
SAFETY DATA SHEET

Annex II

Exposure scenario

Substance Name: 2-methylbutane

EC Number: 201-142-8

CAS Number: 78-78-4

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EXPOSURE ASSESSMENT

ES number	Volume (EU tonnes per year per use)	Manufacture	Identified uses			Resulting life cycle stage		Linked to Identified Use	Sector of Use (SU)	Preparation Category (PC)	Process category (PROC)	Article category (AC)	Environmental Release Category (ERC)
			Formulation	End use	Consumer use	Service life (for articles)	Waste stage						
ES 1	3.68E+05	X						01	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 15	NA	1, 4
ES 2	1.13E+05	X						01a	3, 8, 9	NA	1, 2, 3, 4, 8a, 8b, 9, 15	NA	1, 2, 3, 4, 5, 6, 7
ES 3	1.12E+05		X					02	3, 10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	NA	2
ES 4	6.00E+00			X				03a	3	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, 15	NA	4
ES 5	4.30E+01			X				04a	3	NA	1, 2, 3, 4, 7, 8a, 8b, 10, 13	NA	4
ES 6	9.59E+03			X				09	3	NA	1, 2, 3, 8b, 9, 12	NA	4
ES 7	7.00E+02			X				12b	22	NA	1, 2, 3, 8a, 8b, 16	NA	9a, 9b
ES 8	2.09E+05				X			12c	21	13	NA	NA	9a, 9b
ES 9	4.60E+02			X				13a	3	NA	1, 2, 3, 4, 8a, 8b, 9	NA	7
ES 10	2.25E+02			X				13b	22	NA	1, 2, 3, 8a, 9, 20	NA	9a, 9b
ES 11	1.00E+02				X			16	21	28, 39	NA	NA	8a, 8d
ES 12	5.00E+01			X				17a	3	NA	10, 15	NA	2, 4
ES 13	5.01E+00			X				17b	22	NA	10, 15	NA	8a

1.1 Manufacture of Substance – Industrial

1.1.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Manufacture of Substance – Industrial	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 15 Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.
Environmental Release Categories	1, 4
Specific Environmental Release Category	ESVOC 1.1.v1
Processes, tasks, activities covered	
Manufacture of the substance or use as an intermediate or process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).	
Assessment Method	
See Section 3.	
Risk Management Measures	
HIGH General exposures (closed systems) [CS15]	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC3	No specific measures identified[EI18]
General exposures (open systems) [CS16] PROC4	No specific measures identified[EI18]
Process sampling [CS2] PROC8b	No specific measures identified[EI18]
Laboratory activities [CS36] PROC15	No specific measures identified[EI18]
Bulk transfers[CS14](open systems)[CS108] PROC8b	No specific measures identified[EI18]
Bulk transfers[CS14](open systems)[CS108] PROC8b	No specific measures identified[EI18]
Bulk transfers[CS14](closed systems)[CS107] PROC8b	No specific measures identified[EI18]
Equipment cleaning and maintenance[CS39] PROC8a	No specific measures identified[EI18]
Material storage[CS67] PROC1	No specific measures identified[EI18]
Material storage[CS67] PROC2	No specific measures identified[EI18]
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	3.7e4
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	3.7e4
Maximum daily site tonnage (kg/day)	1.2e5
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300

Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	5.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-4
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	40.4
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d).	2.5e6
Assumed domestic sewage treatment plant flow (m ³ /d)	10000
Conditions and measures related to external treatment of waste for disposal	
During manufacturing no waste of the substance is generated. [ETW4]	
Conditions and measures related to external recovery of waste	
During manufacturing no waste of the substance is generated. [ERW2]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOG 1.1.v1. Scaled assessments for EU refineries have been performed using site-specific data and are attached in PETRORISK file – “Site-Specific Production” worksheet [DSU6].	

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.2 Distribution of Substance – Industrial

1.2.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Distribution of Substance – Industrial	
Use Descriptor	
Sector(s) of Use	3, 8, 9
Process Categories	1, 2, 3, 4, 8a, 8b, 9, 15 Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.
Environmental Release Categories	1, 2, 3, 4, 5, 6, 7
Specific Environmental Release Category	ESVOC 1.1b.v1
Processes, tasks, activities covered	
Bulk loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its sampling, storage, unloading, maintenance and associated laboratory activities. Excludes emissions during transport.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
General exposures (closed systems) [CS15] PROC1	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC3	No specific measures identified[EI18]
General exposures (open systems) [CS16] PROC4	No specific measures identified[EI18]
Process sampling [CS2] PROC3	No specific measures identified[EI18]
Laboratory activities [CS36] PROC15	No specific measures identified[EI18]
Bulk transfers[CS14](closed systems)[CS107] PROC8b	No specific measures identified[EI18]
Bulk transfers[CS14](open systems)[CS108] PROC8b	No specific measures identified[EI18]
Bulk transfers[CS14](open systems)[CS108] PROC8b	No specific measures identified[EI18]
Drum and small package filling[CS6] PROC9	No specific measures identified[EI18]
Equipment cleaning and maintenance[CS39] PROC8a	No specific measures identified[EI18]

