure estimation and reference to its source

1.3.2 ES 1 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

1.3.3 ES 1 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

1.3.4 ES 1 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

1.3.5 ES 1 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

1.3.6 ES 1 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture

(charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

1.3.7 ES 1 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

1.3.8 ES 1 - CS 8: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

1.4. ES 1 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

2. ES 2: Industrial use; Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

2.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS9:	Industrial use (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS10:	Industrial use (Use as laboratory reagent)	PROC15

2.2. ES 2 Conditions of use affecting exposure

2.2.1 ES 2 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.2.2 ES 2 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent

containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.3 ES 2 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.4 ES 2 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.5 ES 2 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.6 ES 2 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.7 ES 2 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

2.2.8 ES 2 - CS 8: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

2.2.9 ES 2 - CS 9: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

2.2.10 ES 2 - CS 10: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics
Concentration of the Substance in : <= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

2.3. ES 2 Exposure estimation and reference to its source

2.3.2 ES 2 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

2.3.3 ES 2 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

2.3.4 ES 2 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

2.3.5 ES 2 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

2.3.6 ES 2 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture

(charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

2.3.7 ES 2 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

2.3.8 ES 2 - CS 8: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

2.3.9 ES 2 - CS 9: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

2.3.10 ES 2 - CS 10: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

2.4. ES 2 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

3. ES 3: Industrial use; Distribution of substance

3.1. Title section

Environment		
CS1:	Industrial use (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article), Use of functional fluid at industrial site)	ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with	PROC2

	equivalent containment conditions)	
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS7:	Industrial use (Use as laboratory reagent)	PROC15

3.2. ES 3 Conditions of use affecting exposure

3.2.1 ES 3 - CS 1: Control of environmental exposure: Industrial use (Manufacture of the substance, Formulation into mixture, Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use at industrial site leading to inclusion into/onto article, Use of intermediate, Use of reactive processing aid at industrial site (no inclusion into or onto article), Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article), Use of reactive process regulators in polymerisation processes at industrial site (inclusion or not into/onto article), Use of functional fluid at industrial site) (ERC1, ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b, ERC6c, ERC6d, ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

3.2.2 ES 3 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

3.2.3 ES 3 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

3.2.4 ES 3 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

3.2.5 ES 3 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

3.2.6 ES 3 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

3.2.7 ES 3 - CS 7: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

3.3. ES 3 Exposure estimation and reference to its source

3.3.2 ES 3 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

3.3.3 ES 3 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term -	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01

systemic		
combined routes	ECETOC TRA worker v2.0	0,08

3.3.4 ES 3 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

3.3.5 ES 3 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

3.3.6 ES 3 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

3.3.7 ES 3 - CS 7: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

3.4. ES 3 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

4. ES 4: Industrial use; Formulation [mixing] of preparations and/or re-packaging

4.1. Title section

Environment	
CS1: Industrial use (Formulation into mixture)	ERC2
Workers	

CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS8:	Industrial use (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS9:	Industrial use (Use as laboratory reagent)	PROC15

4.2. ES 4 Conditions of use affecting exposure

4.2.1 ES 4 - CS 1: Control of environmental exposure: Industrial use (Formulation into mixture) (ERC2)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

4.2.2 ES 4 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.2.3 ES 4 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.2.4 ES 4 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.2.5 ES 4 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.2.6 ES 4 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.2.7 ES 4 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

4.2.8 ES 4 - CS 8: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

4.2.9 ES 4 - CS 9: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Use as laboratory reagent No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

4.3. ES 4 Exposure estimation and reference to its source

4.3.2 ES 4 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

4.3.3 ES 4 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

4.3.4 ES 4 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

4.3.5 ES 4 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

4.3.6 ES 4 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

4.3.7 ES 4 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

4.3.8 ES 4 - CS 8: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

4.3.9 ES 4 - CS 9: Worker exposure: Industrial use (Use as laboratory reagent)

(PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

4.4. ES 4 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

5. ES 5: Industrial use; Use in polymer production

5.1. Title section

Environment		
CS1:	Industrial use (Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article))	ERC6c
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Calendering operations)	PROC6
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Use as laboratory reagent)	PROC15

5.2. ES 5 Conditions of use affecting exposure

5.2.1 ES 5 - CS 1: Control of environmental exposure: Industrial use (Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)) (ERC6c)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

5.2.2 ES 5 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.3 ES 5 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.4 ES 5 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.5 ES 5 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.6 ES 5 - CS 6: Control of worker exposure: Industrial use (Calendering operations) (PROC6)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.7 ES 5 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.8 ES 5 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

5.2.9 ES 5 - CS 9: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Storage	:	< 1 kg, < 1 l

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

5.3. ES 5 Exposure estimation and reference to its source

5.3.2 ES 5 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

5.3.3 ES 5 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

5.3.4 ES 5 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or	0,22

- local and systemic	formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

5.3.5 ES 5 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

5.3.6 ES 5 - CS 6: Worker exposure: Industrial use (Calendering operations) (PROC6)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

5.3.7 ES 5 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07

Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

5.3.8 ES 5 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

5.3.9 ES 5 - CS 9: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

5.4. ES 5 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

6. ES 6: Industrial use; Coatings and paints, thinners, paint

removers

6.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Use as laboratory reagent)	PROC15

6.2. ES 6 Conditions of use affecting exposure

6.2.1 ES 6 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

6.2.2 ES 6 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.3 ES 6 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.4 ES 6 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.5 ES 6 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.6 ES 6 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.7 ES 6 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation

Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.8 ES 6 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Transfer of substance or mixture (charging/discharging) at dedicated facilities No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

6.2.9 ES 6 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

6.2.10 ES 6 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

6.2.11 ES 6 - CS 11: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm^2

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

6.3. ES 6 Exposure estimation and reference to its source

6.3.2 ES 6 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m^3 (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

6.3.3 ES 6 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

6.3.4 ES 6 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

6.3.5 ES 6 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

6.3.6 ES 6 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

6.3.7 ES 6 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

6.3.8 ES 6 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

6.3.9 ES 6 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

6.3.10 ES 6 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

6.3.11 ES 6 - CS 11: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

6.4. ES 6 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

7. ES 7: Professional use; Coatings and paints, thinners, paint removers, Adhesives, sealants, Foaming, Use in polymer processing

