MDI: Final Exposure Scenarios in the e-SDS format $As\ of\ 30\ April\ 2012$

On the next pages the MDI Exposure Scenarios (ES) in the e-SDS format are presented.

At the request of the consortia TNO clustered the eleven ES in the MDI CSR into eight broad clusters following the life cycle tree of MDI.

ES cluster	Life cycle stage	MDI	
1	Manufacturing	- Manufacturing of MDI	
2	Manufacturing of other substances and formulation	Manufacturing of other SubstancesFormulating, Repackaging and Distribution	
3	End uses – industrial	 Flexible Foam Elastomers, TPU, Polyamide, Polyimide and Synthetic Fibres and Manufacturing of other Polymers 	
4			
5		Composite Material Based on Wood/Man-made/Mineral/Natural Fibres	
6		Foundry Other Composite Material	
7	End uses – professional	 Rigid foam Coatings Composite Material Based on Wood/Man-Made/Mineral/Natural Fibres Adhesives and sealants Other Composite Material 	
8	End uses - consumer	Rigid FoamCoatingsAdhesives and sealants	

Exposure scenario cluster 1: Manufacturing of MDI

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Manufacturing of MDI	
Use Descriptor	Sector of Use: SU 3, SU 8, SU 9	
	Process Categories and Environmental Release Categories: PROC 0a, PROC 1, PROC 2, PROC 3, PROC 4, PROC 8a, PROC 8b, PROC 15 ERC 1, ERC 2, ERC 6c	
Processes, tasks, activities covered	Covers: Industrial: - PROC 0a: Removal of solidified materials by mechanical means in containers, vessels, blenders	
	 PROC 1: Use in closed process, no likelihood of exposure. (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) 	
	 PROC 2: Use in closed continuous processes with occasional exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions). 	
	 PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment breaks). 	
	 PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, sampling, maintenance, equipment breaks). 	
	 PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/ large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging). 	
	 PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. drum filling, sampling, waste collection 	

	O throughout and the Landau in a
	& transfer, charging, discharging)
	PROC 15: Use as a laboratory reagent
Section 2	Operational conditions and risk management measures
Field for additional statements to exp	plain scenario if required.
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100 % (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
	Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection
All contributing scenarios at product temperatures <u>below</u> 40 °C for pure MDI or <u>below</u> 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. PPE14: Use suitable eye protection and gloves. PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures <u>above</u> 40 °C for pure MDI or <u>above</u> 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings.

	
	Or - E83: Handle in a fume cupboard or under extract ventilation.
	- PPE30: If above technical/organisational control measures are not feasible, then adopt following PPE:
	- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.
	Or
	- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 0a: Removal of solidified	- G4: Covers frequency up to: monthly use
materials by mechanical means in	- PPE14: Use suitable eye protection and gloves. ²
containers, vessels, blenders	- PPE27: Wear suitable coveralls to prevent exposure to the skin.
	- PPE29: Wear a respirator conforming to EN140
	with Type A/P2 filter or better
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
PROC 2. Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)	- EH8: No specific measures identified.
PROC 3. Use in closed batch	- EI18: No specific measures identified.
processes (synthesis or	
formulation) (e.g. during sampling, maintenance, equipment breaks)	
PROC 4. Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, sampling,	- EI18: No specific measures identified
maintenance, equipment breaks)	
PROC 8a. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging)	 EI18: No specific measures identified If solid MDI: PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
& nansier, charging, discharging)	

PROC 8b. Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging) PROC 15. Use as a laboratory reagent	- EI18: No specific measures identified. - EI18: No specific measures identified
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].
	Not biodegradable [PrC5f].
Operational conditions	Indoor/Outdoor use [OOC3].
Amounts used	macer caract are [o cer].
Fraction of EU tonnage used in region [A1]:	1
Regional use tonnage (tonnes/year) [A2]:	2,000,000
Fraction of regional tonnage used locally [A3]:	0.281
Maximum daily site tonnage (kg/day) [A4].	1,873,333
Frequency and duration of use	
Type of release	Continuous release [FD2].
Emission days (days/year) [FD4]	≥ 300
Environmental factors not influence	ced by risk management
Local freshwater dílution factor [EF1].	10
Local marine water dilution factor [EF2].	100
Other given operational	Used in closed systems.
conditions affecting environmental exposure	Dry processes.
Release fraction to air from process [OOC4].	3.2·10 ⁻⁸
Release fraction to wastewater from process [OOC5].	0

3.1 Health	
Section 3	Exposure Estimation
Other environmental control measures additional to above	None.
Conditions and measures related to external recovery of waste	Not applicable.
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to municipal sewage treatment plant	Domestic sewage treatment is not assumed [STP2].
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Air:	Treat air emissions to provide a typical removal efficiency of >99% [TCR7].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Off-gases are treated by: Incineration, and/or Carbon absorption, and/or Caustic scrubbing.
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
Risk Management Measures	
Release fraction to soil from process (regional only) [OOC6].	0

3.1. Health

Measured data has been used to estimate worker exposure.

PROC#	Inhalation exposure - long term (mg/m³)	RCR inhalation – long term	Inhalation exposure –short term (mg/m ³	RCR inhalation - short term
PROC 0a	0.0056	0.112	0.011	0.112
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.164	0.016	0.164
PROC 8a	0.029	0.582	0.058	0.582

PROC 8b	0.029	0.582	0.058	0.582
PROC 15	0.006	0.112	0.011	0.112
3.2. Enviro	nment			
Used EUSE	S model [EE4].			
Compartm	ent	Predicted Environmen Concentrat	ntal	Characterisation Ratio
Freshwater	(mg/l)	6.87·10 ⁻³		< 6.87·10 ⁻³
Marine water	er (mg/l)	5.43·10 ⁻⁴		$< 5.43 \cdot 10^{-3}$
Agricultural	l soil (mg/kg)	0.239		< 0.239
Grassland (1	mg/kg)	0.239		< 0.239
Section 4		Guidance to che Exposure Scena	eck compliance v rio	vith the
4.1. Health				
Guidance to DU		Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC-22] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23] Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use		
		Descriptors		
4.2. Enviro				
Not applica	ble			
Section 5 Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)				
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.				
Control of	Worker Exposure			
Not applica	ble			
Control of environmental exposure				
Not applica	ble			

Exposure scenario cluster 2: Use of MDI for Manufacturing of other Substances and Formulation (including Resin Manufacture), Repackaging and Distribution

