

RUBRIEK 1: Identificatie van de stof of het mengsel en van de vennootschap/onderneming**1.1. Productidentificatie**

Handelsnaam: **MT FINISHER Part B**
Product vorm: Mengsel
UFI-code: 9FAH-CVKV-9204-HS6Y

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

Aanbevolen gebruik: Vernettingsmiddel voor het coaten van materialen of kleefstoffen voor industriële of professionele toepassingen.

1.3. Details betreffende de verstrekker van het veiligheidsinformatieblad




SOBELTEC nv
Klein Frankrijkstraat 43 - 9600 Ronse - Belgium T +32 55 230 600
info@sobeltec.be
Bevoegde persoon die verantwoordelijk is voor het veiligheidsinformatieblad: info@sobeltec.be

1.4. Telefoonnummer voor noodgevallen

NL: Nationaal Vergiftigingen Informatie Centrum (NVIC)
030-274 8888
BE: Antigifcentrum
070 245 245

RUBRIEK 2: Identificatie van de gevaren 2.1. Indeling van de stof of het mengsel

Indeling overeenkomstig Verordening 1272/2008/CE (CLP):

-  Waarschuwing, Acute Tox. 4, Schadelijk bij inademing.
-  Waarschuwing, Skin Sens. 1, Kan een allergische huidreactie veroorzaken.
-  Waarschuwing, STOT SE 3, Kan irritatie van de luchtwegen veroorzaken.

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

2.2. Etiketteringselementen Etikettering

(1272/2008/CE): Gevarenpictogrammen:



Waarschuwing

Gevarenaanduidingen:

- H332 Schadelijk bij inademing.
- H317 Kan een allergische huidreactie veroorzaken.
- H335 Kan irritatie van de luchtwegen veroorzaken.

Veiligheidsaanbevelingen:

- P261 Inademing van stof/rook/gas/nevel/damp/spuitnevel vermijden. P280 Beschermende handschoenen/beschermende kleding/oogbescherming/gelaatsbescherming dragen.
- P312 Bij onwel voelen een ANTIGIFCENTRUM/arts raadplegen.
- P333+P313 Bij huidirritatie of uitslag: een arts raadplegen.
- P362+P364 Verontreinigde kleding uittrekken en wassen alvorens deze opnieuw te gebruiken.
- P501 Inhoud/verpakking afvoeren volgens de geldende voorschriften.

Bijzondere schikkingen:

- EUH204 Bevat isocyanaten. Kan een allergische reactie veroorzaken

EUH208 Bevat hexamethyleen-1,6-diisocynaat. Kan een allergische reactie veroorzaken
Bevat:
Hexamethylene diisocyanate oligomers, isocyanurate
Bijzondere bepalingen overeenkomstig bijlage XVII van REACH en latere wijzigingen: Geen

2.3. Andere gevaren











Geen PBT, zPzB of hormoonontregelende stoffen die aanwezig zijn in de concentratie $\geq 0,1\%$. Geen ander risico

RUBRIEK 3: Samenstelling en informatie over de bestanddelen

3.1. Stoffen

N.A.

3.2. Mengsels

Hoeveelheid	Voornaam	Volgnummer	Classificatie
~100 %	Hexamethylene diisocyanate oligomers, isocyanurate	CAS: 28182-81-2 EC: 931-274-8 REACH No.: 01-21194857 96-17	 3.1/4/Inhal Acute Tox. 4 H332  3.4.2/1-1A-1B Skin Sens. 1,1A,1B H317  3.8/3 STOT SE 3 H335
<1000 ppm	hexamethyleen-1,6-diisocynaat	Index 615-011-00-1 nummer: CAS: 822-06-0 EC: 212-485-8 REACH No.: 01-21194575 71-37	 3.1/1/Inhal Acute Tox. 1 H330  3.2/2 Skin Irrit. 2 H315  3.3/2 Eye Irrit. 2 H319  3.8/3 STOT SE 3 H335  3.1/4/Oral Acute Tox. 4 H302  3.4.1/1 Resp. Sens. 1 H334  3.4.2/1 Skin Sens. 1 H317 Specifieke concentratiegrenzen: C $\geq 0,5\%$: Resp. Sens. 1 H334 C $\geq 0,5\%$: Skin Sens. 1 H317

RUBRIEK 4: Eerstehulpmaatregelen

4.1. Beschrijving van de eerstehulpmaatregelen

In geval van contact met de huid:

De besmette kledingstukken onmiddellijk uitdoen en deze op veilige wijze vernietigen.
De lichaamsdelen die met de giftige stof in aanraking zijn gekomen, of waarvan u dat vermoedt, onmiddellijk met veel stromend water afspoelen, zo mogelijk met zeep. Het lichaam volledig wassen (douche of bad).

In geval van contact met de ogen:

Bij aanraking met de ogen onmiddellijk met overvloedig water afspoelen en deskundig medisch advies inwinnen. **In geval van inslikken:** NIET braken opwekken **In geval van inademen:**

In geval van onregelmatige of afwezige ademhaling, kunstmatige beademing toepassen.

In geval van inademen onmiddellijk een arts raadplegen en de verpakking of het etiket tonen. Als u zich onwel voelt een arts raadplegen.

4.2. Belangrijkste acute en uitgestelde symptomen en effecten

Geen

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

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

Behandeling:

None

RUBRIEK 5: Brandbestrijdingsmaatregelen**5.1. Blusmiddelen** Geschikte

blusmiddelen:

Bluspoeder, CO₂ of schuim. Schuim en water gebruiken alleen in geval de brand een behoorlijke omvang heeft.

Blusmiddelen die om veiligheidsredenen niet moeten worden gebruikt: waterstraal.

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

De verbranding produceert zware rook.

De gassen die worden geproduceerd door de verbranding niet inademen.

5.3. Advies voor brandweerlieden

Geschikte ademhalingapparatuur gebruiken.

Het voor de brand gebruikte besmette bluswater afzonderlijk verzamelen. Niet in het riool lozen. De onbeschadigde containers, indien dit op een veilige manier gedaan kan worden, verplaatsen uit de gevarezone.

RUBRIEK 6: Maatregelen bij het accidenteel vrijkomen van de stof of het mengsel**6.1. Persoonlijke voorzorgsmaatregelen, beschermingsmiddelen en noodprocedures**

De individuele beschermingsmiddelen dragen.

Ademhalingsapparatuur dragen bij blootstelling aan dampen/stof/aerosol

Voor een goede ventilatie zorgen

Gebruik geschikte beschermingsmiddelen voor de ademhaling.

Raadpleeg de beschermingsmaatregelen zoals uiteengezet bij punt 7 en 8.

6.2. Milieuvoorzorgsmaatregelen

Niet in het oppervlaktewater, afvalwater of bodem laten doordringen.

Bewaar het besmette spoelwater en verwijder dit in overeenstemming met de geldende plaatselijke en nationale voorschriften.

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

6.3. Insluitings- en reinigingsmethoden en -materiaal

Mechanisch verwijderen; rest met vochtig, vloeistofabsorberend materiaal (b.v. zaagsel, chemicaliënbindmiddel op basis calciumsilicaat-hydraat, zand) afdekken.

Na ca. 1 uur in afvalverpakking doen, niet afsluiten (CO₂ - ontwikkeling!). Vochtig houden en buiten op een veilige plaats meerdere dagen laten staan.

6.4. Verwijzing naar andere rubrieken Zie ook paragraaf 8 en 13.

RUBRIEK 7: Hantering en opslag

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

contact met huid en ogen, inademing van dampen en nevel.

Gebruik het gelokaliseerde ventilatiesysteem.

Gebruik geen lege containers voordat ze zijn gereinigd.

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

Verwezen wordt ook naar paragraaf 8 voor de aanbevolen beschermingsvoorzieningen.

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

Verwezen wordt ook naar paragraaf 8 voor de aanbevolen beschermingsvoorzieningen.

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

de buurt houden van voedsel, drank en voeder.

Goed geluchte ruimten.

7.3. Specifiek eindgebruik Geen

enkel bijzonder gebruik.

RUBRIEK 8: Maatregelen ter beheersing van blootstelling/persoonlijke bescherming

8.1. Controleparameters hexamethyleen-1,6-diisocyaanat -

CAS: 822-06-0

UE - TWA: 0.034 mg/m³, 0.005 ppm - Opmerkingen: ITALY

OEL - TWA: 0.035 mg/m³, 0.005 ppm - STEL: 0.07 mg/m³, 0.01 ppm - Opmerkingen:

DENMARK

OEL - TWA: 0.075 mg/m³, 0.01 ppm - STEL: 0.15 mg/m³, 0.02 ppm - Opmerkingen: FRANCE

OEL - TWA: 0.035 mg/m³, 0.005 ppm - STEL: 0.035 mg/m³, 0.005 ppm - Opmerkingen:

GERMANY

OEL - TWA: 0.035 mg/m³ - STEL: 0.035 mg/m³ - Opmerkingen: HUNGARY

OEL - TWA: 0.04 mg/m³ - STEL: 0.08 mg/m³ - Opmerkingen: POLAND

OEL - TWA: 0.035 mg/m³, 0.005 ppm - Opmerkingen: SPAIN

OEL - TWA: 0.02 mg/m³, 0.002 ppm - STEL: 0.03 mg/m³, 0.005 ppm - Opmerkingen:

SWEDEN

ACGIH - TWA(8u): 0.005 ppm - Opmerkingen: URT irr, resp sens

DNEL blootstellingslimietwaarden

Hexamethylene diisocyanate oligomers, isocyanurate - CAS: 28182-81-2

Industriearbeider: 0.5 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Lange termijn, plaatselijke effecten