7.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8a, ERC8c, ERC8d, ERC8f
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3

CS3:	Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes)	PROC4, PROC5
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation)	PROC13, PROC14
CS9:	Professional use (Use as laboratory reagent)	PROC15
CS10:	Professional use (Manual activities involving hand contact)	PROC19

7.2. ES 7 Conditions of use affecting exposure

7.2.1 ES 7 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

7.2.2 ES 7 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition With occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

7.2.3 ES 7 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes) (PROC4, PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

7.2.4 ES 7 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

7.2.5 ES 7 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

7.2.6 ES 7 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure) : 90 %

Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %

Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

7.2.7 ES 7 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

7.2.8 ES 7 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation) (PROC13, PROC14)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Note	:	Treatment of articles by dipping and pouring

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

7.2.9 ES 7 - CS 9: Control of worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used

Storage : < 1 kg, < 1 l

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

7.2.10 ES 7 - CS 10: Control of worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to : 1980 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

7.3. ES 7 Exposure estimation and reference to its source

7.3.2 ES 7 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or	0,22

- local and systemic	formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

7.3.3 ES 7 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises, Mixing or blending in batch processes) (PROC4, PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,01
combined routes	ECETOC TRA worker v2.0, Mixing or blending in batch processes	0,75

7.3.4 ES 7 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

7.3.5 ES 7 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

7.3.6 ES 7 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

7.3.7 ES 7 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

7.3.8 ES 7 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring, Tabletting, compression, extrusion, pelettisation, granulation) (PROC13, PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,01
combined routes	ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring	0,75
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation)	0,74
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation)	0,03
combined routes	ECETOC TRA worker v2.0, Tabletting, compression, extrusion, pelettisation, granulation	0,77

7.3.9 ES 7 - CS 9: Worker exposure: Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

7.3.10 ES 7 - CS 10: Worker exposure: Professional use (Manual activities involving hand contact) (PROC19)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	6,47 mg/m³ (ECETOC TRA worker v2.0)	0,18
Worker - dermal, long-term - systemic	14,14 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,31

7.4. ES 7 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

8. ES 8: Consumer use; Coatings and paints, thinners, paint removers, Surface treatment

8.1. Title section

Coatings and paints, thinners, paint removers (PC9a) Non-metal surface treatment products (PC15) Ink and toners (PC18) Polishes and wax blends (PC31) Lubricants, greases, release products (PC24) Textile dyes and impregnating products (PC34)		
Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8a, ERC8c, ERC8d, ERC8f
Consumer		
CS2:	Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products)	PC9a, PC15
CS3:	Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products)	PC9a, PC15
CS4:	Consumer use (Ink and toners)	PC18
CS5:	Consumer use (Ink and toners)	PC18
CS6:	Consumer use (Polishes and wax blends)	PC31

8.2. ES 8 Conditions of use affecting exposure

8.2.1 ES 8 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use leading to inclusion into/onto article (indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8a, ERC8c, ERC8d, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

8.2.2 ES 8 - CS 2: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Remarks : Waterborne paint
Rolling, Brushing
No spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Molecular weight	:	45 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	1,25 kg/day

Frequency and duration of use

Application duration	:	120 min
Frequency of use	:	1 days per year
Exposure duration	:	132 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²
dermal	:	0,00003 kg/min

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	20 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,6
Mass transfer rate	:	0,331 m/min
Release area	:	10 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.3 ES 8 - CS 3: Control of consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Remarks	:	Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0198 kg/min

Frequency and duration of use

Application duration	:	15 min
Frequency of use	:	2 days per year
Exposure duration	:	15 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²
dermal	:	0,0001 kg/min
Uptake fraction, oral	:	100 %

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	34 m3
Temperature	:	25 °C
Ventilation rate per hour	:	1,5
Room height	:	2,25 m
Weight percent	:	30 %
Remarks	:	Non-Volatile
Density	:	1,5 g/cm3
Remarks	:	Non-Volatile
Airborne fraction	:	100 %
Remarks	:	Non-Volatile
Inhalation cut-off diameter	:	0,015 mm

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

8.2.4 ES 8 - CS 4: Control of consumer exposure: Consumer use (Ink and toners) (PC18)

Remarks	:	Refilling

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amount per use	:	0,05 kg

Frequency and duration of use

Application duration	:	0,3 min
Frequency of use	:	104 days per year
Exposure duration	:	0,75 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	0,331 m/min
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.5 ES 8 - CS 5: Control of consumer exposure: Consumer use (Ink and toners) (PC18)

Remarks	:	Printing process

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

	:	0,016 kg/day

Frequency and duration of use

Exposure duration	:	600 min
Frequency of use	:	365 days per year

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	25 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,6

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.2.6 ES 8 - CS 6: Control of consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Remarks	:	No spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	272 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

: 0,55 kg/day

Frequency and duration of use

Application duration	:	900 min
Frequency of use	:	1 days per year
Release duration	:	120 min
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	430 cm²
dermal	:	0,00003 kg/min

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	4740 m/min
Release area	:	22 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

8.3. ES 8 Exposure estimation and reference to its source

8.3.2 ES 8 - CS 2: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,72 mg/m³ (Consexpo v4.1)	0,10
Chronic dermal systemic exposure	2,77 mg/kg bw/day (Consexpo v4.1)	0,05
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,15

8.3.3 ES 8 - CS 3: Consumer exposure: Consumer use (Coatings and paints, thinners, paint removers, Non-metal surface treatment products) (PC9a, PC15)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,26 mg/m³ (Consexpo v4.1)	0,04
Chronic dermal systemic exposure	1,15 mg/kg bw/day (Consexpo v4.1)	0,02
Consumer - oral, long-term - systemic	0,13 mg/kg bw/day (Consexpo v4.1, Risk management measures are based on qualitative risk characterisation.)	
combined routes	Consexpo v4.1	0,06

8.3.4 ES 8 - CS 4: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
Chronic dermal systemic exposure	0,008 mg/kg bw/day (Consexpo v4.1)	0,0002

8.3.5 ES 8 - CS 5: Consumer exposure: Consumer use (Ink and toners) (PC18)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	1,29 mg/m³ (Consexpo v4.1)	0,18