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Use of MDI for Manufacturing other Substances and Formulation (including Resin Manufacture), Repackaging and Distribution	
Use Descriptor	Sector of Use for Manufacturing of other Substances: SU 3, SU 8, SU 9 Sector of use Formulation (including Resin Manufacture), Repackaging and Distribution: SU 3, SU 10	
	Process Categories and Environmental Release Categories:	
	A) Use for Manufacturing of other substances PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15 ERC2, ERC3, ERC6a	
	B) Formulation (including Resin Manufacture), Repackaging and Distribution PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15 ERC2, ERC3, ERC6c	
Processes, tasks, activities covered	Covers: Industrial: - PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	
	PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)	
	 PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment breaks) 	
	 PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises 	

	(e.g. during use, sampling, maintenance, equipment breaks)	
	 PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) (e.g. mixing) 	
	 PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging) 	
	 PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging) 	
	 PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing) 	
	- PROC 15: Use as a laboratory reagent	
Section 2	Operational conditions and risk management measures	
Field for additional statements to explain scenario if required.		
Section 2.1	Control of worker exposure	
Product characteristics		
Physical form of product	Physical state: liquid (only solid when specifically mentioned)	
Concentration of substance in product	G13: Covers percentage substance in the product up to 100 % (unless stated differently).	
Amounts used	Not applicable.	
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).	
Human factors not influenced by risk management	None identified.	
Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical	

	measures to prevent dispersion, 3. Organisational measures, 4. Personal protection
All contributing scenarios at product temperatures <u>below</u> 40 °C for pure MDI or <u>below</u> 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. PPE14: Use suitable eye protection and gloves PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation. - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	- E118: No specific measures identified.
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or	- EI18: No specific measures identified.

	formulation) (e.g. during sampling, maintenance, equipment breaks)	
	PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, sampling, maintenance, equipment breaks)	- EI18: No specific measures identified
	PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) (e.g. mixing)	- E54: Provide extract ventilation to points where emissions occur.
	PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
	PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
	PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)	- EI18: No specific measures identified
	PROC 15: Use as a laboratory reagent	- EI18: No specific measures identified
	Section 2.2	Control of environmental exposure
	Product characteristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
4		Predominantly hydrophobic [PrC4a].
	0 4 1 11	Not biodegradable [PrC5f].
	Operational conditions	Indoor/Outdoor use [OOC3].

Amounts used		
Fraction of EU tonnage used in region [A1]:	1	
Regional use tonnage (tonnes/year) [A2]:	520,000	
Fraction of regional tonnage used locally [A3]:	0.019	
Average local daily tonnage (kg/d) [A5]:	33,333	
Frequency and duration of use		
Type of release	Continuous release [FD2].	
Emission days (days/year) [FD4]	≥ 300	
Environmental factors not influe	enced by risk management	
Local freshwater dilution factor [EF1].	10	
Local marine water dilution factor [EF2].	100	
Other given operational	Used in open systems.	
conditions affecting environmental exposure	Dry processes.	
Release fraction to air from process [OOC4].	1.2·10 ⁻⁵	
Release fraction to wastewater from process [OOC5].	0	
Release fraction to soil from process (regional only) [OOC6]	0	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].	
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].	
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].	

Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.

Section 3 Exposure Estimation

3.1. Health

Measured data has been used to estimate worker exposure.

PROC#	Inhalation exposure – long term (mg/m³)	RCR inhalation - long term	Inhalation exposure – short term (mg/m³)	RCR inhalation – Short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.164	0.016	0.164
PROC 5	0.029	0.582	0.058	0.582
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.009	0.094
PROC 15	0.006	0.112	0.011	0.112

3.2. Environment

Used EUSES model [EE4].

Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio
Freshwater (mg/l)	6.85·10 ⁻³	< 6.85·10 ⁻³
Marine water (mg/l)	5.43·10 ⁻⁴	< 5.43·10 ⁻³
Agricultural soil (mg/kg)	0.239	< 0.239
Grassland (mg/kg)	0.239	< 0.239
Section 4	Guidance to check compliance with the Exposure Scenario	

4.1. Health		
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]	
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]	
	Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors	

4.2. Environment

Not applicable

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Not applicable

Control of environmental exposure

Not applicable

Exposure scenario cluster 3: Industrial use of MDI for Flexible Foam and Elastomers, TPU, Polyamide, Polyimide and Synthetic Fibres and Manufacturing of other Polymers

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Industrial use of MDI for Flexible Foam and Elastomers, TPU, Polyamide, Polyimide and Synthetic Fibres and Manufacturing of other Polymers	
Use Descriptor	Sector of Use: SU 3	
	Process Categories and Environmental Release Categories: A) Use in Flexible Foam PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 14, PROC 15, PROC 21 ERC 2, ERC 3, ERC 6c B) Use in Elastomers TPU, Polyamide, Polyimide and Synthetic Fibres and Manufacturing of other Polymers PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 ERC 2, ERC 3, ERC 6c	
Processes, tasks, activities	Covers:	
covered	Industrial: - PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	
	PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing in cabinet, during sampling, charging, discharging, maintenance, equipment cleaning, occasional interventions)	
	 PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, sampling, maintenance, equipment cleaning, occasional interventions) 	
	 PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during casting, other open uses, maintenance, 	

risk management	
Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection
All contributing scenarios at product temperatures <u>below</u> 40 °C for pure MDI or <u>below</u> 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop. PPE14: Use suitable eye protection and gloves. PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation. - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed	- EI18: No specific measures identified.

	moulding, sawing in cabinet, during sampling, charging, discharging, maintenance, equipment cleaning, occasional interventions)	
	PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, sampling, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified.
	PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during casting, other open uses, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified
	PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	- E54: Provide extract ventilation to points where emissions occur.
	PROC 7: Industrial spraying.	 E59: Carry out in a vented booth provided with laminar airflow Or E57: Carry out in a vented booth or extracted enclosure Or E61: Minimize exposure by-extracted full enclosure for the operation or equipment Or E60: Minimize exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
-		1 ype 141 2 liller of better.