Industriearbeider: 1 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Korte termijn, lokale effecten

hexamethyleen-1,6-diisocyaanat - CAS: 822-06-0

Industriearbeider: 0.07 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Korte termijn, systematische effecten - Eindpunt: Irritatie van de luchtwegen

Industriearbeider: 0.07 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Korte termijn, lokale effecten - Eindpunt: Irritatie van de luchtwegen
Industriearbeider: 0.035 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Lange termijn, systematische effecten - Eindpunt: Irritatie van de luchtwegen
Industriearbeider: 0.035 mg/m³ - Blootstelling: Humane Inhalatie - Frequentie: Lange termijn, plaatselijke effecten - Eindpunt: Irritatie van de luchtwegen

PNEC blootstellingslimietwaarden

Hexamethylene diisocyanate oligomers, isocyanurate - CAS: 28182-81-2

Doel: Zeewater - Waarde: 0.0127 mg/l

Doel: Zoet water - Waarde: 0.127 mg/l

Doel: Zeewater sedimenten - Waarde: 26670 mg/kg

Doel: Zoetwater sedimenten - Waarde: 266700 mg/kg

Doel: Periodieke afgifte - Waarde: 1.27 mg/l

Doel: Reinigingsinstallatie - Waarde: 38.3 mg/l

Doel: Bodem - Waarde: 53182 mg/kg hexamethyleen-1,6-diisocynaat -

CAS: 822-06-0

Doel: Zeewater - Waarde: 0.00774 mg/l

Doel: Zoet water - Waarde: 0.0774 mg/l

Doel: Zeewater sedimenten - Waarde: 0.001334 mg/kg

Doel: Zoetwater sedimenten - Waarde: 0.01334 mg/kg

Doel: Periodieke afgifte - Waarde: 0.774 mg/l

Doel: Reinigingsinstallatie - Waarde: 8.42 mg/l

Doel: Bodem - Waarde: 0.0026 mg/kg

8.2. Maatregelen ter beheersing van blootstelling

Bescherming van de ogen.

Gebruik een veiligheidsbril of een veiligheidsbril, gebruik geen ooglens (Standard EN 166).

Bescherming van de huid:

Draag geschikte beschermende kleding (Standard EN 1149). **Bescherming**

van de handen:

Gebruik veiligheidshandschoenen die een totale bescherming garanderen, bijv. van PVC, neopreen of rubber (Standard EN 374).

Bescherming van de luchtwegen:

Gebruik een geschikt beschermingsmiddel voor de luchtwegen, bijvoorbeeld A2-P2 (Standard EN 405).

RUBRIEK 9: Fysische en chemische eigenschappen

9.1. Informatie over fysische en chemische basiseigenschappen

Eigenschappen	Waarde	Methode:	Nota's:
Fysische toestand:	Vloeistof	--	--
Kleur:	N.A.	--	--
Geur:		--	--
Smeltpunt/vriespunt:	N.A.	--	--
Kookpunt of beginkookpunt en kooktraject:	>220 °C	--	--
Ontvlambaarheid:	N.A.	--	--
Onderste en bovenste explosiegrens:	N.A.	--	--
Ontvlambaarheidspunt:	228 °C	--	--
Temperatuur van zelfontsteking:	N.A.	--	--

Temperatuur van afbreken:	N.A.	--	--
pH:	N.A.	--	--
Kinematische viscositeit:	> 20,5 mm ² /sec (40 °C)	--	--
Inwateroplosbaarheid:	Onoplosbaar, reageert met water	--	--
Oplosbaarheid in olie:	N.A.	--	--
Verdelingscoëfficiënt n- octanol/water (logwaarde):	N.A.	--	--
Dampdruk:	N.A.	--	--
Dichtheid en/of relatieve dichtheid:	1.16 g/cm ³	--	--
Relatieve dampdichtheid:	N.A.	--	--

Deeltjeskenmerken:

Deeltjesgrootte:	N.A.	--	--
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Beginkookpunt en kookinterval, Ontvlambaarheidspunt, Verdampingsnelheid, Boven/onderlimiet van ontvlambaarheid of ontploffing, Dampdruk, Temperatuur van zelfontsteking: Indien niet anders gespecificeerd, de gegevens betreffen de oplosmiddel.

De waarden niet altijd voldoen aan de specificaties van het product. De specificatie gegevens zijn volgens de data sheet.

9.2. Overige informatie

Eigenschappen	Waarde	Methode:	Nota's:
Viscositeit:	1200 mPa.s	--	--

RUBRIEK 10: Stabiliteit en reactiviteit

10.1. Reactiviteit

Stabiel in normale omstandigheden van opslag en manipulatie.

10.2. Chemische stabiliteit

Stabiel in normale omstandigheden van opslag en manipulatie.

10.3. Mogelijke gevaarlijke reacties

Exotherme reactie met aminen en alcoholen; met water CO₂-ontwikkeling: in gesloten verpakking drukverhoging, gevaar van barsten.

In contact met basismetalen (alkalmetaal, alkalische aarde, poederlegeringen of dampen), sterk reducerende stoffen kan het ontvlambare gassen voortbrengen.

In contact met oxyderende minerale zuren, sterk oxyderende stoffen, kan het giftige gassen voortbrengen.

10.4. Te vermijden omstandigheden Vast onder normale omstandigheden.

10.5. Chemisch op elkaar inwerkende materialen Deze informatie is niet beschikbaar.

10.6. Gevaarlijke ontledingsproducten

Geen gevaarlijke ontbindingsproducten bij vakkundige opslag en behandeling.

RUBRIEK 11: Toxicologische informatie

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

Toxicologische informatie van het product: N.A.

Toxicologische informatie van de belangrijkste stoffen in het product

Hexamethyleen diisocyanate oligomeren, isocyanurate - CAS: 28182-81-2 a)

acute toxiciteit:

Test: LD50 - Blootstellingswijze: Oraal - Soorten: Rat, vrouwtje > 2500 mg/kg - Bron: OECD 423

Test: LD50 - Blootstellingswijze: Huid - Soorten: Rat > 2000 mg/kg - Bron: OECD 402

Test: LC50 - Blootstellingswijze: Nevel van inademing 1.5 mg/l - Duur: 4u - Bron: OECD 403 b)

huidcorrosie/-irritatie:

Test: Irriterend voor de huid - Blootstellingswijze: Huid - Soorten: Konijn Positief - Bron: OECD 404

c) ernstig oogletsel/oogirritatie:

Test: Irritant voor de ogen - Blootstellingswijze: Ogen - Soorten: Konijn Negatief - Bron: OECD 405

d) sensibilisatie van de luchtwegen/de huid:

Test: Sensibilisering van de huid - Blootstellingswijze: Huid - Soorten: Cavia Positief - Bron: OECD 406

Test: Sensibilisering door inademing - Blootstellingswijze: Inademing - Soorten: Cavia Negatief - Bron: OECD 403

Gif-opwekkings dynamiek, metabolisme en verdelingsinformatie:

Test: NOAEL - Blootstellingswijze: Inhalation (aerosol) - Soorten: Rat 3.3 mg/m³ - Bron: OECD 413 hexamethyleen-1,6-diisocyanate -

CAS: 822-06-0 a) acute toxiciteit:

Test: LD50 - Blootstellingswijze: Oraal - Soorten: Rat 746 mg/kg

Test: LD50 - Blootstellingswijze: Huid - Soorten: Konijn 599 mg/kg - Duur: 24u

Test: LC50 - Blootstellingswijze: Inademing - Soorten: Rat 0.124 mg/l - Duur: 4u b)

huidcorrosie/-irritatie:

Test: Bijtend voor de huid - Blootstellingswijze: Huid - Soorten: Konijn Positief - Duur: 4u - Bron: OECD 404

c) ernstig oogletsel/oogirritatie:

Test: Bijtend voor de ogen - Blootstellingswijze: Ogen - Soorten: Konijn Positief - Duur: 30 seconden - Bron: OECD 405

d) sensibilisatie van de luchtwegen/de huid:

Test: Sensibilisering van de huid - Blootstellingswijze: Huid - Soorten: Cavia Positief - Bron: OECD 406

Test: Sensibilisering door inademing - Blootstellingswijze: Inademing - Soorten: Cavia Positief - Bron: OECD 406

i) STOT bij herhaalde blootstelling:

Test: NOAEC - Blootstellingswijze: Damp van inademing - Soorten: Rat Positief 0.035 mg/m³ - Duur: 2 jaar - Bron: OECD 453 - Opmerkingen: Doelorganen: Ademhalingswegen Gif-

opwekkings dynamiek, metabolisme en verdelingsinformatie:

Test: NOAEL - Blootstellingswijze: Damp van inademing - Soorten: Rat 0.2 mg/m³ - Duur: 2 jaar - Bron: OECD 453

Test: LOAEL - Blootstellingswijze: Damp van inademing - Soorten: Rat 1 mg/m³ - Duur: 2 jaar - Bron: OECD 453

Indien niet anders gespecificeerd, moet de informatie die vereist wordt in Reglement (EU)2020/878 beschouwd worden als n.v.t.:

- a) acute toxiciteit;
- b) huidcorrosie/-irritatie;
- c) ernstig oogletsel/oogirritatie;
- d) sensibilisatie van de luchtwegen/de huid;
- e) mutageniteit in geslachtscellen;
- f) kankerverwekkendheid;
- g) giftigheid voor de voortplanting;;
- h) STOT bij eenmalige blootstelling;
- i) STOT bij herhaalde blootstelling;
- j) gevaar bij inademing.