8.3.6 ES 8 - CS 6: Consumer exposure: Consumer use (Polishes and wax blends) (PC31)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	3,93 mg/m³ (Consexpo v4.1)	0,56
Chronic dermal systemic exposure	2,12 mg/kg bw/day (Consexpo v4.1)	0,04
combined routes	Consexpo v4.1	0,60

8.4. ES 8 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

9. ES 9: Industrial use; Use in cleaning agents

9.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Industrial spraying)	PROC7
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS8:	Industrial use (Roller application or brushing)	PROC10
CS9:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

9.2. ES 9 Conditions of use affecting exposure

9.2.1 ES 9 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

Concentration of the Substance in Mixture/Article : <= 100 %

9.2.2 ES 9 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Technical conditions and measures : Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

9.2.3 ES 9 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

9.2.4 ES 9 - CS 4: Control of worker exposure: Industrial use (Manufacture or

formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

9.2.5 ES 9 - CS 5: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

9.2.6 ES 9 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

9.2.7 ES 9 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Transfer of substance or mixture (charging/discharging) at dedicated facilities No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

9.2.8 ES 9 - CS 8: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

9.2.9 ES 9 - CS 9: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

9.3. ES 9 Exposure estimation and reference to its source

9.3.2 ES 9 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

9.3.3 ES 9 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

9.3.4 ES 9 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

9.3.5 ES 9 - CS 5: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

9.3.6 ES 9 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

9.3.7 ES 9 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

9.3.8 ES 9 - CS 8: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

9.3.9 ES 9 - CS 9: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

9.4. ES 9 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

10. ES 10: Professional use; Use in cleaning agents

10.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive	ERC8a, ERC8d

	processing aid (no inclusion into or onto article, outdoor))	
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Chemical production where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13

10.2. ES 10 Conditions of use affecting exposure

10.2.1 ES 10 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

10.2.2 ES 10 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition With occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

10.2.3 ES 10 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside

hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

10.2.4 ES 10 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

10.2.5 ES 10 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

10.2.6 ES 10 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Exposure routes : dermal

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

10.2.7 ES 10 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable

Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

10.2.8 ES 10 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with ‘basic’ employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

10.3. ES 10 Exposure estimation and reference to its source

10.3.2 ES 10 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003

combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

10.3.3 ES 10 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

10.3.4 ES 10 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

10.3.5 ES 10 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80

10.3.6 ES 10 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

10.3.7 ES 10 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

10.3.8 ES 10 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring)	0,01
combined routes	ECETOC TRA worker v2.0, Treatment of articles by dipping and pouring	0,75

10.4. ES 10 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

11. ES 11: Consumer use; Use in cleaning agents

11.1. Title section

Washing and cleaning products (PC35)		
Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive	ERC8a, ERC8d

	processing aid (no inclusion into or onto article, outdoor))	
Consumer		
CS2:	Consumer use (Washing and cleaning products)	PC35
CS3:	Consumer use (Washing and cleaning products)	PC35
CS4:	Consumer use (Washing and cleaning products)	PC35
CS5:	Consumer use (Washing and cleaning products)	PC35
CS6:	Consumer use (Washing and cleaning products)	PC35
CS7:	Consumer use (Washing and cleaning products)	PC35

11.2. ES 11 Conditions of use affecting exposure

11.2.1 ES 11 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

11.2.2 ES 11 - CS 2: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks : No spraying
Default database: cleaning and washing/all purpose cleaner/liquid/mixing and loading

Product characteristics

Concentration of the Substance in Mixture/Article : <= 20 %

Molecular weight : 22 g/mol
Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used

Amounts used : 0,5 kg/day

Frequency and duration of use

Application duration : 0,3 min
Frequency of use : 104 days per year
Exposure duration : 0,75 min

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	4740 m/min
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.3 ES 11 - CS 3: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	No spraying Application

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 4 %
Molecular weight	:	18 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,4 kg/day

Frequency and duration of use

Application duration	:	20 min
Frequency of use	:	104 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	4740 m/min
Release area	:	10 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.4 ES 11 - CS 4: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Sprays Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0468 kg/min

Frequency and duration of use

Spray duration	:	0,41 min
Frequency of use	:	365 days per year
Exposure duration	:	60 min
Release duration	:	2,6 s

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²
dermal	:	0,000046 kg/min
Uptake fraction, oral	:	100 %

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	15 m3
Temperature	:	25 °C
Ventilation rate per hour	:	2,5
Room height	:	2,5 m
Weight percent	:	5 %
Remarks	:	Non-Volatile
Density	:	1,8 g/cm3
Remarks	:	Non-Volatile
Airborne fraction	:	20 %
Remarks	:	Non-Volatile
Inhalation cut-off diameter	:	0,015 mm

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

11.2.5 ES 11 - CS 5: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Sprays Cleaning

Product characteristics

Concentration of the Substance in	:	<= 5 %

Mixture/Article

Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0162 kg/day

Frequency and duration of use

Application duration	:	10 min
Frequency of use	:	365 days per year
Exposure duration	:	60 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	15 m3
Temperature	:	25 °C
Ventilation rate per hour	:	2,5
Mass transfer rate	:	4740 m/min
Release area	:	17100 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.6 ES 11 - CS 6: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Floor cleaning (liquids) Mixing operations (open systems) Loading of application equipment

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	22 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,5 kg/day

Frequency and duration of use

Application duration	:	0,3 min
Frequency of use	:	104 days per year
Exposure duration	:	0,75 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Temperature	:	25 °C
Ventilation rate per hour	:	1,0
Mass transfer rate	:	4740 m/min
Release area	:	20 cm²

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

11.2.7 ES 11 - CS 7: Control of consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Remarks	:	Floor cleaning (liquids) Application

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 2,5 %
Molecular weight	:	18 g/mol
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,88 kg/day

Frequency and duration of use

Application duration	:	30 min
Frequency of use	:	104 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	215 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	4740 m/min
Release area	:	22 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

11.3. ES 11 Exposure estimation and reference to its source

11.3.2 ES 11 - CS 2: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,01 mg/m³ (Consexpo v4.1)	0,001
Chronic dermal systemic exposure	0,03 mg/kg bw/day (Consexpo v4.1)	0,0006
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,002