	PROC 8a: Transfor preparation (charging/dischavessels/large condedicated facilitis sampling, waste transfer, charging	rging) from/to stainers at non- es (e.g. collection &	- EI18: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter	
	PROC 8b: Trans or preparation (charging/discha vessels/large con dedicated faciliti sampling, waste transfer, charging	rging) from/to tainers at es (e.g. collection &	- EI18: No specific measures identified -	
	PROC 9: Transfer or preparation in containers (e.g. of line, including w	to small ledicated filling	- EI18: No specific measures identified	
	PROC 14: Produ preparations or a tableting, compre extrusion, pelleti	rticles by ession,	- EI18: No specific measures identified	
	PROC 15: Use as reagent	s laboratory	- EI18: No specific measures identified	
PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)		substances als and/or noulding,	- EI18: No specific measures identified	
	Section 2.2		Control of environmental exposure	
	Product characteristics		Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a].	
			Not biodegradable [PrC5f].	
	Operational conditions		Indoor/Outdoor use [OOC3].	
Amounts used				
Fraction of EU tonnage used in region [A1]:		onnage used in	1	
	Regional use tonnage	Use in Flexible Foams	260,000	

	T	
(tonnes/year) [A2]:	Use in Elastomers etc.	160,000
Fraction of regional	Use in Flexible Foams	0.038
tonnage used locally [A3]:	Use in Elastomers etc.	0.063
Maximum daily (kg/day) [A4].	site tonnage	33,333
Frequency and	duration of use	
Type of release		Continuous release [FD2].
Emission days (days/year) [FD4]	≥ 300
Environmental	factors not influe	enced by risk management
Local freshwater [EF1].	dilution factor	10
Local marine wa factor [EF2].	iter dilution	100
Other given operational		Used in open systems.
conditions affecting environmental exposure		Dry processes.
Release fraction process [OOC4]		1.2·10 ⁻⁵
Release fraction to wastewater from process [OOC5].		0
Release fraction to soil from process (regional only) [OOC6].		0
Risk Managem	ent Measures	
Technical condit measures at proc (source) to preve	ess level	Common practices vary across sites thus conservative process release estimates used [TCS 1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil		
Air:		No air emission controls required; required removal efficiency is 0% [TCR5].
Sóil:		Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational prevent/limit re		Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].].
Conditions and a	neasures related	Wastewater emission controls are not applicable as there is

to municipal sewage treatment plant	no direct release to wastewater [TCR3].
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.
Section 3	Exposure Estimation

3.1. Health

Measured data has been used to estimate worker exposure.

PROC#	Inhalation exposure – long term (mg/m³)	RCR inhalation - long term	Inhalation exposure – short term (mg/m³)	RCR inhalation - short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.116	0.016	0.116
PROC 5 Flexible Foam	0.029	0.582	0.058	0.582
PROC 5 Elastomers	0.012	0.246	0.025	0.246
PROC 7	0.011	0.224	0.022	0.224
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.010	0.094
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.006	0.128	0.013	0.128

3.2. Environment

Used EUSES model [EE4].

Compartment	Predicted Environmental	Risk Characterisation
	Concentration	Ratio

Freshwater (mg/l)	6.87·10 ⁻³	$< 6.87 \cdot 10^{-3}$		
Marine water (mg/l)	5.43·10 ⁻⁴	$< 5.43 \cdot 10^{-3}$		
Agricultural soil (mg/kg)	0.239	< 0.239		
Grassland (mg/kg)	0.239	< 0.239		
Section 4	Guidance to check complian Scenario	Guidance to check compliance with the Exposure Scenario		
4.1. Health				
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]			
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]			
Further information on the a Exposure Scenario can be for ISOPA interpretation on sel		nd at: [GC 24]		
4.2. Environment	•			
Not applicable				
Section 5				
Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)				
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.				
Control of Worker Exposure				
Not applicable				
Control of environmental exposure				
Not applicable				

Exposure Scenario cluster 4: Industrial use of MDI for Rigid Foam, Coatings, and Adhesives and Sealants

ES Annex to the e-SDS		
Exposure Scenario Title		
Industrial use of MDI for Rigid Foam, Coatings and Adhesives and Sealants		
Sector of Use: SU 3		
Process Categories and Environmental Release Categories: A) Use for Rigid Foam, PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC10, PROC 15, PROC 21 ERC 2, ERC 3, ERC 6c B) Use for Coatings PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 15 ERC 2, ERC 3, ERC 5, ERC 6c C) Use for Adhesives and Sealants PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15 ERC 2, ERC 3, ERC 5, ERC 6c		
 PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing, during sampling, maintenance, equipment cleaning, occasional interventions) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, during sampling, maintenance, equipment cleaning, occasional interventions) PROC 4: Use in batch and other process (synthesis) 		

	moulding, pouring on conveyor or in box, open sawing, during sampling, maintenance, equipment cleaning, occasional interventions)	
	 PROC 5: Mixing or blending in batch processes for formulations or 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 non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging) 	
	 PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging) 	
	 PROC 9: Transfer of substance or preparation into small containers (e.g. 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 laboratory reagent 	
	 PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting) 	
Section 2	Operational conditions and risk management measures	
	ts to explain scenario if required.	
Section 2.1	Control of worker exposure	
Product characteristics		
Physical form of product	Physical state: liquid (only solid when specifically mentioned)	

Concentration of substance in product	G13: Covers percentage substance in the product up to 100 % (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection
All contributing scenarios at product temperatures below 40 °C for pure MDI or below 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. PPE14: Use suitable eye protection and gloves. PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation.
PROC 1: Use in closed	 - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term. - EI18: No specific measures identified.
process, no likelihood of	2110. 140 specific measures identified.

exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic of manual closed moulding, sawing, during sampling, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. close moulding, sawing in cabinet, blending, during sampling, maintenance, equipment cleaning, occasional interventions)	
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyou or in box, open sawing, during sampling, maintenance, equipment cleaning, occasional interventions)	
PROC 5: Mixing or blending in batch processe for formulations or preparations and articles (multistage and/or significant contact)	- E54: Provide extract ventilation to points where emissions occur
PROC 7. Industrial spraying	Same as mentioned above for all PROCs, and: - E59: Carry out in a vented booth provided with laminar airflow Or - E57: Carry out in a vented booth or extracted enclosure Or
	- E61 Minimize exposure by-extracted full enclosure for the

	operation or equipment
	Or - E60: Minimize exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
	 - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified -
PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)	- EI18: No specific measures identified
PROC 10: Roller application or brushing	- E118: No specific measures identified
PROC 13: Treatment of articles by dipping and pouring	- E118: No specific measures identified
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation	- EI18: No specific measures identified
PROC 15: Use as laboratory reagent	- EI18: No specific measures identified

PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)		- EI18: No specific measures identified	
Section 2.2		Control of environmental exposure	
Product chara	ncteristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].	
		Predominantly hydrophobic [PrC4a].	
		Not biodegradable [PrC5f].	
Operational c	onditions	Indoor/Outdoor use [OOC3].	
Amounts used	l		
Fraction of EU used in region		1	
Regional use tonnage	Rigid Foam	1,120,000	
(tonnes/year) [A2]:	Coating	60,000	
[: 12].	Adhesives and sealants	300,000	
Fraction of	Rigid foam	8.9·10 ⁻³	
regional tonnage used	Coating	0.167	
locally [A3]:	Adhesives and sealants	0.033	
Maximum dail tonnage (kg/da		33,333	
Frequency an	d duration of	use	
Type of release	e	Continuous release [FD2].	
Emission days (days/year) [FD4]		≥300	
Environmental factors not i		influenced by risk management	
Local freshwater dilution factor [EF1].		10	
Local marine v		100	
Other given o	perational	Used in open systems.	