11.2. Informatie over andere gevaren Hormoonontregelende eigenschappen:

Geen hormoonontregelende stoffen die aanwezig zijn in de concentratie $\geq 0,1\%$

RUBRIEK 12: Ecologische informatie

12.1. Toxiciteit

Een normaal gebruik van het produkt maken en het produkt niet onbeheerd achterlaten.

Hexamethyleen diisocyanate oligomeren, isocyanurate - CAS: 28182-81-2 a) Acuut gevaar voor het aquatische milieu:

Eindpunt: LC50 - Soorten: Vissen ≥ 100 mg/l - Duur u: 96 - Opmerkingen: EU Method C.1

Eindpunt: LC50 - Soorten: Daphnia 127 mg/l - Duur u: 48 - Opmerkingen: EU Method C.2

Eindpunt: EC50 - Soorten: Algen > 1000 mg/l - Duur u: 72 - Opmerkingen: Method OECD 201 c)

Toxiciteit voor bacteriën:

Eindpunt: EC50 - Soorten: Actiefslib 3828 mg/l - Duur u: 3 - Opmerkingen: Method OECD 209

hexamethyleen-1,6-diisocyanate - CAS: 822-06-0 a) Acuut gevaar voor het aquatische milieu:

Eindpunt: LC50 - Soorten: Vissen 22 mg/l - Duur u: 96 - Opmerkingen: Method EU C.1

Eindpunt: EC50 - Soorten: Daphnia ≥ 89.1 mg/l - Duur u: 48 - Opmerkingen: Method EU C.2

Eindpunt: EC50 - Soorten: Algen > 77.4 mg/l - Duur u: 72 - Opmerkingen: Method EU C.3

b) Chronisch gevaar voor het aquatische milieu:

Eindpunt: LOEC - Soorten: Algen 12.6 mg/l - Duur u: 72 - Opmerkingen: Method EU C.3

Eindpunt: NOEC - Soorten: Algen 11.7 mg/l - Duur u: 72 - Opmerkingen: Method EU C.3 c)

Toxiciteit voor bacteriën:

Eindpunt: EC50 - Soorten: Actiefslib 842 mg/l - Duur u: 3 - Opmerkingen: EG-RL 88/302/EEC

12.2. Persistentie en afbreekbaarheid

Hexamethyleen diisocyanate oligomeren, isocyanurate - CAS: 28182-81-2

Biologische afbreekbaarheid: Niet snel afbreekbaar - Test: Zuurstofverbruik - Duur: 28 dagen

- %: 1 - Opmerkingen: Method OECD 301D hexamethyleen-1,6-diisocyanate -

CAS: 822-06-0

Biologische afbreekbaarheid: Niet snel afbreekbaar - Test: Biochemisch zuurstofverbruik - Duur: 28 dagen

- %: 42

12.3. Bioaccumulatie

Hexamethyleen diisocyanate oligomeren, isocyanurate - CAS: 28182-81-2

Test: BCF - Bioconcentratiefactor 367.7 hexamethyleen-1,6-diisocyanate -

CAS: 822-06-0

Bioaccumulatie: Niet bioaccumulatief - Test: BCF - Bioconcentratiefactor 57.63 Test: LogKow 3.2

12.4. Mobiliteit in de bodem

Hexamethyleen diisocyanate oligomeren, isocyanurate - CAS: 28182-81-2

Test: LogKoc 7.3-7.8

hexamethyleen-1,6-diisocyanate - CAS: 822-06-0

Test: LogKoc 3.77

12.5. Resultaten van PBT- en zPzB-beoordeling vPvB

stoffen: Geen - PBT stoffen: Geen **12.6.**

Hormoonontregelende eigenschappen Geen
hormoonontregelende stoffen die aanwezig zijn in
de concentratie $\geq 0,1\%$

12.7. Andere schadelijke effecten Informatie
niet beschikbaar.

RUBRIEK 13: Instructies voor verwijdering**13.1. Afvalverwerkingsmethoden**

Indien mogelijk hergebruiken. Handelen in overeenstemming met de geldende plaatselijke en nationale voorschriften.

RUBRIEK 14: Informatie met betrekking tot het vervoer

14.1. VN-nummer of ID-nummer

Ongevaarlijk goed met betrekking tot de vervoersvoorschriften.

14.2. Juiste ladingnaam overeenkomstig de modelreglementen van de VN N.A.

14.3. Transportgevarenklasse(n) N.A.

14.4. Verpakkingsgroep N.A.

14.5. Milieugevaren N.A.

14.6. Bijzondere voorzorgen voor de gebruiker N.A.

14.7. Zeevervoer in bulk overeenkomstig IMO-instrumenten

RUBRIEK 15: Regelgeving**15.1. Specifieke veiligheids-, gezondheids- en milieureglementen en -wetgeving voor de stof of het mengsel**

Richtl. 98/24/EG (Risico's verbonden met chemicaliën op het werk)

Richtl. 2000/39/EG (Beroepsmatige blootstellingsgrenswaarden)

Verordening (EG) n. 1907/2006 (REACH)

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

Verordening (EG) n. 790/2009 (ATP 1 CLP)

Verordening (EU) n. 2020/878

Verordening (EU) n. 286/2011 (ATP 2 CLP)

Regolamento (UE) n. 618/2012 (ATP 3 CLP)

Verordening (EU) n. 487/2013 (ATP 4 CLP)

Verordening (EU) n. 944/2013 (ATP 5 CLP)

Verordening (EU) n. 605/2014 (ATP 6 CLP)

Verordening (EU) n. 2015/1221 (ATP 7 CLP)

Verordening (EU) n. 2016/918 (ATP 8 CLP)

Verordening (EU) n. 2016/1179 (ATP 9 CLP)

Verordening (EU) n. 2017/776 (ATP 10 CLP)

Verordening (EU) n. 2018/669 (ATP 11 CLP)

Verordening (EU) n. 2018/1480 (ATP 13 CLP)

Verordening (EU) n. 2019/521 (ATP 12 CLP)

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

Beperkingen met betrekking tot het product: Beperking 3
Beperkingen met betrekking tot de stoffen die het bevat: Geen beperkingen.

Indien van toepassing refereren aan de volgende wetgevingen:
Richtlijn 2012/18/EY (Seveso III)
Verordening (EG) nr. 648/2004 (detergentia).
Richtl. 2004/42/EG (Richtlijn VOS)
Indeling WGK (Water gevarenklasse - Verwaltungsvorschrift wassergefährdende Stoffe)

Bepalingen over richtlijnen EU 2012/18 (Seveso III):
Geen

15.2. Chemische veiligheidsbeoordeling

Een chemische veiligheidsbeoordeling is uitgevoerd voor het mengsel
Stoffen waarvoor een chemische veiligheidsbeoordeling is uitgevoerd: Hexamethylene diisocyanate oligomers, isocyanurate

RUBRIEK 16: Overige informatie

Tekst van de gebruikte zinnen in paragraaf 3:
H332 Schadelijk bij inademing.
H317 Kan een allergische huidreactie veroorzaken.
H335 Kan irritatie van de luchtwegen veroorzaken.
H330 Dodelijk bij inademing.
H315 Veroorzaakt huidirritatie.
H319 Veroorzaakt ernstige oogirritatie.
H302 Schadelijk bij inslikken.
H334 Kan bij inademing allergie- of astmasymptomen of ademhalingsmoeilijkheden veroorzaken.

Gevarenklasse en gevarencategorie	Code	Beschrijving
Acute Tox. 1	3.1/1/Inhal	Acute toxiciteit (bij inademing), categorie 1
Acute Tox. 4	3.1/4/Inhal	Acute toxiciteit (bij inademing), categorie 4
Acute Tox. 4	3.1/4/Oral	Acute toxiciteit (oraal), categorie 4
Skin Irrit. 2	3.2/2	Huidirritatie, categorie 2
Eye Irrit. 2	3.3/2	Oogirritatie, categorie 2
Resp. Sens. 1	3.4.1/1	Sensibilisatie van de luchtwegen, categorie 1
Skin Sens. 1	3.4.2/1	Sensibilisatie van de huid, categorie 1
Skin Sens. 1,1A,1B	3.4.2/1-1A-1B	Sensibilisatie van de huid, categorie 1,1A,1B
STOT SE 3	3.8/3	Specifieke doelorgaantoxiciteit bij eenmalige blootstelling STOT eenm, Categorie 3

Deze informatiefiche is in alle delen gecontroleerd conform de Verordening 2020/878.
Indeling en procedure die gebruikt is om de indeling voor mengsels af te leiden overeenkomstig Verordening (EG) 1272/2008 [CLP]:

Indeling overeenkomstig Verordening (EG) nr. 1272/2008	Indelingsprocedure
Acute Tox. 4, H332	Berekeningsmethode
Skin Sens. 1, H317	Berekeningsmethode

STOT SE 3, H335

Berekeningsmethode

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

Voornaamste bibliografische bronnen:

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

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

De hierin opgenomen informatie is gebaseerd op onze kennis op de bovenvermelde datum. Heeft uitsluitend betrekking op het aangegeven produkt en vormt geen speciale kwaliteitsgarantie. Het gebruik van andere stoffen of preparaten in een proces kan de gegevens in dit veiligheidsinformatieblad ongeldig. De gebruiker is gehouden zich ervan te vergewissen of de informatie geschikt en compleet is met betrekking tot het specifieke gebruik dat de gebruiker ervan wil maken.