11.3.3 ES 11 - CS 3: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,61 mg/m³ (Consexpo v4.1)	0,09
Chronic dermal systemic exposure	11,70 mg/kg bw/day (Consexpo v4.1)	0,22
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,31

11.3.4 ES 11 - CS 4: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,000011 mg/m³ (Consexpo v4.1)	
Chronic dermal systemic exposure	0,01 mg/kg bw/day (Consexpo v4.1)	0,0002
Consumer - oral, long-term - systemic	0,0006 mg/kg bw/day (Consexpo v4.1)	
combined routes	Consexpo v4.1	0,0002

11.3.5 ES 11 - CS 5: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,11 mg/m³ (Consexpo v4.1)	0,02
Chronic dermal systemic exposure	0,12 mg/kg bw/day (Consexpo v4.1)	0,002
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,02

11.3.6 ES 11 - CS 6: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,01 mg/m³ (Consexpo v4.1)	0,001
Chronic dermal systemic exposure	0,04 mg/kg bw/day (Consexpo v4.1)	0,0008
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,002

11.3.7 ES 11 - CS 7: Consumer exposure: Consumer use (Washing and cleaning products) (PC35)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,38 mg/m³ (Consexpo v4.1)	0,05
Chronic dermal systemic exposure	7,31 mg/kg bw/day (Consexpo v4.1)	0,14
Consumer - oral, long-term - systemic	Consexpo v4.1, Not applicable	
combined routes	Consexpo v4.1	0,19

11.4. ES 11 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

12. ES 12: Industrial use; Use in lubricants

12.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site)	ERC4, ERC7
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions)	PROC17, PROC18

12.2. ES 12 Conditions of use affecting exposure

12.2.1 ES 12 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article), Use of functional fluid at industrial site) (ERC4, ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

12.2.2 ES 12 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.2.3 ES 12 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process

with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

12.2.4 ES 12 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

12.2.5 ES 12 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.2.6 ES 12 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %

Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.2.7 ES 12 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.2.8 ES 12 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.2.9 ES 12 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

12.2.10 ES 12 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

12.2.11 ES 12 - CS 11: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Note	:	Lubrication at high energy conditions in metal working operations

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

12.3. ES 12 Exposure estimation and reference to its source

12.3.2 ES 12 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

12.3.3 ES 12 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

12.3.4 ES 12 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

12.3.5 ES 12 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

12.3.6 ES 12 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

12.3.7 ES 12 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

12.3.8 ES 12 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated	0,37

	filling line, including weighing))	
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

12.3.9 ES 12 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

12.3.10 ES 12 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

12.3.11 ES 12 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations, General greasing/lubrication at high kinetic energy conditions) (PROC17, PROC18)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,03
combined routes	ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations	0,10
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions)	0,13

combined routes	ECETOC TRA worker v2.0, General greasing/lubrication at high kinetic energy conditions	0,20

12.4. ES 12 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

13. ES 13: Industrial use; Metal working fluids

13.1. Title section

Environment		
CS1:	Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Lubrication at high energy conditions in metal working operations)	PROC17

13.2. ES 13 Conditions of use affecting exposure

13.2.1 ES 13 - CS 1: Control of environmental exposure: Industrial use (Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC4)

Remarks : As no environmental hazard was identified no environmental-

related exposure assessment and risk characterization was performed.

13.2.2 ES 13 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

13.2.3 ES 13 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside

hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

13.2.4 ES 13 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²
Remarks : Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²
Remarks : Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Technical conditions and measures : Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition

Note : Chemical production where opportunity for exposure arises
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

13.2.5 ES 13 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm^2

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

13.2.6 ES 13 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Amounts used : 0,6 L/min

Frequency and duration of use
Exposure duration : 360 min
Frequency of use : <= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

13.2.7 ES 13 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min

Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 90 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

13.2.8 ES 13 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

13.2.9 ES 13 - CS 9: Control of worker exposure: Industrial use (Roller application or

brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

13.2.10 ES 13 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

13.2.11 ES 13 - CS 11: Control of worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

13.3. ES 13 Exposure estimation and reference to its source

13.3.2 ES 13 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

13.3.3 ES 13 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

13.3.4 ES 13 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

13.3.5 ES 13 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

13.3.6 ES 13 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

13.3.7 ES 13 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

13.3.8 ES 13 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or	0,43

	mixture (charging/discharging) at dedicated facilities	
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

13.3.9 ES 13 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

13.3.10 ES 13 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

13.3.11 ES 13 - CS 11: Worker exposure: Industrial use (Lubrication at high energy conditions in metal working operations) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,07
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations)	0,03
combined routes	ECETOC TRA worker v2.0, Lubrication at high energy conditions in metal working operations	0,10

13.4. ES 13 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

14. ES 14: Professional use; Metal working fluids

14.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Mixing or blending in batch processes)	PROC5
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Roller application or brushing)	PROC10
CS7:	Professional use (Non-industrial spraying)	PROC11
CS8:	Professional use (Treatment of articles by dipping and pouring)	PROC13
CS9:	Professional use (Lubrication at high energy conditions in metal working operations)	PROC17

14.2. ES 14 Conditions of use affecting exposure

14.2.1 ES 14 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

14.2.2 ES 14 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition With occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

14.2.3 ES 14 - CS 3: Control of worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

14.2.4 ES 14 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

14.2.5 ES 14 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

14.2.6 ES 14 - CS 6: Control of worker exposure: Professional use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	80 %
Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

14.2.7 ES 14 - CS 7: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

14.2.8 ES 14 - CS 8: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid

Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

14.2.9 ES 14 - CS 9: Control of worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 90 %

Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

14.3. ES 14 Exposure estimation and reference to its source

14.3.2 ES 14 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled	0,003

	exposure or processes with equivalent containment condition)	
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

14.3.3 ES 14 - CS 3: Worker exposure: Professional use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,74
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0, Mixing or blending in batch processes)	0,01
combined routes	ECETOC TRA worker v2.0, Mixing or blending in batch processes	0,75

14.3.4 ES 14 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

14.3.5 ES 14 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74

Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

14.3.6 ES 14 - CS 6: Worker exposure: Professional use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

14.3.7 ES 14 - CS 7: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

14.3.8 ES 14 - CS 8: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

14.3.9 ES 14 - CS 9: Worker exposure: Professional use (Lubrication at high energy conditions in metal working operations) (PROC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37

- local and systemic		
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

14.4. ES 14 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

15. ES 15: Professional use; Use in agrochemicals

15.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8a, ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC1, PROC2
CS3:	Professional use (Chemical production where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS6:	Professional use (Non-industrial spraying)	PROC11
CS7:	Professional use (Treatment of articles by dipping and pouring)	PROC13

15.2. ES 15 Conditions of use affecting exposure

15.2.1 ES 15 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor), Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8a, ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was

performed.