conditions affecting environmental exposure	Dry processes.			
Release fraction to air from process [OOC4].	1.2·10 ⁻⁵			
Release fraction to wastewater from process [OOC5].	0	0		
Release fraction to soil from process (regional only) [OOC6].	0			
Risk Management Measur	es			
Technical conditions and measures at process level (source) to prevent release	Common practices y process release estir			
Technical onsite conditions and releases to soil	s and measures to rec	duce or limit disc	harges, air emissions	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].			
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].			
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].].			
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].			
Conditions and measures related to external treatment of waste for disposal	Not applicable.			
Conditions and measures related to external recovery of waste	Not applicable.			
Other environmental control measures additional to above	None.			
Section 3	Exposure Estimation			
3.1. Health				
	Measured data has been used to estimate worker exposure.			
PROC # Inhalation	RCR Inhalation RCR inhalation			

	exposure – long term (mg/m³)	inhalation – long term	exposure – short term (mg/m³)	– short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.164	0.016	0.164
PROC 5	0.029	0.582	0.058	0.582
PROC 7 (Hotmelt)	0.011	0.224	0.022	0.224
PROC 7 (other than hotmelt)	0.010	0.204	0.020	0.204
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.009	0.094
PROC 10	0.017	0.344	0.034	0.344
PROC 13	0.017	0.344	0.034	0.344
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.006	0.260	0.013	0.128

3.2. Environment

Used EUSES model [EE4].

C	Duadiated Environmental	Risk Characterisation		
Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio		
Freshwater (mg/l)	6.87·10 ⁻³	< 6.87·10 ⁻³		
Marine water (mg/l)	5.43·10 ⁻⁴	< 5.43·10 ⁻³		
Agricultural soil (mg/kg)	0.239	< 0.239		
Grassland (mg/kg)	0.239	< 0.239		
Section 4	Guidance to check complian Scenario	ce with the Exposure		
4.1. Health				
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are			

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Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]

Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors

4.2. Environment

Not applicable

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Not applicable

Control of environmental exposure

Not applicable

Exposure Scenario cluster 5: Industrial use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Industrial use of MDI for Composite Material Based on Wood/Man-Made/Mineral/Natural Fibres	
Use Descriptor	Sector of Use: SU 3	
	Process Categories and Environmental Release Categories:	
	PROC 0a, PROC 0b, PROC 0c, PROC 1, PROC 2, PROC 3, PROC 4, PROC7, PROC 8a, PROC 8b, PROC 10, PROC 14, PROC 15, PROC 21 ERC 2, ERC 3, ERC 5	
Processes, tasks, activities covered	 PROC 0a: Removal of solidified materials by mechanical means in containers, vessels, blenders 	
	 PROC 0b: Cleaning production line area with high pressurized air 	
	- PROC 0c: Cleaning production line area with brush	
	 PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging, blowline injections, blender operations) 	
	 PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sawing, sampling, maintenance, equipment cleaning, occasional interventions/inspections at enclosed areas) 	
	 PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions) 	
	 PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas) 	
	- PROC7: Industrial Spraying	
	 PROC 8a: Transfer of substance or preparation 	

	 (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging) PROC 10: Roller application or brushing (low energy spreading) PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation PROC 15: Use as laboratory reagent 		
	 PROC 21: Low energy manipulation of substances bound in materials and/or articles 		
Section 2	Operational conditions and risk management measures		
Field for additional statements to explain scenario if required.			
Section 2.1	Control of worker exposure		
Product characteristics			
Physical form of product	Physical state: liquid (only solid when specifically mentioned)		
Concentration of substance in product	G13: Covers percentage substance in the product up to 100 % (unless stated differently).		
Amounts used	Not applicable.		
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).		
Human factors not influenced by risk management	None identified.		
Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection		
All contributing scenarios at product temperatures <u>below</u> 40 °C for pure MDI or <u>below</u> 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off 		

	any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. - PPE14: Use suitable eye protection and gloves. - PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures <u>above</u> 40 °C for pure MDI or <u>above</u> 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation. - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE. - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 0a: Removal of	- G4: Covers frequency up to: monthly use
solidified materials by	- PPE14: Use suitable eye protection and gloves.
mechanical means in	- PPE27: Wear suitable coveralls to prevent exposure to the
containers, vessels, blenders	skin.
	- PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 0b: Cleaning	- PPE14: Use suitable eye protection and gloves.
production line area with high	- PPE27: Wear suitable coveralls to prevent exposure to the
pressurized air	skin.
	- PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 0c: Cleaning	- PPE14: Use suitable eye protection and gloves.
production line area with	- PPE27: Wear suitable coveralls to prevent exposure to the
brush	skin.
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste	- EI18: No specific measures identified.

collection & transfer, charging, discharging, blowline injections, blender operations)	
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sawing, sampling, maintenance, equipment cleaning, occasional interventions/inspections at enclosed areas)	- EI18: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified.
Activities close to the former line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)	 E82: Provide extract ventilation to material transfer points and other openings. Minimal efficiency exhaust ventilation: ≥25% PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Activities close to the mat line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)	- EI18: No specific measures identified.
PROC 7: Industrial spraying	 E59: Carry out in a vented booth provided with laminar airflow Or E57: Carry out in a vented booth or extracted enclosure Or E61: Minimise exposure by-extracted full enclosure for the operation or equipment

	Or - E60: Minimise exposure by partial enclosure of the
	operation or equipment and provide extract ventilation at openings
	 - PPE30: If above technical/organisational control measures are not feasible, then adopt following PPE: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	 EI18: No specific measures identified. If solid MDI: PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
PROC 10: Roller application or brushing (low energy spreading)	- EI18: No specific measures identified.
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation	- E54: Provide extract ventilation to points where emissions occur.
PROC 15: Use as laboratory reagent	- EI18: No specific measures identified.
PROC 21: Low energy manipulation of substances bound in materials and/or articles	- E54: Provide extract ventilation to points where emissions occur.
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
	Predominantly hydrophobic [PrC4a].

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	Not biodegradable [PrC5f].
Operational conditions	Indoor/Outdoor use [OOC3].
Amounts used	
Fraction of EU tonnage used in region [A1]:	1
Regional use tonnage (tonnes/year) [A2]:	43,600
Fraction of regional tonnage used locally [A3]:	0.229
Maximum daily site tonnage (kg/day) [A4].	33,333
Frequency and duration of us	se
Type of release	Continuous release [FD2].
Emission days (days/year) [FD4]	≥ 300
Environmental factors not inf	fluenced by risk management
Local freshwater dilution factor [EF1].	10
Local marine water dilution factor [EF2].	100
Other given operational conditions affecting environmental exposure	Used in open systems. Dry processes.
Release fraction to air from process [OOC4].	1.2·10 ⁻⁵
Release fraction to wastewater from process [OOC5].	0
Release fraction to soil from process (regional only) [OOC6].	0
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
Technical onsite conditions an and releases to soil	nd measures to reduce or limit discharges, air emissions
Air	No air emission controls required; required removal efficiency is 0% [TCR5].

Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.
Section 3	Exposure Estimation

3.1. Health

Measured data has been used to estimate worker exposure.

PROC#	Inhalation exposure – long term (mg/m³)	RCR inhalation – long term	Inhalation exposure – short term (mg/m³)	RCR inhalation – short term
PROC 0a	0.0056	0.112	0.0112	0.112
PROC 0b	0.002	0.042	0.004	0.042
PROC 0c	0.014	0.28	0.028	0.28
PROC 1	0.002	0.038	0.004	0.038
PROC 2	0.038	0.76	0.076	0.76
PROC 3	0.002	0.038	0.004	0.038
PROC 4 Activities close to the former line	0.011	0.227	0.023	0.227
PROC 4 Activities close to the mat line	0.007	0.136	0.014	0.136

PROC 7	0.010	0.204	0.020	0.204
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.002	0.034	0.003	0.034
PROC 10	0.017	0.328	0.034	0.328
PROC 14	0.006	0.078	0.012	0.078
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.0004	0.008	0.001	0.008

3.2. Environment

Used EUSES model [EE4].

Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio
Freshwater (mg/l)	6.87·10 ⁻³	< 6.87·10 ⁻³
Marine water (mg/l)	5.43·10 ⁻⁴	< 5.43·10 ⁻³
Agricultural soil (mg/kg)	0.239	< 0.239
Grassland (mg/kg)	0.239	< 0.239
Section 4	Guidance to check complian Scenario	ce with the Exposure
4.1. Health		
Guidance to DU	Predicted exposures are not ex DN(M)EL when the Risk Mar Measures/Operational Conditi implemented [GC 22]	nagement
	Where other Risk Managemer Conditions are adopted, then u are managed to at least equiva	sers should ensure that risks
	Further information on the ass Exposure Scenario can be four ISOPA interpretation on select	nd at: [GC 24]

4.2. Environment

Not applicable

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Not applicable
Control of environmental exposure
Not applicable

Exposure Scenario cluster 6: Industrial use of MDI in Foundry and Other Composite Material

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Industrial use of MDI in Foundry and Other Composite Material	
Use Descriptor	Sector of Use: SU 3	
	Process Categories and Environmental Release Categories: A) Industrial use in Foundry PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 14, PROC 15 ERC2, ERC3, ERC5 B) Industrial use in Other Composite Material PROC 1, PROC 2, PROC 3, PROC 5, PROC 8a, PROC 8b, PROC 13, PROC 14, PROC 15 ERC 2, ERC 3, ERC 5, ERC 6c	
Processes, tasks, activities covered	 PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, 	
	 equipment cleaning, occasional interventions, checking quality of sand mix) PROC 4: Open batch/continuous processes with opportunity for exposure (e.g., during mat dumping, sampling, maintenance, equipment cleaning, occasional 	

	interventions at open areas)
	- PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)
	 PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)
	 PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)
	 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 laboratory reagent
G 4. 3	
Section 2	Operational conditions and risk management measures
Field for additional statements t	o explain scenario if required.
Field for additional statements t Section 2.1	
Field for additional statements t Section 2.1 Product characteristics	o explain scenario if required. Control of worker exposure
Field for additional statements t Section 2.1	o explain scenario if required.
Field for additional statements to Section 2.1 Product characteristics Physical form of product Concentration of substance in	Control of worker exposure Physical state: liquid (only solid when specifically mentioned) G13: Covers percentage substance in the product up to 100 %
Field for additional statements to Section 2.1 Product characteristics Physical form of product Concentration of substance in product	Control of worker exposure Physical state: liquid (only solid when specifically mentioned) G13: Covers percentage substance in the product up to 100 % (unless stated differently).
Field for additional statements to Section 2.1 Product characteristics Physical form of product Concentration of substance in product Amounts used	Control of worker exposure Physical state: liquid (only solid when specifically mentioned) G13: Covers percentage substance in the product up to 100 % (unless stated differently). Not applicable. G2: Covers daily exposures up to 8 hours (unless stated
Field for additional statements to Section 2.1 Product characteristics Physical form of product Concentration of substance in product Amounts used Frequency and duration of use Human factors not influenced	Control of worker exposure Physical state: liquid (only solid when specifically mentioned) G13: Covers percentage substance in the product up to 100 % (unless stated differently). Not applicable. G2: Covers daily exposures up to 8 hours (unless stated differently).

product temperatures below 40 °C for pure MDI or below 45 °C for other MDI based substances All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances	than 3 to 5 air changes per hour). - E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. - PPE14: Use suitable eye protection and gloves. - PPE27: Wear suitable coveralls to prevent exposure to the skin. Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation. - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)	For use of MDI in Foundry - E82: Provide extract ventilation to material transfer points and other openings. For use of MDI in Other Composite Material - EI18: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or	For use of MDI in Foundry E82: Provide extract ventilation to material transfer points and

formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)	other openings. For use of MDI in Other Composite Material - EI18: No specific measures identified.
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises	- E54: Provide extract ventilation to points where emissions occur.
Foundry PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	 E82: Provide extract ventilation to material transfer points and other openings. E54: Provide extract ventilation to points where emissions occur.
Other composite materials PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	- E54: Provide extract ventilation to points where emissions occur.
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified
PROC 13: Treatment of articles by dipping and pouring	- EI18: No specific measures identified

PROC 14. Product preparations or art		- E54: Provide extract ventilation to points where emissions occur.
tableting, compression, extrusion, pelletisation		occur.
PROC 15. Use as laboratory reagent		- EI18: No specific measures identified
Section 2.2		Control of environmental exposure
Product characte	ristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
		Predominantly hydrophobic [PrC4a].
		Not biodegradable [PrC5f].
Operational cond	litions	Indoor/Outdoor use [OOC3].
Amounts used		
Fraction of EU ton in region [A1]:	nage used	1
Regional use	Foundry	56,400
tonnage (tonnes/year) [A2]:	Other Composite Material	1,120,000
Fraction of	Foundry	0.177
regional tonnage used locally [A3]:	Other Composite Material	8.9·10 ⁻³
Maximum daily si (kg/day) [A4].	te tonnage	33,333
Frequency and do	uration of use	2
Type of release		Continuous release [FD2].
Emission days (da [FD4]	ys/year)	≥ 300
Environmental factors not infl		nenced by risk management
Local freshwater dilution factor [EF1].		10
Local marine water dilution factor [EF2].		100
Other given oper		Used in open systems.
conditions affecting environmental exposure		Dry processes.