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

ADR:	Europese Overeenkomst betreffende het internationaal vervoer van gevaarlijke goederen over de weg.
ATE:	Acute toxiciteitsschatting
ATEmengsel:	Schatting van de acute toxiciteit (Mengsels)
CAS:	Chemical Abstracts Service (divisie van American Chemical Society).
CLP:	Classificatie, Etikettering, Verpakking
DNEL:	Afgeleide dosis zonder effect.
EINECS:	Europese inventarisatie van bestaande commerciële chemische stoffen.
GefStoffVO:	Verordening Gevaarlijke Stoffen, Duitsland
GHS:	Wereldwijd geharmoniseerd systeem voor de indeling en etikettering van chemicaliën.
IATA:	Vereniging voor internationaal luchtvervoer.
IATA-DGR:	Dangerous Goods Regulation van de "International Air Transport Association" (IATA).
ICAO:	Internationale Burgerluchtvaartorganisatie.
ICAO-TI:	Technische Instructies van de "International Civil Aviation Organization" (ICAO).
IMDG:	Internationale Maritieme Code voor Gevaarlijke goederen.
INCI:	Internationale Nomenclatuur van Cosmetische Ingrediënten.
KSt:	Explosie-coëfficiënt
LC50:	Letale concentratie, voor 50 procent van de testpopulatie.
LD50:	Letale dosis, voor 50 procent van de testpopulatie.
PNEC:	Voorspelde nuleffectconcentratie.
RID:	Reglement betreffende het internationaal vervoer van gevaarlijke goederen per spoor.
STEL:	Korte termijn blootstellingslimiet
STOT:	Specifieke doelorgaantoxiciteit
TLV:	Maximaal Aanvaarde Concentratie
TWA:	Tijdgewogen gemiddelde
WGK:	Duitse Water Hazard Class.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Version:2

Revision date: 07/02/2019

Exposure scenario	Sector(s) of Use:	Process Category(ies):	Environmental Release Category(ies):
1. Formulation (industrial and professional)	SU 3, SU10	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15	ERC2
2. Industrial end use	SU 3, SU12, SU13, SU19	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15	ERC5, ERC6a, ERC6c,
3. Professional end use	SU10, SU12, SU13, SU19, SU22	PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15	ERC2, ERC8c, ERC8f

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Section 1 - Exposure Scenario Title	
ES1. Formulation (industrial and professional)	
Description of activities/processes treated in the exposure scenario	
Main User Group: SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites SU 10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)	
Process category: PROC 1 Use in closed process, no likelihood of exposure PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling) PROC 3 Use in closed batch process (synthesis or formulation) PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15 Use as a laboratory reagent	
Environmental release category: ERC2 - Formulation of preparations	
Section 2 - Operating Conditions and Risk management measures	
2.1 - Operating Conditions related to human exposure	
Duration of exposure	8 h/day
Frequency of exposure	220 d/year
Physical form	Liquid
Concentration of substance in preparation or article: max 100%	
2.2 - Risk management measures related to human health	
Organisational and Technical measures: Local exhaust ventilation is required. In long-term processes where contact to substance cannot be excluded (e.g. filling operations), containment (e.g. housing) is recommended. Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures. Control staff entry to work area. Persons who suffer from skin complaints or other hypersensitivity reactions of skin should not work with the product. Ensure all equipment well maintained. Regular cleaning of equipment and work area.	
Risk management measures: In short-term process where contact to substance cannot be excluded (e.g. sampling operations), an air-fed mask or a combination of activated carbon filter and particulate filter is required. For processes where the opportunity for exposure arises, the use of gloves and protective clothing is stipulated. Suitable materials for safety gloves; EN 3743: Laminate glove - PE/EVOH/PE; Breakthrough time \geq 480 min. Wear eye/face protection e.g. goggles and face shield. Keep away from foodstuffs, drinks and tobacco. Keep working clothes separately. Change contaminated or soaked clothing immediately.	
2.3 - Operating Conditions related to environment	
Emission days per site	max. 300
Annual amount used per site	>1000 t

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Abatement measures waste water	No waste water is occurring during formulation.
2.4 - Risk management measures related to environment	
Organisational measures:	
Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures	
Abatement measures:	
Waste water:	No waste water is generated
Waste air:	All waste gases from production and dis/charging steps are transferred to a combustion unit or to an activated carbon filter
Soil:	Sealing of all relevant soil surfaces in the facility
Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle):	
Type of waste: Solvent used for cleaning procedures.	
Disposal technique: The waste from production is disposed by incineration in a waste combustor.	
Fraction released to environment: No emission to the environment during waste treatment during waste treatment.	
Section 3 - Estimation of exposure information	
3.1 - Estimation of exposure	
Workers (oral)	No significant oral exposure
Workers (dermal)	Estimated by the means of the ECETOC TRA model
PROC 1 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
PROC 2 (>4 h)	0,14 mg/kg (body weight) using personal protection equipment
PROC 3 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
PROC 4 (>4 h)	0.69 mg/kg (body weight) using personal protection equipment
PROC 5 (>4 h)	1,37 mg/kg (body weight) using personal protection equipment
PROC 8a (>4 h)	1,37 mg/kg (body weight) using personal protection equipment
PROC 8b (>4 h)	0,69 mg/kg (body weight) using personal protection equipment PROC
9 (>4 h)	0,69 mg/kg (body weight) using personal protection equipment
PROC 15 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
Workers (inhalation)	Estimated by the means of the ECETOC TRA model
PROC 1 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 2 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 3 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 4 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 5 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 8a (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
8b (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 9 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 15 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
Environment	
Water	0 mg/l
Soil	0 mg/kg wet weight
STP	0 mg/l
Human via environment	0 mg/kg bw/day
3.2 - Workers exposure	

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Oral exposure to HDI TRIMER is unlikely to occur because it is prohibited to eat, drink or smoke in the production area. Resting rooms are separated from the manufacturing area and industrial hygiene standards are applied. Personnel who work with HDI TRIMER should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitization conditions of the skin should not handle or work with HDI TRIMER. Anyone who develops chronic respiratory distress when working with Polyisocyanates should be removed from exposure and examined by a physician.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Further exposure must be avoided if a sensitivity to HDI TRIMER has developed (ALIPA, 2008). As the formulation HDI TRIMER takes place in closed processes, dermal and inhalation exposure may solely arise at sampling and filling steps. Such exposure is reduced through appropriate risk management measurements like the use of closed units, the presence of ventilation and exhaustion as well as equipped work places and personal protection equipment. A generic tier 1 estimation of the workers exposure occurring at the manufacture of HDI TRIMER was performed using the ECETOC TRA model (v. 2009). Underlying substance properties as well as model settings are presented in the following table.

Substance properties		Model setting	
Molecular weight	Ca. 500 g/mol	Type of setting	Industrial
Vapour pressure	< 0,0001 Pa	State	Liquid
Water solubility	n.a.	Duration of activity	> 4 h/day
Dustiness	n.a.	Use of ventilation	Indoor, without ventilation (dermal exposition); Indoor, with ventilation (inhalation exposition)
		Use of respiratory protection equipment	No
		Substance used in preparation	n.a.

Dermal exposure of workers to HDI TRIMER is solely possible during (dis)charging as well as sampling steps. According to the Technical Report (ECETOC, 2004) no dermal exposure is expected when operating in closed (PROC 1), closed continuous (PROC 2) or closed batch processes (PROC 3). Though the outcome of the ECETOC TRA for all PROC's is reported here.

Operation	Dermal exposure estimate (mg/kg bw/day) Without PPE	Dermal exposure estimate (mg/kg bw/day) With PPE
PROC 1 >4 h	0,34	0,03
PROC 2 >4 h	1,37	0,14
PROC 3 >4 h	0,34	0,03
PROC 4 >4 h	6,86	0,69
PROC 5 >4 h	13,7	1,37
PROC 8a >4 h	13,7	1,37
PROC 8b >4 h	6,86	0,69
PROC 9 >4 h	6,86	0,69
PROC 15 >4 h	0,34	0,03

For processes where the possibility for exposure arises, the use of personal protection equipment (PPE), e.g. gloves is recommended to control the risk. Use of suitable gloves reduces exposure by 90% (EU TGD, Part I, 2003). For PROC 5 and 8a, elevated exposure is estimated. Regarding the sensibilising effect of HDI TRIMER, exposure time should be reduced or other effective RMMs (e.g. housing) should be considered.

Inhalation exposure is minimized via the application of mainly closed processes as well as the presence of local exhaust ventilation during all sampling and (dis)charging operations. The following table comprises the calculated exposure of workers during the manufacture of HDI TRIMER. However, the current version of ECETOC TRA (July,

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

2009) has some weaknesses for the exposure estimation of liquids. The tool does not give any response to changes when using LEV, PPE or different exposure times. Therefore, the effect of LEV (90%) was calculated manually.

Operation	Dermal exposure estimate without PPE		Dermal exposure estimate with PPE	
	mg/m ³	mg/kg pc/giorno	mg/m ³	mg/kg pc/giorno
PROC 1 >4 h	2,1	0,32	0,21	0,04
PROC 2 >4 h	2,1	0,32	0,21	0,04
PROC 3 >4 h	2,1	0,32	0,21	0,04
PROC 4 >4 h	2,1	0,32	0,21	0,04
PROC 5 >4 h	2,1	0,32	0,21	0,04
PROC 8a >4 h	2,1	0,32	0,21	0,04
PROC 8b >4 h	2,1	0,32	0,21	0,04
PROC 9 >4 h	2,1	0,32	0,21	0,04
PROC 15 >4 h	2,1	0,32	0,21	0,04

In order to validate the refined ECETOC TRA estimations, results were compared with those from the “Advanced Reach Tool” (<http://www.advancedreachtool.com/>) (Version 1). This tool has been developed for higher tier exposure assessments. It is capable to estimate exposure from handling liquids. As an example, filling operations according to PROC 8b/9 were calculated with the tool.