15.2.2 ES 15 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

15.2.3 ES 15 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

15.2.4 ES 15 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and	:	Local exhaust ventilation

measures
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

15.2.5 ES 15 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

15.2.6 ES 15 - CS 6: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Amounts used : 0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

15.2.7 ES 15 - CS 7: Control of worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

15.3. ES 15 Exposure estimation and reference to its source

15.3.2 ES 15 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,0007

Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38

15.3.3 ES 15 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

15.3.4 ES 15 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

15.3.5 ES 15 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

15.3.6 ES 15 - CS 6: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

15.3.7 ES 15 - CS 7: Worker exposure: Professional use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

15.4. ES 15 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

16. ES 16: Industrial use; Use in functional fluids

16.1. Title section

Environment		
CS1:	Industrial use (Use of functional fluid at industrial site)	ERC7
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9

16.2. ES 16 Conditions of use affecting exposure

16.2.1 ES 16 - CS 1: Control of environmental exposure: Industrial use (Use of functional fluid at industrial site) (ERC7)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

16.2.2 ES 16 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

16.2.3 ES 16 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

16.2.4 ES 16 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical

production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

16.2.5 ES 16 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

16.2.6 ES 16 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year
Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

16.3. ES 16 Exposure estimation and reference to its source

16.3.2 ES 16 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

16.3.3 ES 16 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

16.3.4 ES 16 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term -	0,34 mg/kg bw/day (ECETOC TRA worker v2.0,	0,003

systemic	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

16.3.5 ES 16 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

16.3.6 ES 16 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
combined routes	ECETOC TRA worker v2.0, Transfer of substance or	0,43

	mixture (charging/discharging) at dedicated facilities	
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

16.4. ES 16 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

17. ES 17: Professional use; Use in functional fluids

17.1. Title section

Environment		
CS1:	Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor))	ERC9a, ERC9b
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	PROC1, PROC2, PROC3
CS3:	Professional use (Chemical production where opportunity for exposure arises)	PROC4
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS5:	Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC9

CS6:	Professional use (Use of functional fluids in small devices)	PROC20

17.2. ES 17 Conditions of use affecting exposure

17.2.1 ES 17 - CS 1: Control of environmental exposure: Professional use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

17.2.2 ES 17 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.
Technical conditions and measures	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition With occasional controlled exposure

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

17.2.3 ES 17 - CS 3: Control of worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

17.2.4 ES 17 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

17.2.5 ES 17 - CS 5: Control of worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

17.2.6 ES 17 - CS 6: Control of worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

17.3. ES 17 Exposure estimation and reference to its source

17.3.2 ES 17 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition) (PROC1, PROC2, PROC3)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood	0,0007

	of exposure or processes with equivalent containment conditions)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23

17.3.3 ES 17 - CS 3: Worker exposure: Professional use (Chemical production where opportunity for exposure arises) (PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,80

17.3.4 ES 17 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type	Exposure estimate	RCR

of effects		
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

17.3.5 ES 17 - CS 5: Worker exposure: Professional use (Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,80

17.3.6 ES 17 - CS 6: Worker exposure: Professional use (Use of functional fluids in small devices) (PROC20)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,02
combined routes	ECETOC TRA worker v2.0	0,39

17.4. ES 17 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

18. ES 18: Consumer use; Heat transfer fluids, Hydraulic fluids

18.1. Title section

Heat transfer fluids (PC16)		
Hydraulic fluids (PC17)		
Environment		
CS1:	Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor))	ERC9a, ERC9b
Consumer		
CS2:	Consumer use (Heat transfer fluids, Hydraulic fluids)	PC16, PC17

18.2. ES 18 Conditions of use affecting exposure

18.2.1 ES 18 - CS 1: Control of environmental exposure: Consumer use (Widespread use of functional fluid (indoor), Widespread use of functional fluid (outdoor)) (ERC9a, ERC9b)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

18.2.2 ES 18 - CS 2: Control of consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Remarks : Transfer of substance or mixture (charging/discharging) at non dedicated-facilities

Product characteristics

Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : < 15 min

Human factors not influenced by risk management

Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other given operational conditions affecting consumers exposure

Outdoor / Indoor : Indoor use
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures : No specific measures identified.

18.3. ES 18 Exposure estimation and reference to its source

18.3.2 ES 18 - CS 2: Consumer exposure: Consumer use (Heat transfer fluids, Hydraulic fluids) (PC16, PC17)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,08
oral	Not applicable	
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	0,36

18.4. ES 18 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

19. ES 19: Professional use; Anti-freeze and de-icing products

19.1. Title section

Environment		
CS1:	Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8d
Workers		
CS2:	Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC1, PROC2
CS3:	Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS4:	Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS5:	Professional use (Non-industrial spraying)	PROC11

19.2. ES 19 Conditions of use affecting exposure

19.2.1 ES 19 - CS 1: Control of environmental exposure: Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

19.2.2 ES 19 - CS 2: Control of worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent

containment conditions
Sample via a closed loop or other system to avoid exposure.