Release fraction to air from process [OOC4].	1.2·10 ⁻⁵	
Release fraction to wastewater from process [OOC5].	0	
Release fraction to soil from process (regional only) [OOC6].	0	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].	
Technical onsite conditions and releases to soil	d measures to reduce or limit discharges, air emissions and	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].	
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].	
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].	
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].	
Conditions and measures related to external treatment of waste for disposal	Not applicable.	
Conditions and measures related to external recovery of waste	Not applicable.	
Other environmental control measures additional to above	None.	
Section 3	Exposure Estimation	
3.1. Health		
Measured data has been used to estimate worker exposure.		

PROC#	Inhalation exposure – long term (mg/m³)	RCR inhalation – long term	Inhalation exposure – short term (mg/m³)	RCR inhalation – short term
PROC 1 Foundry	0.002	0.036	0.004	0.036

PROC 1 Other Composite	0.013	0.260	0.026	0.260
PROC 2 – Foundry	0.002	0.036	0.004	0.036
PROC 2 – Other Composite	0.013	0.260	0.026	0.260
PROC 3 – Foundry	0.002	0.036	0.004	0.036
PROC 3 – Other Composite	0.009	0.184	0.018	0.184
PROC 4 – Foundry	0.004	0.078	0.008	0.078
PROC 5 - Foundry	0.002	0.036	0.004	0.036
PROC 5 – Other Composite	0.029	0.582	0.058	0.582
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 13	0.017	0.344	0.034	0.344
PROC 14 Foundry	0.004	0.078	0.008	0.078
PROC 14 Other Composite	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112

3.2. Environment

Used EUSES model [EE4].

Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio	
Freshwater (mg/l)	6.87·10 ⁻³	< 6.87·10 ⁻³	
Marine water (mg/l)	5.43·10 ⁻⁴	< 5.43·10 ⁻³	
Agricultural soil (mg/kg)	0.239	< 0.239	
Grassland (mg/kg)	0.239 < 0.239		
Section 4	Guidance to check compliance with the Exposure Scenario		

Guidance to DU Predicted exposures are not expected to exceed the when the Risk Management Measures/Operation outlined in Section 2 are implemented [GC 22]		
	al Conditions	
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]	
Further information on the assumptions contained Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Description	1	

4.2. Environment

Not applicable

Section 5

Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)

Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.

Control of Worker Exposure

Not applicable

Control of environmental exposure

Not applicable

Exposure Scenario cluster 7: Professional end uses of MDI

ES Annex to the e-SDS	
Section 1	Exposure Scenario Title
Title	Professional end uses of MDI
Use Descriptor	Sector of Use: SU 22
	Process Categories and Environmental Release Categories: A) Rigid Foam, professional use PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11 ERC 8c, ERC 8f
	B) Coatings professional use PROC 5, PROC 8a, PROC 10, PROC 11, PROC 13 ERC 8c, ERC 8f
	C) Adhesives and sealants professional use PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 13 ERC 8c, ERC 8f
	D) Composite material based on wood/man-made/mineral/natural fibres, professional use PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 15, PROC 21 ERC 8c, ERC 8f
	E) Other composite material, professional use PROC 2, PROC 3, PROC 5, PROC 8a, PROC 14 ERC 8c, ERC 8f
Processes, tasks, activities covered	 PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions)
	 PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. cavity filling, during sampling, maintenance, equipment cleaning, occasional interventions)
	 PROC 4: Use in batch and other process (synthesis)

	where opportunity for exposure arises (e.g. cavity filling, during use, maintenance/cleaning/incidental interventions)
	 PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)
	 PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)
	 PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)
	 PROC 10: Roller application or brushing (e.g. one component foam use, low energy spreading)
	- 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 laboratory reagent
	PROC 21: Low energy manipulation of substances bound in materials and/or articles
Section 2	Operational conditions and risk management measures
Field for additional statements to e	explain scenario if required.
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100 % (unless stated differently).

	Exception: PROC 11 < 60%
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
Contributing Scenarios	Risk Management Measures Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection
All contributing scenarios at product temperatures <u>below</u> 40 °C for pure MDI or <u>below</u> 45 °C for other MDI based substances	 E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. PPE14: Use suitable eye protection and gloves. PPE27: Wear suitable coveralls to prevent exposure to the skin.
All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances	Same as above, and: - E54: Provide extract ventilation to points where emissions occur. Or - E82: Provide extract ventilation to material transfer points and other openings. Or - E83: Handle in a fume cupboard or under extract ventilation. - PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE: - PPE22: Wear a respirator conforming to EN140 with Type A filter or better. Or - demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.
PROC 2: Use in closed,	- EI18: No specific measures identified.
continuous process with	

occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions)	
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. cavity filling, during sampling, maintenance, equipment cleaning, occasional interventions)	- EI18: No specific measures identified.
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. cavity filling, during use, maintenance/cleaning/incidental interventions)	- EI18: No specific measures identified.
Activities close to the former line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)	 Professional use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres E82: Provide extract ventilation to material transfer points and other openings. Minimal efficiency exhaust ventilation: ≥ 25% PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection &	Rigid foams and Coatings Professional use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres - EI18: No specific measures identified. Adhesives and sealants and Other Composite Material - E54: Provide extract ventilation to points where emissions occur. - EI18: No specific measures identified. If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.

transfer, charging, discharging)	
PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities(e.g. sampling, waste collection & transfer, charging, discharging).	- EI18: No specific measures identified.
PROC 10: Roller application or brushing (e.g. one component foam use, low energy spreading)	- EI18: No specific measures identified.
PROC 11: Non industrial spraying (indoor and outdoor)	 OC28: Avoid carrying out activities involving exposure for more than 4 hours PPE32: Wear a full face respirator conforming to EN140 with Type A/P2 filter or better. E4: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying
PROC 13: Treatment of articles by dipping and pouring	- EI18: No specific measures identified
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelletisation	- E54: Provide extract ventilation to points where emissions occur.
PROC 15: Use as laboratory reagent	- EI18: No specific measures identified.
PROC 21: Low energy manipulation of substances bound in materials and/or articles	- E54: Provide extract ventilation to points where emissions occur.
Section 2.2	Control of environmental exposure
Product characteristics	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3]. Predominantly hydrophobic [PrC4a]. Not biodegradable [PrC5f].
Operational conditions	Indoor/Outdoor use [OOC3].
Amounts used	arrange arrange arrange
Fraction of EU tonnage used in	1

region [A1]:		
Regional use tonnage (tonnes/year) [A2]:	Rigid foam, Composite Material based on Wood/Man- made/Mineral/ Natural Fibres and Other Composite Material	Up to 1,120,000
	Coatings and Adhesives and sealants	60,000
Fraction of region locally [A3]:	nal tonnage used	2.0·10 ⁻³
Maximum daily site tonnage (kg/day) [A4].	Rigid foam , Composite Material based on Wood/Man- made/Mineral/ Natural Fibres and Other Composite Material	6,137
	Coatings and Adhesives and sealants	329
Frequency and d	luration of use	
Type of release		Dispersive use [FD3].
Emission days (da	ays/year) [FD4]	365
Environmental f	actors not influe	nced by risk management
Local freshwater dilution factor [EF1].		10
Local marine water dilution factor [EF2].		100
Other given operational		Used in open systems.
conditions affect environmental ex		Dry processes.