Model settings	Input
Primary product	Liquid
Process temperature	15-25°C
Vapour pressure	0,0001 Pa
Liquid weight fraction	1
Viscosity	Like water
Is the primary emission source located in the breathing zone of the worker (<1 m)?	Yes
Activity class	Falling liquids
Activity subclass	Falling liquids with splash loading
Use rate of transfer	10-1000 l/min
Level of containment	handling that reduces contact between product and adjacent air
General control measures	local exhaust ventilation
Type of hood	fixed capturing hood
Fully enclosed	No
Are demonstrable and effective housekeeping practices in place?	Yes
Site description	indoors, room size 1000m ³
Air changes per hour	3
Are secondary sources present in the workroom?	No
Exposure period	Full shift

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

The outcome of the “Advanced Reach Tool” was 0.037 mg/m³ (75-percentile) and 0.074 mg/m³ (90-percentile). These results show that results from ECETOC TRA modified with the factor of 0.1 according to LEV are in the same range or even more conservative.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

The following table comprises the total exposure of a worker occurring during the manufacture of the substance accounting for the dermal as well as inhalation exposure for each single process. All relevant RMMs have been considered.

Operation	Total exposure (mg/kg bw/day)
PROC1	0,07
PROC2	0,17
PROC3	0,07
PROC4	0,73
PROC5	0,86
PROC8a	0,86
PROC8b	0,73
PROC9	0,73
PROC15	0,07

3.3 - Consumer exposure

Not applicable as the manufacture of the substance is characterized and consumer are not affected.

3.4 - Indirect exposure of human via the environment (oral)

No release of HDI TRIMER by waste water, waste air or waste from manufacture occurs. Therefore humans are not exposed via the environment.

3.5 - Environmental exposure

Environmental releases: Release of HDI TRIMER is strictly controlled by means of effective risk management measures. Exposure of the environment is not expected. Waste gases are cleaned by incineration or by an activated carbon filter. Organic solvent used for cleaning procedures are disposed off via a waste combustion unit. During waste treatment, exposure of the environment is therefore not expected.

Exposure concentration in sewage treatment plants (STP): No waste water is generated related to manufacture of HDI TRIMER. Therefore a sewage treatment plant (STP) is not affected. **PEC_{STP} = 0 mg/l.**

Exposure concentration in aquatic pelagic compartment: Summary of the Predicted Exposure Concentration (PEC) of HDI TRIMER in aquatic pelagic compartment taken into account for risk characterisation:

Compartments	PEC local (aquatic) mg/l	PEC local + regional (aquatic) mg/l	Justification
Freshwater	0	0	No waste water is generated related to formulation of HDI TRIMER. Therefore, direct emissions to freshwater are not expected. Indirect emission of the substance via atmospheric deposition is also not possible due to the risk management measures during manufacture (cleaning of waste air) and during waste disposal (incineration).
Marine water	0	0	See freshwater
Intermittent release of water	0	0	See freshwater

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

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Predicted Exposure Concentrations (PEC) in sediments: In the risk characterization was considered the total of expected exposure concentrations (PEC) of the HDI TRIMER freshwater sediments:

Compartments	PEC local (sediments) mg/kg dw	PEC local + regional (sediments) mg/kg dw	Justification
Freshwater sediments	0	0	No waste water is generated related to formulation of HDI TRIMER. Therefore, direct emissions to freshwater sediment are not expected. Indirect emission of the substance via atmospheric deposition is also not possible due to the risk management measures during manufacture (cleaning of waste air) and during waste disposal (incineration).
Marine water sediments	0	0	See fresh water sediments

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Exposure concentrations in soil and groundwater: The exposure of the terrestrial compartment can occur through the application of sewage sludge and the deposition from the atmosphere. Since no emission to waste water occurs, the entry via sewage sludge can be excluded. Deposition from air is unlikely to occur as an emission to the atmospheric compartment during manufacture can be excluded. Waste gases are transferred to an incineration plant or to similar cleaning processes, where HDI TRIMER is completely removed. Furthermore, all relevant surfaces within the production plant are sealed to prevent contamination of soil. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in soil taken into account for risk characterisation.

Compartments	PEC local (soil/groundwater)	PEC local + regional (soil/groundwater)	Justification
Agricultural Soil averaged (mg/kg ww)	0	0	No penetration via the application of sewage. Sludge and atmospheric deposition.
Prateria media (mg/kg peso/peso)	0	0	See agricultural soil
Falde freatiche (mg/l)	0	0	See agricultural soil

Atmospheric compartment: Waste air is transferred to an incineration plant or to similar waste treatment procedures assuming an efficiency of 100 % with respect to the removal of HDI TRIMER. Consequently, an emission to the atmospheric compartment can be excluded. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in air taken into account for risk characterisation.

	PEC local (air)	PEC local+regional (air)	Justification
During emission ($\mu\text{g}/\text{m}^3$)	0	0	Complete removal from waste gases due to purification, e.g. via incineration.
Annual average ($\mu\text{g}/\text{m}^3$)	0	0	See emission
Annual deposition ($\mu\text{g}/\text{m}^2/\text{day}$)	0	0	See emission

Exposure concentration relevant for the food chain (Secondary poisoning): During formulation, HDI TRIMER is not released into the environment. Therefore, secondary poisoning via the environment is not considered to be a risk.

Summary of the Predicted Exposure Concentration for HDI TRIMER in food for secondary poisoning taken into account for risk characterisation.

	PEC local (oral)	PEC local + regional (oral)	Justification
PEC oral, predator (mg/kg w/w)	0	0	No release into the environment
PEC oral, top predator (mg/kg w/w)	0	0	No release into the environment
Concentration in earthworm (mg/kg ww)	0	0	No release into the environment

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Section 4 - Guidance to Downstream User
ECETOC TRA, or, EUSES v2.1, Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures, If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required

Section 1 - Exposure Scenario Title
ES2. Industrial end use
Description of activities/processes treated in the exposure scenario
Main User Group: SU3 - Industrial uses: Uses of substances as such or in preparations at industrial sites SU 12 - Manufacture of plastics products, including compounding and conversion SU 13 - Manufacture of other non-metallic mineral products, e.g. plasters, cement SU 19 - Building and construction work
Process category: PROC 1 Use in closed process, no likelihood of exposure PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling) PROC 3 Use in closed batch process (synthesis or formulation) PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7 Industrial spraying. PROC 8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10 Roller application or brushing PROC 13 Treatment of articles by dipping and pouring. PROC 14 Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15 Use as a laboratory reagent

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Environmental release category: ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6a Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6c Industrial use of monomers for manufacture of thermoplastics. ERC 6d Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers	
Section 2 - Operating Conditions and Risk management measures	
2.1 - Operating Conditions related to human exposure	
Duration of exposure	8 h/day
Frequency of exposure	220 d/year
Physical form	Liquid
Concentration of substance in preparation or article: in general 50%	
2.2 - Risk management measures related to human health	
Organisational and Technical measures: Local exhaust ventilation is required. In long-term processes where contact to substance cannot be excluded (e.g. filling operations), containment (e.g. housing) is recommended. Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures. Control staff entry to work area. Persons who suffer from skin complaints or other hypersensitivity reactions of skin should not work with the product. Ensure all equipment well maintained. Regular cleaning of equipment and work area.	
Risk management measures: In short-term process where contact to substance cannot be excluded (e.g. sampling operations), an air-fed mask or a combination of activated carbon filter and particulate filter is required. For processes where the opportunity for exposure arises, the use of gloves and protective clothing is stipulated. Suitable materials for safety gloves; EN 374-	
3: Laminate glove - PE/EVOH/PE; Breakthrough time \geq 480 min. Wear eye/face protection e.g. goggles and face shield. Keep away from foodstuffs, drinks and tobacco. Keep working clothes separately. Change contaminated or soaked clothing immediately.	
2.3 - Operating Conditions related to environment	
Emission days per site	max. 300
Annual amount used per site	>1000 t
Abatement measures waste water	No waste water is occurring during production.
2.4 - Risk management measures related to environment	
Organisational measures: Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures	
Abatement measures: Waste water: No waste water is generated Waste air: All waste gases from production and dis/charging steps are transferred to a combustion unit or to an activated carbon filter Soil: Sealing of all relevant soil surfaces in the facility	
Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle): Type of waste: Solvent used for cleaning procedures. Disposal technique: The waste from production is disposed by incineration in a waste combustor. Fraction released to environment: No emission to the environment during waste treatment during waste treatment.	