Technical conditions and measures : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

19.2.3 ES 19 - CS 3: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : inhalative
Technical conditions and measures : Local exhaust ventilation
Effectiveness (of a measure) : 80 %
Personal protective measures : If technical measures not practical:
Wear suitable respiratory protection.
Effectiveness (of a measure) : 80 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

19.2.4 ES 19 - CS 4: Control of worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

19.2.5 ES 19 - CS 5: Control of worker exposure: Professional use (Non-industrial spraying) (PROC11)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,05 L/min

Frequency and duration of use

Exposure duration	:	150 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	<= 1000 m3

Risk Management Measures

Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Personal protective measures	:	Wear a respirator conforming to EN140.
Effectiveness (of a measure)	:	40 %
Organisational measures to	:	Ensure that direction of application is only horizontal or

prevent /limit releases, dispersion and exposure		downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the direction of airflow is clearly away from the worker.
Note	:	Not applicable
Organisational measures to prevent /limit releases, dispersion and exposure	:	Provide enhanced general ventilation by mechanical means.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the task is not carried out by more than one worker simultaneously.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

19.3. ES 19 Exposure estimation and reference to its source

19.3.2 ES 19 - CS 2: Worker exposure: Professional use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC1, PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment	0,0007

	conditions)	
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	0,003
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions	0,004
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	0,01
combined routes	ECETOC TRA worker v2.0, Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	0,38

19.3.3 ES 19 - CS 3: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,50

19.3.4 ES 19 - CS 4: Worker exposure: Professional use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,88 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,74
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,80

19.3.5 ES 19 - CS 5: Worker exposure: Professional use (Non-industrial spraying) (PROC11)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	14,05 mg/m³ (Stoffenmanager v4.0)	0,40
Worker - dermal, long-term - systemic	53,75 mg/kg bw/day (RISKOFDERM v2.1)	0,51
combined routes	Not applicable	0,91

19.4. ES 19 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

20. ES 20: Consumer use; Anti-freeze and de-icing products

20.1. Title section

Anti-freeze and de-icing products (PC4)		
Environment		
CS1:	Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor))	ERC8d
Consumer		
CS2:	Consumer use (Anti-freeze and de-icing products)	PC4
CS3:	Consumer use (Anti-freeze and de-icing products)	PC4
CS4:	Consumer use (Anti-freeze and de-icing products)	PC4

20.2. ES 20 Conditions of use affecting exposure

20.2.1 ES 20 - CS 1: Control of environmental exposure: Consumer use (Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)) (ERC8d)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

20.2.2 ES 20 - CS 2: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks : De-icing of vehicles and similar equipment by spraying

Spraying

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,0468 kg/min

Frequency and duration of use

Spray duration	:	0,7 min
Frequency of use	:	365 days per year
Exposure duration	:	240 min

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands and forearms.
Covers skin contact area up to	:	1900 cm²
dermal	:	0,000046 kg/min
Uptake fraction, oral	:	100 %

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Room height	:	2,5 m
Weight percent	:	100 %
Remarks	:	Non-Volatile
Density	:	1,8 g/cm3
Remarks	:	Non-Volatile
Airborne fraction	:	100 %
Remarks	:	Non-Volatile
Inhalation cut-off diameter	:	0,015 mm

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	Ensure spraying away from persons.

20.2.3 ES 20 - CS 3: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Remarks	:	De-icing of vehicles and similar equipment by spraying Cleaning

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used
Amounts used : 0,00029 kg/day

Frequency and duration of use
Frequency of use : 365 days per year

Human factors not influenced by risk management
Dermal exposure : Palm of one hand
Covers skin contact area up to : 215 cm²

Other given operational conditions affecting consumers exposure
Temperature : 25 °C

20.2.4 ES 20 - CS 4: Control of consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 30 %

Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : < 15 min

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to : 960 cm²

Other given operational conditions affecting consumers exposure
Outdoor / Indoor : Indoor use
Temperature : 25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)
Consumer Measures : No specific measures identified.

20.3. ES 20 Exposure estimation and reference to its source

20.3.2 ES 20 - CS 2: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,0006 mg/m³ (Consexpo v4.1)	0,0001
Chronic dermal systemic exposure	0,50 mg/kg bw/day (Consexpo v4.1)	0,009
Consumer - oral, long-term - systemic	0,005 mg/kg bw/day (Consexpo v4.1)	
combined routes	Consexpo v4.1	0,009

20.3.3 ES 20 - CS 3: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	Not applicable	
Chronic dermal systemic exposure	4,46 mg/kg bw/day (Consexpo v4.1)	0,08
Consumer - oral, long-term - systemic	Not applicable	
combined routes	Consexpo v4.1	0,08

20.3.4 ES 20 - CS 4: Consumer exposure: Consumer use (Anti-freeze and de-icing products) (PC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	1,93 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,28
Worker - dermal, long-term - systemic	4,11 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	0,08
oral	Not applicable	
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at non dedicated-facilities	0,36

20.4. ES 20 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

21. ES 21: Industrial use, Professional use; Use in

laboratories

21.1. Title section

Environment		
CS1:	Industrial use, Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor))	ERC8a
Workers		
CS2:	Industrial use, Professional use (Use as laboratory reagent)	PROC15

21.2. ES 21 Conditions of use affecting exposure

21.2.1 ES 21 - CS 1: Control of environmental exposure: Industrial use, Professional use (Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)) (ERC8a)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

21.2.2 ES 21 - CS 2: Control of worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Product characteristics

Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use

Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management

Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor use

Risk Management Measures

Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice : Wear solely goggles.

21.3. ES 21 Exposure estimation and reference to its source

21.3.2 ES 21 - CS 2: Worker exposure: Industrial use, Professional use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

21.4. ES 21 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

22. ES 22: Industrial use; Use in water treatment agents

22.1. Title section

Environment		
CS1:	Industrial use (Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article))	ERC3, ERC4
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS6:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities)	PROC8b
CS7:	Industrial use (Treatment of articles by dipping and pouring)	PROC13

22.2. ES 22 Conditions of use affecting exposure

22.2.1 ES 22 - CS 1: Control of environmental exposure: Industrial use (Formulation into solid matrix, Use of non-reactive processing aid at industrial site (no inclusion into or onto article)) (ERC3, ERC4)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

22.2.2 ES 22 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

22.2.3 ES 22 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

22.2.4 ES 22 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Palm of one hand
Covers skin contact area up to : 240 cm²
Remarks : Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²
Remarks : Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

22.2.5 ES 22 - CS 5: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

22.2.6 ES 22 - CS 6: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Product characteristics

Concentration of the Substance in	:	<= 100 %

Mixture/Article

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Transfer of substance or mixture (charging/discharging) at dedicated facilities
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

22.2.7 ES 22 - CS 7: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Exposure routes : dermal
Personal protective measures : Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure) : 90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

22.3. ES 22 Exposure estimation and reference to its source

22.3.2 ES 22 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

22.3.3 ES 22 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

22.3.4 ES 22 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled	0,003

	exposure or processes with equivalent containment condition)	
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