Release fraction to	o air from	0.15			
process [OOC4].					
Release fraction to from process [OO		0			
Release fraction to process (regional		5.0.10)-3		
Risk Managemen	nt Measures				
Technical conditions and measures at process level (source) to prevent release		Common practices vary across sites thus conservative process release estimates used [TCS 1].			
Technical onsite releases to soil	conditions and n	neasur	es to reduce or lim	it discharges, air	emissions and
Air:		No air emission controls required; required removal efficiency is 0% [TCR5].			
Soil:		Soil emission controls are not applicable as there is no direct release to soil [TCR4].			
Organizational measures to prevent/limit release from site		Prevent discharge of un-dissolved substance to or recover from wastewater [OMS1].			
Conditions and measures related to municipal sewage treatment plant			ewater emission con direct release to was		cable as there
Conditions and measures related to external treatment of waste for		Not a	pplicable.		
disposal	1 1	AT 4	1: 11		
Conditions and m to external recove		Not applicable.			
Other environmer measures addition		None.			
Section 3		Exposure Estimation			
3.1. Health					
Measured data ha	Measured data has been used to estimate worker exposure.				
PROC # Inhalation exp – long term (m			RCR inhalation – long term	Inhalation exposure – short term (mg/m³)	RCR inhalation – short term
PROC 2	0.013		0.260	0.026	0.260

PROC 3	0.009	0.184	0.018	0.184
	0.009	0.184	0.018	0.184
PROC 3 (Composite material based on wood/man- made/ mineral/ natural fibers, professional use)	0.002	0.038	0.004	0.038
PROC 4	0.006	0.116	0.012	0.116
PROC 4 (Composite material based on wood/man- made/ mineral/ natural fibers, professional use)	0.011	0.227	0.023	0.227
PROC 5	0.029	0.582	0.058	0.582
PROC 5 (enclosed)	0.012	0.246	0.025	0.246
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 8b (Composite material based on wood/man- made/ mineral/ natural fibers, professional use)	0.002	0.034	0.003	0.034
PROC 10	0.017	0.328	0.034	0.328
PROC 11- Indoor	0.04	0.80	0.08	0.80
PROC 11- Outdoor	0.043	0.87	0.087	0.87
PROC 13	0.017	0.344	0.034	0.344
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.0004	0.008	0.001	0.008

3.2. Environment				
Used EUSES model [EE4].				
Compartment	Predicted Environmental Risk Characterisa Concentration Ratio			
Freshwater (mg/l)	6.94·10 ⁻³	< 6.94·10 ⁻³		
Marine water (mg/l)	5.45·10 ⁻⁴	< 5.45·10 ⁻³		
Agricultural soil (mg/kg)	0.240	< 0.240		
Grassland (mg/kg)	0.240	< 0.240		
Section 4	Guidance to check complian Scenario	Guidance to check compliance with the Exposure Scenario		
4.1. Health				
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]			
	Exposure Scenario can be fou	Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors		
4.2. Environment				
Not applicable				
Section 5				
Additional good practice adv (Section Optional)	ice beyond the REACH Chemical	Safety Assessment -		
	in this section have not been take the exposure scenario above. The e 37 (4) of REACH.			
Control of Worker Exposure				
Not applicable				
Control of environmental exp	oosure			

Not applicable

Exposure Scenario cluster 8: Consumer end uses of MDI

ES Annex to the e-SDS		
Section 1	Exposure Scenario Title	
Title	Consumer uses of MDI	
Use Descriptor	Sector of Use: SU 21	
	Product category: PC 1, PC 9a, PC 32	
	Environmental Release Categories: ERC 8c, ERC 8f	
Processes, tasks, activities	Rigid foam	
covered	• Coatings	
	Adhesives and sealants	
Section 2	Operational conditions and risk management measures	
Field for additional statements	to explain scenario if required.	
Section 2.2	Control of consumer exposure	
Physical form of product	Physical state: liquid (only solid when specifically	
Contributing Scenarios	mentioned) Operations conditions	
PC 32: Rigids, insulation	-	
foams	 For each use event, covers use amounts up to 825 g [ConsOC2]; 	
	 Covers use in room size of 57.5 m³ [ConsOC11]; 	
	 For each use event, covers exposure up to 0.5 hr/event 	
	[ConsOC14];	
PC 9a: Coatings, paints	 Covers concentrations up to 30% [ConsOC1]; 	
Use of 2-component paint,	- For each use event, covers use amounts up to 150g	
solvent rich	[ConsOC2];	
	Covers use in room size of 20m³[ConsOC11]; For each use event, covers exposure up to 2.00 hr/event	
	[ConsOC14];	
PC 9a: Coatings, paints	Covers concentrations up to 30% [ConsOC1];	
Use of 2-component paint,	- For each use event, covers use amounts up to 195g	
high solid	[ConsOC2];	
	- Covers use in room size of 20m ³ [ConsOC11];	
	- For each use event, covers exposure up to 0.5 hr/event	
DOA G VI	[ConsOC14];	
PC 9a: Coatings, paints Mixing and loading of 2-	- Covers concentrations up to 100% [ConsOC1];	
component solvent rich paint	 For each use event, covers use amounts up to 150g [ConsOC2]; 	