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Section 3 - Estimation of exposure information	
3.1 - Estimation of exposure	
Workers (oral)	No significant oral exposure
Workers (dermal)	Estimated by the means of the ECETOC TRA model
PROC 1 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
PROC 2 (>4 h)	0,14 mg/kg (body weight) using personal protection equipment
PROC 3 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
PROC 4 (>4 h)	0.69 mg/kg (body weight) using personal protection equipment
PROC 5 (>4 h)	1,37 mg/kg (body weight) using personal protection equipment
PROC 7 (>4 h)	4,20 mg/kg (body weight) using personal protection equipment
PROC 8a (>4 h)	1,37 mg/kg (body weight) using personal protection equipment PROC
8b (>4 h)	0,69 mg/kg (body weight) using personal protection equipment PROC 9 (>4
h)	0,69 mg/kg (body weight) using personal protection equipment
PROC 10 (>4 h)	1,62 mg/kg (body weight) using personal protection equipment
PROC 13 (>4 h)	2,70 mg/kg (body weight) using personal protection equipment PROC
14 (>4 h)	0,34 mg/kg (body weight) using personal protection equipment
PROC 15 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
Workers (inhalation)	Estimated by the means of the ECETOC TRA model
PROC 1 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
2 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
3 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
4 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
5 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
7 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 8a (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
8b (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC 9 (>4
h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 10 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation PROC
13 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 14 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 15 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
Environment	
Water	0 mg/l
Soil	0 mg/kg wet weight
STP	0 mg/l
Human via environment	0 mg/kg bw/day
3.2 - Workers exposure	

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Oral exposure to HDI TRIMER is unlikely to occur because it is prohibited to eat, drink or smoke in the production area. Resting rooms are separated from the manufacturing area and industrial hygiene standards are applied. Personnel who work with HDI TRIMER should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitization conditions of the skin should not handle or work with HDI TRIMER. Anyone who develops chronic respiratory distress when working with Polyisocyanates should be removed from exposure and examined by a physician. Further exposure must be avoided if a sensitivity to HDI TRIMER has developed (ALIPA, 2008). As the formulation HDI TRIMER takes place in closed processes, dermal and inhalation exposure may solely arise at sampling and filling steps. Such exposure is reduced through appropriate risk management measurements like the use of closed units, the presence of ventilation and exhaustion as well as equipped work places and personal protection equipment. A generic tier 1 estimation of the workers exposure occurring at the manufacture of HDI TRIMER was performed using the ECETOC TRA model (v. 2009). Underlying substance properties as well as model settings are presented in the following table.

Substance properties		Model setting	
Molecular weight	Ca. 500 g/mol	Type of setting	Industrial
Vapour pressure	< 0,0001 Pa	State	Liquid
Water solubility	n.a.	Duration of activity	> 4 h/day
Dustiness	n.a.	Use of ventilation	Indoor, without ventilation (dermal exposition); Indoor, with ventilation (inhalation exposition)
		Use of respiratory protection equipment	No
		Substance used in preparation	n.a.

Dermal exposure of workers to HDI TRIMER is solely possible during (dis)charging as well as sampling steps. According to the Technical Report (ECETOC, 2004) no dermal exposure is expected when operating in closed (PROC 1), closed continuous (PROC 2) or closed batch processes (PROC 3). Though the outcome of the ECETOC TRA for all PROC's is reported here.

Operation	Dermal exposure estimate (mg/kg bw/day) Without PPE	Dermal exposure estimate (mg/kg bw/day) With PPE
PROC 1 >4 h	0,34	0,03
PROC 2 >4 h	1,37	0,14

PROC 3 >4 h	0,34	0,03
PROC 4 >4 h	6,86	0,69
PROC 5 >4 h	13,7	1,37
PROC 7 >4 h	42,9	4,3
PROC 8a >4 h	13,7	1,37
PROC 8b >4 h	6,86	0,69
PROC 9 >4 h	6,86	0,69
PROC 10 >4 h	27,7	2,7

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

PROC 13 >4 h	13,7	1,37
PROC 14 >4 h	3,43	0,34
PROC 15 >4 h	0,34	0,03

For processes where the opportunity for exposure arises, the use of personal protection equipment (PPE) is recommended to control the risk. Use of PPE's reduces exposure by 90% (EU TGD, Part 5, 7 and 10, additional RMMs are required in cases where opportunity for contact with the substance exists. In these cases, either technical measures or personal protection equipment should be used. When the worker is in near distance to the spray. The spray direction is typically horizontal or downwards. Downward ventilation (about 0.3 m/sec) is used from top to down and overspray is collected in a filter. The one-way overall, gloves and a full-face respirator mask with external air supply (ALIPA 2010). Inhalation exposure is minimised via the application of mainly closed processes as well as the use of exhaust ventilation during all sampling and (dis)charging operations. The following table comprises the exposure of workers during the industrial end use of HDI TRIMER. However, the current version of the tool (July, 2009) has some weaknesses for the exposure estimation of liquids. The tool does not give different exposure estimates when using LEV, PPE or different exposure times. Therefore the effect of LEV (90% reduction) is estimated manually.

Operation	Inhalative exposure estimate	
	mg/m ³	mg/kg pc/giorno
PROC 1 >4 h	2,1	0,32
PROC 2 >4 h	2,1	0,32
PROC 3 >4 h	2,1	0,32
PROC 4 >4 h	2,1	0,32
PROC 5 >4 h	2,1	0,32
PROC 7 >4 h	2,1	0,32
PROC 8a >4 h	2,1	0,32
PROC 8b >4 h	2,1	0,32
PROC 9 >4 h	2,1	0,32
PROC 10 >4 h	2,1	0,32
PROC 13 >4 h	2,1	0,32
PROC 14 >4 h	2,1	0,32
PROC 15 >4 h	2,1	0,32

In order to validate the refined ECETOC TRA estimations, results were compared with those from the "Reach Tool" (<http://www.advancedreachtool.com/>) (Version 1). This tool has been developed for exposure assessments. It is capable to estimate exposure from handling liquids. Two examples have been calculated: Spraying according to PROC7 and filling operations according to PROC 8b/9 were calculated. The following table, input parameters are described.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Model settings	Input
Primary product	Liquid
Process temperature	15-25°C
Vapour pressure	0,0001 Pa
Liquid weight fraction	0.1 – 0.5 (10-50 %)
Viscosity	Like water
Is the primary emission source located in the breathing zone of the worker (<1 m)?	Yes
Activity class	Surface spraying of liquids
Situation	moderate (0.3 – 3 l/min.)
Spray direction	Horizontal or downwards
Spray technique	Spraying with high compressed air
Process fully enclosed?	no
Effective housekeeping?	yes
Site description	Indoors, room size 100 m ³
Primary localised controls	Fixed capturing hood (90 % reduction)
Secondary localised controls	no
Segregation	3
Air changes per hour	No
Are secondary sources present in the workroom?	Full shift

The outcome of the “Advanced Reach Tool” was 0.095 mg/m³ (75-percentile) and 0.18 mg/m³ (90-percentile). These results show that results from ECETOC TRA modified with the factor of 0.1 according to LEV are in the same range or even more conservative.

Model settings	Input
Primary product	Liquid
Process temperature	15-25°C
Vapour pressure	0,0001 Pa
Liquid weight fraction	1
Viscosity	Like water
Is the primary emission source located in the breathing zone of the worker (<1 m)?	Yes
Activity class	Falling liquids
Activity subclass	Falling liquids with splash loading
Use rate of transfer	10-1000 l/min
Level of containment	handling that reduces contact between product and adjacent air
General control measures	local exhaust ventilation
Type of hood	fixed capturing hood
Fully enclosed	No

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Are demonstrable effective housekeeping and practices in place?	Yes
Site description	indoors, room size 1000m ³
Air changes per hour	3
Are secondary sources present in the workroom?	No

Exposure period	Full shift
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The outcome of the "Advanced Reach Tool" was 0.037 mg/m³ (75-percentile) and 0.074 mg/m³ (90-percentile). These results show that results from ECETOC TRA modified with the factor of 0.1 according to LEV are in the same range or even more conservative. The following table comprises the total exposure of the worker occurring during the industrial end use as an accounting for the dermal as well as inhalation exposure for each single process.

Operation	Total exposure (mg/kg bw/day)
PROC1>4h	0,07
PROC2>4h	0,18
PROC3>4h	0,07
PROC4>4h	0,73
PROC5>4h	1,41
PROC7>4h	4,3
PROC8a>4h	1,41
PROC8b>4h	0,73
PROC9>4h	0,73
PROC10>4h	2,7
PROC13>4h	1,41
PROC14>4h	0,38
PROC15>4h	0,07

3.3 - Consumer exposure

Not applicable as the industrial end use in industrial setting of the substance is characterized and consumers are not affected

3.4 - Indirect exposure of human via the environment (oral)

No release of HDI TRIMER by waste water, waste air or waste from manufacture occurs. Therefore humans are not exposed via the environment.

3.5 - Environmental exposure

Environmental releases: Release of HDI TRIMER is controlled by means of effective risk management measures. Exposure of the environment is not expected. Waste gases are cleaned by incineration or by an activated carbon filter. Organic solvent used for cleaning procedures are disposed off via a waste combustion unit. During waste treatment, exposure of the environment is therefore not expected.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Exposure concentration in sewage treatment plants (STP):

Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection:

1. Collection of the "overspray" in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills.
2. Collection of the "overspray" with dry filters and disposing off by incineration or landfill (see 1.). **PEC_{STP} = 0 mg/l.**

Exposure concentration in aquatic pelagic compartment: Summary of the Predicted Exposure Concentration (PEC) of HDI TRIMER in aquatic pelagic compartment taken into account for risk characterisation:

Compartments	PEC local (aquatic) mg/l	PEC local + regional (aquatic) mg/l	Justification
Freshwater	0	0	Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection: 1. Collection of the "overspray" in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills. 2. Collection of the "overspray" with dry filters and disposing off by incineration or landfill (see 1.).
Marine water	0	0	See freshwater
Intermittent release of water	0	0	See freshwater

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Predicted Exposure Concentrations (PEC) in sediments: In the risk characterization was considered the total of expected exposure concentrations (PEC) of the HDI TRIMER freshwater sediments:

Compartments	PEC local (sediments) mg/kg dw	PEC local + regional (sediments) mg/kg dw	Justification
Freshwater sediments	0	0	Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection: 1. Collection of the "overspray" in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills. 2. Collection of the "overspray" with dry filters and disposing off by incineration or landfill (see 1.).
Marine water sediments	0	0	See fresh water sediments

Exposure concentrations in soil and groundwater: The exposure of the terrestrial compartment can occur through the application of sewage sludge and the deposition from the atmosphere. Since no emission to waste water occurs, the entry via sewage sludge can be excluded. Deposition from air is unlikely to occur as an emission to the atmospheric compartment during manufacture can be excluded. Waste gases are transferred to an incineration plant or to similar cleaning processes, where HDI TRIMER is completely removed. Furthermore, all relevant surfaces within the production plant are sealed to prevent contamination of soil. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in soil taken into account for risk characterisation.