22.3.5 ES 22 - CS 5: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

22.3.6 ES 22 - CS 6: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities) (PROC8b)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0)	0,06
combined routes	ECETOC TRA worker v2.0	0,43

22.3.7 ES 22 - CS 7: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

22.4. ES 22 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

23. ES 23: Consumer use; Adhesives, sealants

23.1. Title section

Adhesives, sealants (PC1)		
Environment		
CS1:	Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8c, ERC8f
Consumer		
CS2:	Consumer use (Adhesives, sealants)	PC1

23.2. ES 23 Conditions of use affecting exposure

23.2.1 ES 23 - CS 1: Control of environmental exposure: Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8c, ERC8f)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

23.2.2 ES 23 - CS 2: Control of consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Remarks : Worst case assumption
Mixing operations (open systems)
Loading of application equipment

Product characteristics

Concentration of the Substance in Mixture/Article : <= 0,075 %

Molecular weight : 3.000 g/mol
Physical Form (at time of use) : Liquid
Vapour pressure : 0,123 hPa

Amount used

Amounts used : 9 kg/day

Frequency and duration of use

Application duration	:	75 min
Frequency of use	:	0,25 days per year
Exposure duration	:	75 min

Human factors not influenced by risk management

Covers skin contact area up to	:	110 cm²
dermal	:	0,00003 kg/min

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	58 m3
Temperature	:	25 °C
Ventilation rate per hour	:	0,5
Mass transfer rate	:	4740 m/min
Release area	:	4 m2

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

23.3. ES 23 Exposure estimation and reference to its source

23.3.2 ES 23 - CS 2: Consumer exposure: Consumer use (Adhesives, sealants) (PC1)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	4,1 mg/m³ (Consexpo v4.1)	0,59
Chronic dermal systemic exposure	0,26 mg/kg bw/day (Consexpo v4.1)	0,005
Consumer - oral, long-term - systemic	Not applicable	
combined routes	Consexpo v4.1	0,60

23.4. ES 23 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

24. ES 24: Industrial use; Manufacture of substance,

Adhesives, sealants, Foaming, Use in coatings, Use in polymer production

24.1. Title section

Environment		
CS1:	Industrial use (Formulation into mixture, Formulation into solid matrix, Use at industrial site leading to inclusion into/onto article, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article))	ERC2, ERC3, ERC5, ERC6c
Workers		
CS2:	Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions)	PROC1
CS3:	Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions)	PROC2
CS4:	Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises)	PROC3, PROC4
CS5:	Industrial use (Mixing or blending in batch processes)	PROC5
CS6:	Industrial use (Industrial spraying)	PROC7
CS7:	Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities)	PROC8a
CS8:	Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	PROC8b, PROC9
CS9:	Industrial use (Roller application or brushing)	PROC10
CS10:	Industrial use (Treatment of articles by dipping and pouring)	PROC13
CS11:	Industrial use (Tabletting, compression, extrusion, pelettisation, granulation)	PROC14
CS12:	Industrial use (Use as laboratory reagent)	PROC15

24.2. ES 24 Conditions of use affecting exposure

24.2.1 ES 24 - CS 1: Control of environmental exposure: Industrial use (Formulation into mixture, Formulation into solid matrix, Use at industrial site leading to inclusion into/onto article, Use of monomer in polymerisation processes at industrial site (inclusion or not into/onto article)) (ERC2, ERC3, ERC5, ERC6c)

Remarks : As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

24.2.2 ES 24 - CS 2: Control of worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with

equivalent containment conditions) (PROC1)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions Sample via a closed loop or other system to avoid exposure.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.3 ES 24 - CS 3: Control of worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.4 ES 24 - CS 4: Control of worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Palm of one hand
Covers skin contact area up to	:	240 cm²
Remarks	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²
Remarks	:	Chemical production where opportunity for exposure arises

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Technical conditions and measures	:	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
Note	:	Chemical production where opportunity for exposure arises No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.5 ES 24 - CS 5: Control of worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.6 ES 24 - CS 6: Control of worker exposure: Industrial use (Industrial spraying) (PROC7)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Amount used

Amounts used	:	0,6 L/min

Frequency and duration of use

Exposure duration	:	360 min
Frequency of use	:	<= 5 days per week

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	> 1000 m3

Risk Management Measures

Technical conditions and	:	Local exhaust ventilation

measures		
Effectiveness (of a measure)	:	50 %
Note	:	Ensure that the direction of airflow is clearly away from the worker.
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	Wear suitable protective clothing. Wear suitable coveralls to prevent exposure to the skin.
Effectiveness (of a measure)	:	80 %
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that the distance from worker to task is greater than 1 m.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure that direction of application is only horizontal or downward.
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of work area
Organisational measures to prevent /limit releases, dispersion and exposure	:	Regular cleaning of equipment
Organisational measures to prevent /limit releases, dispersion and exposure	:	Ensure regular inspection, cleaning and maintenance of equipment and machines.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.7 ES 24 - CS 7: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm^2

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	inhalative
Technical conditions and measures	:	Local exhaust ventilation
Effectiveness (of a measure)	:	90 %
Personal protective measures	:	If technical measures not practical: Wear suitable respiratory protection.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.8 ES 24 - CS 8: Control of worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Note	:	No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.9 ES 24 - CS 9: Control of worker exposure: Industrial use (Roller application or brushing) (PROC10)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %

Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to hands.
Covers skin contact area up to	:	960 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment

Additional good practice advice	:	Wear solely goggles.

24.2.10 ES 24 - CS 10: Control of worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 100 %
Physical Form (at time of use)	:	Low volatile liquid
Vapour pressure	:	0,123 hPa

Frequency and duration of use

Exposure duration	:	<= 480 min
Frequency of use	:	<= 240 days per year

Human factors not influenced by risk management

Dermal exposure	:	Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to	:	480 cm²

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor use

Risk Management Measures

Exposure routes	:	dermal
Personal protective measures	:	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
Effectiveness (of a measure)	:	90 %

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

24.2.11 ES 24 - CS 11: Control of worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 480 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

24.2.12 ES 24 - CS 12: Control of worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Product characteristics
Concentration of the Substance in Mixture/Article : <= 100 %

Physical Form (at time of use) : Low volatile liquid
Vapour pressure : 0,123 hPa

Amount used
Storage : < 1 kg, < 1 l

Frequency and duration of use
Exposure duration : <= 480 min
Frequency of use : <= 240 days per year

Human factors not influenced by risk management
Dermal exposure : Assumes that potential dermal contact is limited to inside hands / one hand / palm of hands.
Covers skin contact area up to : 240 cm²

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor use

Risk Management Measures
Note : Use as laboratory reagent
No specific measures identified.