	 For each use event, covers exposure up to 5 minutes/event [ConsOC14]; 	
PC9a: Coatings, paints Mixing and loading of 2- component high solid paint	 Covers concentrations up to 100% [ConsOC1]; For each use event, covers use amounts up to 195g [ConsOC2]; For each use event, covers exposure up to 5 minutes/event [ConsOC14]; 	
PC 9a: Coatings, paints Floor coating high solid	 Covers concentrations up to 10% [ConsOC1]; For each use event, covers use amounts up to 3000g [ConsOC2]; Covers use in room size of 34m³[ConsOC11]; For each use event, covers exposure up to 1.00 hr/event [ConsOC14]; 	
PC 1 Adhesives and sealants, sealant joint	 Covers concentrations up to 2% [ConsOC1]; Covers skin contact area up to 2cm² [ConsOC5]; For each use event, covers use amounts up to 75g [ConsOC2]; Covers use in room size of 10m³ [ConsOC11]; For each use event, covers exposure up to 45 min./event [ConsOC14]; 	
PC 1 Adhesives and sealants, sealant assembly	 Covers concentrations up to 2% [ConsOC1]; Covers skin contact area up to 43cm² [ConsOC5]; For each use event, covers use amounts up to 390g [ConsOC2]; Covers use in room size of 20m³ [ConsOC11]; For each use event, covers exposure up to 4.00 hr/event [ConsOC14]; 	
PC 1 Adhesives and sealants, adhesive hotmelt	 Covers skin contact area up to 43cm² [ConsOC5]; For each use event, covers use amounts up to 65g [ConsOC2]; Covers use in room size of 20m³ [ConsOC11]; For each use event, covers exposure up to 25 min./event [ConsOC14]; 	
Contributing Scenarios	Risk Management Measures	
PC 32: Rigids, insulation foams	ConsRMM06: Avoid using without gloves.	
PC 9a: Coatings, paints Use of 2-component paint,	ConsRMM06: Avoid using without gloves. ConsRMM08: Avoid using when windows closed.	

solvent rich			
PC 9a: Coatings, paints		ConsRMM06: Avoid using without gloves.	
Use of 2-component	t paint,	ConsRMM08: Avoid using when windows closed.	
high solvent			
PC 9a: Coatings, pa	ints	ConsRMM06: Avoid using without gloves.	
Mixing and loading			
component solvent	rich paint		
PC 9a: Coatings, pa	ints	ConsRMM06: Avoid using without gloves.	
Mixing and loading			
component high soli	id paint		
PC 9a: Coatings, pa	ints	ConsRMM06: Avoid using without gloves.	
Floor coating high s	olid	ConsRMM08: Avoid using when windows closed.	
PC 1 Adhesives and	sealants,	ConsRMM06: Avoid using without gloves.	
sealant joint			
PC 1 Adhesives and	sealants,	ConsRMM06: Avoid using without gloves.	
sealant assembly	,	ConsRMM08: Avoid using when windows closed.	
PC 1 Adhesives and sealants,		ConsRMM06: Avoid using without gloves.	
adhesive hotmelt			
Section 2.2		Control of environmental exposure	
Product characteristics		Substance is a unique structure [PrC1].	
		OR: Substance is complex UVCB [PrC3].	
		Predominantly hydrophobic [PrC4a].	
		Not biodegradable [PrC5f].	
Operational condit	ions	Indoor/Outdoor use [OOC3].	
Amounts used		L J	
Fraction of EU tonn	age used in	l v	
region [A1]:	age asea iii		
Regional use	Rigid	Up to 1,120,000	
tonnage (tonnes	foam		
/year) [A2]:	Coatings	60,000	
	and		
	Adhesives and		
	sealants		
Fraction of regional		$2.0 \cdot 10^{-3}$	
used locally [A3]:			
Maximum daily	Rigid	6,137	
site tonnage	foam		
(kg/day) [A4].	Coatings	329	

· · · · · · · · · · · · · · · · · · ·		
	and Adhesives and	
	sealants	
Frequency and dur	ation of use	
Type of release		Dispersive use [FD3].
Emission days (days/year) [FD4]		365
Environmental fact	tors not infl	uenced by risk management
Local freshwater dilfactor [EF1].	ution	10
Local marine water (factor [EF2].	dilution	100
Other given operat		Used in open and closed systems
conditions affecting environmental expo		Dry processes.
Release fraction to a process [OOC4].	ir from	0.15
Release fraction to v from process [OOCS		0
Release fraction to soil from process (regional only) [OOC6].		5.0·10 ⁻³
Risk Management	Measures	
Technical conditions measures at process (source) to prevent r	level	Common practices vary across sites thus conservative process release estimates used [TCS 1].
Technical onsite co releases to soil	nditions an	d measures to reduce or limit discharges, air emissions and
Air:		No air emission controls required; required removal efficiency is 0% [TCR5].
Soil:		Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational measures to prevent/limit release from site		Prevent discharge of undissolved substance to or recover from wastewater [OMS1].
Conditions and measurelated to municipal treatment plant		Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].

Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.
Section 3	Exposure Estimation

G31: The Consexpo model has been used to estimate consumer exposures unless otherwise indicated.

Relevant Use	Inhalation exposure (mg/m³/day)	RCR chronic	Inhalation exposure (event) (mg/m³/day)	RCR acute
PC 32: Rigids, insulation foams	2,54E-05	<0.01	1.22E-03	0.02
PC 9a: Coatings, paints Use of 2-component paint, solvent rich	3.72E-03	0.15	4.06E-02	0.81
PC 9a: Coatings, paints Use of 2-component paint, high solid	8.22E-04	0.03	3.7E-02	0.74
PC 9a: Coatings, paints Mixing and loading of 2-component solvent rich paint	1.92E-07	<0.01	5.52E-05	<0.01
PC 9a: Coatings, paints Mixing and loading of 2-component high solid paint	1.92E-07	<0.01	5.52E-05	<0.01
PC 9a: Coatings, paints Floor coating high solid	1.39E-03	0.06	3.0E-02	0.67
PC 1 Adhesives and sealants, sealant joint	2.31E-05	<0.01	7.39E-04	0.01
PC 1 Adhesives and sealants, sealant assembly	0.01	0.30	4.0E-02	0.90
PC 1 Adhesives and	6.94E-07	< 0.01	4.00E-05	< 0.01

sealants, adhesive hotmelt			
3.2. Environment			
Used EUSES model [EE4].			
Compartment	Predicted Environmental RCR Concentration		
Freshwater (mg/l)	6.94·10 ⁻³	< 6.94·10 ⁻³	
Marine water (mg/l)	5.45·10 ⁻⁴	< 5.45·10 ⁻³	
Agricultural soil (mg/kg)	0.240	< 0.240	
Grassland (mg/kg)	0.240	< 0.240	
Section 4	Guidance to check compliance with the Exposure Scenario		
4.1. Health	•		
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22] Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23] Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors		
4.2. Environment			
Not applicable			
Section 5			
Additional good practice advice (Section Optional)	beyond the REACH Chemic	al Safety Assessment -	
Note: The measures reported in exposure estimates related to the obligation laid down in Article	ne exposure scenario above. Tl		
Control of Consumer Exposure			
Not applicable			
Control of environmental expos	sure		

Not applicable