Compartments	PEC local (soil/groundwater)	PEC local + regional (soil/groundwater)	Justification
Agricultural Soil averaged (mg/kg ww)	0	0	No penetration via the application of sewage. Sludge and atmospheric deposition.
Prateria media (mg/kg peso/peso)	0	0	See agricultural soil
Falde freatiche (mg/l)	0	0	See agricultural soil

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Atmospheric compartment: Waste air is transferred to an incineration plant or to similar waste treatment procedures assuming an efficiency of 100 % with respect to the removal of HDI TRIMER. Consequently, an emission to the atmospheric compartment can be excluded. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in air taken into account for risk characterisation.

	PEC local (air)	PEC local+regional (air)	Justification
During emission ($\mu\text{g}/\text{m}^3$)	0	0	Complete removal from waste gases due to purification, e.g. via incineration.
Annual average ($\mu\text{g}/\text{m}^3$)	0	0	See emission
Annual deposition ($\mu\text{g}/\text{m}^2/\text{day}$)	0	0	See emission

Exposure concentration relevant for the food chain (Secondary poisoning): During formulation, HDI TRIMER is not released into the environment. Therefore, secondary poisoning via the environment is not considered to be a risk. Summary of the Predicted Exposure Concentration for HDI TRIMER in food for secondary poisoning taken into account for risk characterisation.

	PEC local (oral)	PEC local + regional (oral)	Justification
PEC oral, predator (mg/kg w/w)	0	0	No release into the environment
PEC oral, top predator (mg/kg w/w)	0	0	No release into the environment
Concentration in earthworm (mg/kg ww)	0	0	No release into the environment

Section 4 - Guidance to Downstream User

ECETOC TRA, or, EUSES v2.1, Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures, If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required

Section 1 - Exposure Scenario Title

ES3. Professional end use

Description of activities/processes treated in the exposure scenario

Main User Group:

SU 10 Formulation [mixing] of preparations and/or re-packaging (excluding alloys)

SU 12 - Manufacture of plastics products, including compounding and conversion

SU 13 - Manufacture of other non-metallic mineral products, e.g. plasters, cement

SU 19 - Building and construction work

SU 22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen).

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

<p>Process category: PROC 3 Use in closed batch process (synthesis or formulation) PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at nondedicated facilities PROC 8b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9 Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10 Roller application or brushing PROC 11 Non industrial spraying PROC 13 Treatment of articles by dipping and pouring. PROC 14 Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15 Use as a laboratory reagent</p>	
<p>Environmental release category: ERC 2 Formulation of preparations ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix. ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix</p>	
<p>Section 2 - Operating Conditions and Risk management measures</p>	
<p>2.1 - Operating Conditions related to human exposure</p>	
Duration of exposure	8 h/day
Frequency of exposure	220 d/year
Physical form	Liquid
<p>Concentration of substance in preparation or article: in general 50%</p>	
<p>2.2 - Risk management measures related to human health</p>	
<p>Organisational and Technical measures: Local exhaust ventilation is required. In long-term processes where contact to substance cannot be excluded (e.g. filling operations), containment (e.g. housing) is recommended. Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures. Control staff entry to work area. Persons who suffer from skin complaints or other hypersensitivity reactions of skin should not work with the product. Ensure all equipment well maintained. Regular cleaning of equipment and work area.</p>	
<p>Risk management measures: In short-term process where contact to substance cannot be excluded (e.g. sampling operations), an air-fed mask or a combination of activated carbon filter and particulate filter is required. For processes where the opportunity for exposure arises, the use of gloves and protective clothing is stipulated. Suitable materials for safety gloves; EN 3743: Laminate glove - PE/EVOH/PE; Breakthrough time \geq 480 min. Wear eye/face protection e.g. goggles and face shield. Keep away from foodstuffs, drinks and tobacco. Keep working clothes separately. Change contaminated or soaked clothing immediately.</p>	
<p>2.3 - Operating Conditions related to environment</p>	
Emission days per site	max. 300
Annual amount used per site	>1000 t
Abatement measures waste water	No waste water is occurring during production.
<p>2.4 - Risk management measures related to environment</p>	

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Organisational measures: Procedural and/or control technologies are used to minimise emissions and the resulting exposure during purification or cleaning and maintenance procedures	
Abatement measures: Waste water: No waste water is generated Waste air: All waste gases from production and dis/charging steps are transferred to a combustion unit or to an activated carbon filter Soil: Sealing of all relevant soil surfaces in the facility	
Waste management measures, necessary for risk management at different stages of the life cycle of substances (including mixtures or articles at the end of its life cycle): Type of waste: Solvent used for cleaning procedures. Disposal technique: The waste from production is disposed by incineration in a waste combustor. Fraction released to environment: No emission to the environment during waste treatment during waste treatment.	
Section 3 - Estimation of exposure information	
3.1 - Estimation of exposure	
Workers (oral)	No significant oral exposure
Workers (dermal)	Estimated by the means of the ECETOC TRA model
PROC 3 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
PROC 4 (>4 h)	0.69 mg/kg (body weight) using personal protection equipment
PROC 5 (>4 h)	1,37 mg/kg (body weight) using personal protection equipment
PROC 8a (>4 h)	1,37 mg/kg (body weight) using personal protection equipment
PROC 8b (>4 h)	0,69 mg/kg (body weight) using personal protection equipment
PROC 9 (>4 h)	0,69 mg/kg (body weight) using personal protection equipment
PROC 10 (>4 h)	1,62 mg/kg (body weight) using personal protection equipment
PROC 11 (>4 h)	10,70 mg/kg (body weight) using personal protection equipment
PROC 13 (>4 h)	2,70 mg/kg (body weight) using personal protection equipment
PROC 14 (>4 h)	0,34 mg/kg (body weight) using personal protection equipment
PROC 15 (>4 h)	0,03 mg/kg (body weight) using personal protection equipment
Workers (inhalation)	Estimated by the means of the ECETOC TRA model
PROC 3 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 4 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 5 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 8a (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 8b (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 9 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 10 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 11 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 13 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 14 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
PROC 15 (>4 h)	0,21 mg/m ³ , with Local exhaust ventilation
Environment	
Water	0 mg/l
Soil	0 mg/kg wet weight

STP	0 mg/l
Human via environment	0 mg/kg bw/day
3.2 - Workers exposure	

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Oral exposure to HDI TRIMER is unlikely to occur because it is prohibited to eat, drink or smoke in the production area. Resting rooms are separated from the manufacturing area and industrial hygiene standards are applied. Personnel who work with HDI TRIMER should have a pre-placement medical examination and periodic examinations thereafter, including a pulmonary function test. Anyone with a medical history of chronic respiratory disease, asthmatic or bronchial attacks, indications of allergic responses, recurrent eczema or sensitization conditions of the skin should not handle or work with HDI TRIMER. Anyone who develops chronic respiratory distress when working with Polyisocyanates should be removed from exposure and examined by a physician. Further exposure must be avoided if a sensitivity to HDI TRIMER has developed (ALIPA, 2008). As the synthesis HDI TRIMER takes place in closed processes, dermal and inhalation exposure may solely arise at sampling and filling steps. Such exposure is reduced through appropriate risk management measurements like the use of closed units, the presence of ventilation and exhaustion as well as equipped work places and personal protection equipment. A generic tier 1 estimation of the workers exposure occurring at the manufacture of HDI TRIMER was performed using the ECETOC TRA model (v. 2009). Underlying substance properties as well as model settings are presented in the following table.

Substance properties		Model setting	
Molecular weight	Ca. 500 g/mol	Type of setting	Industrial
Vapour pressure	< 0,0001 Pa	State	Liquid
Water solubility	n.a.	Duration of activity	> 4 h/day
Dustiness	n.a.	Use of ventilation	Indoor, without ventilation (dermal exposition); Indoor, with ventilation (inhalation exposition)
		Use of respiratory protection equipment	No
		Substance used in preparation	n.a.

Dermal exposure of workers to HDI TRIMER is solely possible during (dis)charging as well as sampling steps. According to the Technical Report (ECETOC, 2004) no dermal exposure is expected when operating in closed (PROC 1), closed continuous (PROC 2) or closed batch processes (PROC 3). Though the outcome of the ECETOC TRA for all PROC's is reported here.

Operation	Dermal exposure estimate (mg/kg bw/day)	
	Without PPE	With PPE
PROC 3 >4 h	0,34	0,03
PROC 4 >4 h	6,86	0,69
PROC 5 >4 h	13,7	1,37
PROC 8a >4 h	13,7	1,37
PROC 8b >4 h	6,86	0,69
PROC 9 >4 h	6,86	0,69
PROC 10 >4 h	27,7	2,7
PROC 11 >4 h	107	10,7

PROC 13 >4 h	13,7	1,37	
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Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

PROC 14 >4 h	3,43	0,34	from the
PROC 15 >4 h	0,34	0,03	anced

For processes where the opportunity for exposure arises, the use of personal protection equipment (PPE) such as gloves is recommended to control the risk. Use of PPE's reduces exposure by 90% (EU TGD, Part I, 5, 7 and 10, additional RMMs are required in cases where opportunity for contact with the substance exists. In these cases, either technical measures or personal protection equipment should be used. When the worker is in near distance to the spray. The spray direction is typically horizontal or downwards. Local exhaust ventilation (about 0.3 m/sec) is used from top to down and overspray is collected in a filter. This is the one-way overall, gloves and a full-face respirator mask with external air supply (ALIPA 2010). Inhalation exposure is minimised via the application of mainly closed processes as well as the use of local exhaust ventilation during all sampling and (dis)charging operations. The following table comprises the estimated exposure of workers during the industrial end use of HDI TRIMER. However, the current version (July, 2009) has some weaknesses for the exposure estimation of liquids. The tool does not give changes when using LEV, PPE or different exposure times. Therefore the effect of LEV (90% reduction) is not manually.