Additional good practice advice beyond the REACH Chemical Safety Assessment
Additional good practice advice : Wear solely goggles.

24.3. ES 24 Exposure estimation and reference to its source

24.3.2 ES 24 - CS 2: Worker exposure: Industrial use (Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions) (PROC1)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	0,03 mg/m³ (ECETOC TRA worker v2.0)	0,0007
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,004

24.3.3 ES 24 - CS 3: Worker exposure: Industrial use (Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions) (PROC2)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,08

24.3.4 ES 24 - CS 4: Worker exposure: Industrial use (Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition, Chemical production where opportunity for exposure arises) (PROC3, PROC4)

Route of exposure and type of effects	Exposure estimate	RCR

Worker - inhalative, long-term - local and systemic	7,76 mg/m³ (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,22
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition)	0,003
combined routes	ECETOC TRA worker v2.0, Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition	0,23
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises)	0,06
combined routes	ECETOC TRA worker v2.0, Chemical production where opportunity for exposure arises	0,43

24.3.5 ES 24 - CS 5: Worker exposure: Industrial use (Mixing or blending in batch processes) (PROC5)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,38

24.3.6 ES 24 - CS 6: Worker exposure: Industrial use (Industrial spraying) (PROC7)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	9,79 mg/m³ (Stoffenmanager v4.0)	0,28
Worker - dermal, long-term - systemic	54,6 mg/kg bw/day (RISKOFDERM v2.1)	0,52
combined routes	Not applicable	0,80

24.3.7 ES 24 - CS 7: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at non dedicated-facilities) (PROC8a)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	2,59 mg/m³ (ECETOC TRA worker v2.0)	0,07

- local and systemic		
Worker - dermal, long-term - systemic	13,71 mg/kg bw/day (ECETOC TRA worker v2.0)	0,13
combined routes	ECETOC TRA worker v2.0	0,20

24.3.8 ES 24 - CS 8: Worker exposure: Industrial use (Transfer of substance or mixture (charging/discharging) at dedicated facilities, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)) (PROC8b, PROC9)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities)	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture (charging/discharging) at dedicated facilities	0,43
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,37
Worker - dermal, long-term - systemic	6,86 mg/kg bw/day (ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing))	0,06
combined routes	ECETOC TRA worker v2.0, Transfer of substance or mixture into small containers (dedicated filling line, including weighing)	0,43

24.3.9 ES 24 - CS 9: Worker exposure: Industrial use (Roller application or brushing) (PROC10)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74
Worker - dermal, long-term - systemic	2,74 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,77

24.3.10 ES 24 - CS 10: Worker exposure: Industrial use (Treatment of articles by dipping and pouring) (PROC13)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term	25,87 mg/m³ (ECETOC TRA worker v2.0)	0,74

- local and systemic		
Worker - dermal, long-term - systemic	1,37 mg/kg bw/day (ECETOC TRA worker v2.0)	0,01
combined routes	ECETOC TRA worker v2.0	0,75

24.3.11 ES 24 - CS 11: Worker exposure: Industrial use (Tabletting, compression, extrusion, pelettisation, granulation) (PROC14)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	3,43 mg/kg bw/day (ECETOC TRA worker v2.0)	0,03
combined routes	ECETOC TRA worker v2.0	0,40

24.3.12 ES 24 - CS 12: Worker exposure: Industrial use (Use as laboratory reagent) (PROC15)

Route of exposure and type of effects	Exposure estimate	RCR
Worker - inhalative, long-term - local and systemic	12,94 mg/m³ (ECETOC TRA worker v2.0)	0,37
Worker - dermal, long-term - systemic	0,34 mg/kg bw/day (ECETOC TRA worker v2.0)	0,003
combined routes	ECETOC TRA worker v2.0	0,37

24.4. ES 24 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2

25. ES 25: Consumer use; Insulation foams

25.1. Title section

Polymer preparations and compounds (PC32)		
Environment		
CS1:	Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor))	ERC8c, ERC8f
Consumer		
CS2:	Consumer use (Polymer preparations and compounds)	PC32

25.2. ES 25 Conditions of use affecting exposure

25.2.1 ES 25 - CS 1: Control of environmental exposure: Consumer use (Widespread use leading to inclusion into/onto article (indoor), Widespread use leading to inclusion into/onto article (outdoor)) (ERC8c, ERC8f)

Remarks	:	As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

25.2.2 ES 25 - CS 2: Control of consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

Product characteristics

Concentration of the Substance in Mixture/Article	:	<= 5 %
Physical Form (at time of use)	:	Liquid
Vapour pressure	:	0,123 hPa

Amount used

Amount per use	:	0,825 kg

Frequency and duration of use

Exposure duration	:	30 min
Frequency of use	:	0,2 days per year

Human factors not influenced by risk management

Covers skin contact area up to	:	1900 cm^2
Breathing volume	:	1,5 m3/day

Other given operational conditions affecting consumers exposure

Outdoor / Indoor	:	Indoor use
Room size	:	57,5 m3
Temperature	:	25 °C

Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)

Consumer Measures	:	No specific measures identified.

25.3. ES 25 Exposure estimation and reference to its source

25.3.2 ES 25 - CS 2: Consumer exposure: Consumer use (Polymer preparations and compounds) (PC32)

Route of exposure and type of effects	Exposure estimate	RCR
Consumer- inhalative, long-term - local and systemic	0,06 mg/m³ (Consexpo v4.1)	0,009
Chronic dermal systemic exposure	0,007 mg/kg bw/day (Consexpo v4.1)	0,0008
Consumer - oral, long-term - systemic	Not applicable	
combined routes	Consexpo v4.1	0,01

25.4. ES 25 Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

ECHA guidance for downstream users
Section 2