Operation	Inhalative exposure estimate	
	mg/m ³	mg/kg pc/giorno
PROC 3 >4 h	0,21	0,04
PROC 4 >4 h	0,21	0,04
PROC 5 >4 h	0,21	0,04
PROC 8a >4 h	0,21	0,04
PROC 8b >4 h	0,21	0,04
PROC 9 >4 h	0,21	0,04
PROC 10 >4 h	0,21	0,04
PROC 10 >4 h	0,21	0,04
PROC 13 >4 h	0,21	0,04
PROC 14 >4 h	0,21	0,04
PROC 15 >4 h	0,21	0,04

In order to validate the refined ECETOC TRA estimations, results were compared with the "Reach Tool" (<http://www.advancedreachtool.com/>) (Version 1). This tool has been developed for exposure assessments. It is capable to estimate exposure from handling liquids. Two examples have been shown: Spraying according to PROC11 and filling operations according to PROC 8b/9 were calculated. The following table, input parameters are described.

Model settings	Input
Primary product	Liquid
Process temperature	15-25°C
Vapour pressure	0,0001 Pa
Liquid weight fraction	0.1 – 0.5 (10-50 %)
Viscosity	Like water
Is the primary emission source located in the breathing zone of the worker (<1 m)?	Yes
Activity class	Surface spraying of liquids

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Situation	moderate (0.3 – 3 l/min.)
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Spray direction	Horizontal or downwards
Spray technique	Spraying with high compressed air
Process fully enclosed?	no
Effective housekeeping?	yes
Site description	Indoors, room size 100 m ³
Primary localised controls	Fixed capturing hood (90 % reduction)
Secondary localised controls	no
Segregation	3
Air changes per hour	No
Are secondary sources present in the workroom?	Full shift

The outcome of the “Advanced Reach Tool” was 0.095 mg/m³ (75-percentile) and 0.18 mg/m³ (90-percentile). These results show that results from ECETOC TRA modified with the factor of 0.1 according to LEV are in the same range or even more conservative.

Model settings	Input
Primary product	Liquid
Process temperature	15-25°C
Vapour pressure	0,0001 Pa
Liquid weight fraction	1
Viscosity	Like water
Is the primary emission source located in the breathing zone of the worker (<1 m)?	Yes
Activity class	Falling liquids
Activity subclass	Falling liquids with splash loading
Use rate of transfer	10-1000 l/min
Level of containment	handling that reduces contact between product and adjacent air
General control measures	local exhaust ventilation
Type of hood	fixed capturing hood
Fully enclosed	No
Are demonstrable and effective housekeeping practices in place?	Yes
Site description	indoors, room size 1000m ³
Air changes per hour	3
Are secondary sources present in the workroom?	No
Exposure period	Full shift

The outcome of the “Advanced Reach Tool” was 0.037 mg/m³ (75-percentile) and 0.074 mg/m³ (90-percentile). These results show that results from ECETOC TRA modified with the factor of 0.1 according to LEV are in the same range or even more conservative. The following table comprises the total exposure of the worker occurring during the professional end use as an accounting for the dermal as well as inhalation exposure for each single process.

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Operation	Total exposure (mg/kg bw/day)
PROC3>4h	0,07
PROC4>4h	0,73

PROC5>4h	1,41
PROC8a>4h	1,41
PROC8b>4h	0,73
PROC9>4h	0,73
PROC10>4h	2,7
PROC11>4h	10,7
PROC13>4h	1,41
PROC14>4h	0,38
PROC15>4h	0,07

3.3 - Consumer exposure

Not applicable as the industrial end use in industrial setting of the substance is characterized and consumers are not affected

3.4 - Indirect exposure of human via the environment (oral)

No release of HDI TRIMER by waste water, waste air or waste from manufacture occurs. Therefore humans are not exposed via the environment.

3.5 - Environmental exposure

Environmental releases: Release of HDI TRIMER is controlled by means of effective risk management measures. Exposure of the environment is not expected. Waste gases are cleaned by incineration or by an activated carbon filter. Organic solvent used for cleaning procedures are disposed off via a waste combustion unit. During waste treatment, exposure of the environment is therefore not expected.

Exposure concentration in sewage treatment plants (STP):

Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection:

1. Collection of the "overspray" in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills.
2. Collection of the "overspray" with dry filters and disposing off by incineration or landfill (see 1.). **PEC_{STP} = 0 mg/l.**

Exposure concentration in aquatic pelagic compartment: Summary of the Predicted Exposure Concentration (PEC) of HDI TRIMER in aquatic pelagic compartment taken into account for risk characterisation:

Compartments	PEC local (aquatic) mg/l	PEC local + regional (aquatic) mg/l	Justification

Exposure Scenario

Hexamethylene diisocyanate oligomers, isocyanurate

Freshwater	0	0	<p>Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection:</p> <ol style="list-style-type: none"> 1. Collection of the “overspray” in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills. 2. Collection of the “overspray” with dry filters and disposing off by incineration or landfill (see 1.).
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Marine water	0	0	See freshwater
Intermittent release of water	0	0	See freshwater

Predicted Exposure Concentrations (PEC) in sediments: In the risk characterization was considered the total of expected exposure concentrations (PEC) of the HDI TRIMER freshwater sediments:

Compartments	PEC local (sediments) mg/kg dw	PEC local + regional (sediments) mg/kg dw	Justification
Freshwater sediments	0	0	<p>Waste water related to industrial end use of HDI TRIMER is generally not directed to a sewage treatment plant (STP). Therefore a STP is not affected. There are 2 types of waste water collection:</p> <ol style="list-style-type: none"> 1. Collection of the “overspray” in water. The isocyanate groups in HDI TRIMER react with water yielding polymeric ureas or, if polyols are present, forming Polyurethanes. The sludge is precipitating which in most cases is incinerated or, in a few cases, disposed off in landfills. 2. Collection of the “overspray” with dry filters and disposing off by incineration or landfill (see 1.).
Marine water sediments	0	0	See fresh water sediments

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Exposure concentrations in soil and groundwater: The exposure of the terrestrial compartment can occur through the application of sewage sludge and the deposition from the atmosphere. Since no emission to waste water occurs, the entry via sewage sludge can be excluded. Deposition from air is unlikely to occur as an emission to the atmospheric compartment during manufacture can be excluded. Waste gases are transferred to an incineration plant or to similar cleaning processes, where HDI TRIMER is completely removed. Furthermore, all relevant surfaces within the production plant are sealed to prevent contamination of soil. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in soil taken into account for risk characterisation.

Compartments	PEC local (soil/groundwater)	PEC local + regional (soil/groundwater)	Justification
Agricultural Soil averaged (mg/kg ww)	0	0	No penetration via the application of sewage. Sludge and atmospheric deposition.
Prateria media (mg/kg peso/peso)	0	0	See agricultural soil
Falde freatiche (mg/l)	0	0	See agricultural soil

Atmospheric compartment: Waste air is transferred to an incineration plant or to similar waste treatment procedures assuming an efficiency of 100 % with respect to the removal of HDI TRIMER. Consequently, an emission to the atmospheric compartment can be excluded. Summary of the Predicted Exposure Concentration (PEC) for HDI TRIMER in air taken into account for risk characterisation.

	PEC local (air)	PEC local+regional (air)	Justification
During emission ($\mu\text{g}/\text{m}^3$)	0	0	Complete removal from waste gases due to purification, e.g. via incineration.
Annual average ($\mu\text{g}/\text{m}^3$)	0	0	See emission
Annual deposition ($\mu\text{g}/\text{m}^2/\text{day}$)	0	0	See emission

Exposure concentration relevant for the food chain (Secondary poisoning): During formulation, HDI TRIMER is not released into the environment. Therefore, secondary poisoning via the environment is not considered to be a risk. Summary of the Predicted Exposure Concentration for HDI TRIMER in food for secondary poisoning taken into account for risk characterisation.

	PEC local (oral)	PEC local + regional (oral)	Justification
PEC oral, predator (mg/kg w/w)	0	0	No release into the environment
PEC oral, top predator (mg/kg w/w)	0	0	No release into the environment
Concentration in earthworm (mg/kg ww)	0	0	No release into the environment

Exposure Scenario

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This exposure scenario was drawn to integration of the safety data sheet. The information contained in this annex are based on the data currently available to us in connection with the product. The above data were collected according to our best knowledge, however only for informative purposes.

The Security tab is used to help the user of the product in the decision of the applicability and suitability of the product in relation to the use and in the fulfilment of the obligations associated with the use of hazardous substances, it exempts from knowledge and application of the provisions relating to such activity, nor by the application of appropriate protection measures.

Since we cannot affect the handling, storage, use and disposal of the product and we have no information, no liability is accepted for the handling, storage, use and disposal of the product.

When the product is used as part of another product, the present ES will no longer apply.

Manufactured by:

Sobeltec nv
Phone nr +32 55 230 600