Material storage[CS67] PROC1	No specific measures identified[EI18]
Material storage[CS67] PROC2	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.1e4
Fraction of Regional tonnage used locally	2.0e-3
Annual site tonnage (tonnes/year)	2.3e1
Maximum daily site tonnage (kg/day)	1.1e3
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	
	1.0e-3
Release fraction to wastewater from process (initial release prior to RMM)	
	1.0e-5
Release fraction to soil from process (initial release prior to RMM)	
	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b].	
No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	1.5e7
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk	

model [EE2].
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 1.1b.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.3 Formulation & (Re)packing of Substances and Mixtures – Industrial

1.3.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Formulation & (Re)packing of Substances and Mixtures – Industrial	
Use Descriptor	
Sector(s) of Use	3, 10
Process Categories	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	2
Specific Environmental Release Category	ESVOC 2.2.v1
Processes, tasks, activities covered	
Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletization, extrusion, large and small scale packing, maintenance, sampling and associated laboratory activities	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
General exposures (closed systems) [CS15] PROC1	No specific measures identified[E18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[E18]
General exposures (closed systems) [CS15] PROC3	No specific measures identified[E18]
General exposures (open systems) [CS16] PROC4	No specific measures identified[E18]
General exposures (open systems) [CS16] PROC4	No specific measures identified[E18]
Batch processes at elevated temperatures[CS136]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC3	No specific measures identified[E18]
Process sampling [CS2] PROC3	No specific measures identified[E18]
Laboratory activities [CS36] PROC15	No specific measures identified[E18]

Laboratory activities [CS36] PROC15	No specific measures identified[EI18]
Bulk transfers[CS14] PROC8b	No specific measures identified[EI18]
Mixing operations (open systems)[CS30] PROC5	No specific measures identified[EI18]
Manual[CS34]Transfer from/pouring from containers [CS22] PROC8a	No specific measures identified[EI18]
Drum/batch transfers [CS8] PROC8b	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.1e4
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	1.1e4
Maximum daily site tonnage (kg/day)	3.7e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	300
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (after typical onsite RMMs, consistent with EU Solvent Emissions Directive requirements)	
	2.5e-2
Release fraction to wastewater from process (initial release prior to RMM)	
	2.0e-4
Release fraction to soil from process (initial release prior to RMM)	
	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	41.2
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	7.5e5
Assumed domestic sewage treatment plant flow (m3/d)	2000

Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.
Section 3 Exposure Estimation
3.1. Health
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 2.2.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.4 Uses in Coatings – Industrial

1.4.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Uses in Coatings – Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, 15 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC 4.3a.v1
Processes, tasks, activities covered	
Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
General exposures (closed systems) [CS15] PROC1	No specific measures identified[EI18]
General exposures (closed systems) [CS15]with sample collection[CS56]Use in contained systems[CS38] PROC2	No specific measures identified[EI18]
Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing[CS94]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC2	No specific measures identified[EI18]
Mixing operations (closed systems)[CS29]General exposures (closed systems) [CS15] PROC3	No specific measures identified[EI18]
Film formation - air drying[CS95] PROC4	No specific measures identified[EI18]
Film formation - air drying[CS95] PROC4	No specific measures identified[EI18]
Preparation of material for application[CS96]Mixing operations (open systems)[CS30] PROC5	No specific measures identified[EI18]

Preparation of material for application[CS96]Mixing operations (open systems)[CS30] PROC5	No specific measures identified[EI18]
Spraying (automatic/robotic)[CS97] PROC7	No specific measures identified[EI18]
Manual [CS34]. Spraying[CS10] PROC7	No specific measures identified[EI18]
Material transfers [CS3] PROC8a	No specific measures identified[EI18]
Material transfers [CS3] PROC8a	No specific measures identified[EI18]
Material transfers [CS3] PROC8b	No specific measures identified[EI18]
Roller, spreader, flow application[CS98] PROC10	No specific measures identified[EI18]
Dipping, immersion and pouring[CS4] PROC13	No specific measures identified[EI18]
Laboratory activities [CS36] PROC15	No specific measures identified[EI18]
Material transfers [CS3]Drum/batch transfers [CS8]Transfer from/pouring from containers [CS22] PROC9	No specific measures identified[EI18]
Material transfers [CS3]Drum/batch transfers [CS8]Transfer from/pouring from containers [CS22] PROC9	No specific measures identified[EI18]
Production or preparation of articles by tableting, compression, extrusion or pelletisation[CS100] PROC14	No specific measures identified[EI18]
Production or preparation of articles by tableting, compression, extrusion or pelletisation[CS100] PROC14	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	6.0e-1
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	6.0e-1
Maximum daily site tonnage (kg/day)	3.0e-1
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100

Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.98
Release fraction to wastewater from process (initial release prior to RMM)	7.0e-4
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	90
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d).	2.1e5
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOG SpERC 4.3a.v1.	

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.5 Uses in Cleaning Agents – Industrial

1.5.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use in Cleaning Agents – Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	2, 3, 4, 7, 8a, 8b, 10, 13 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC 4.4a.v1
Processes, tasks, activities covered	
Covers the use as a component of cleaning products including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Bulk transfers[CS14] PROC8a	No specific measures identified[E118]
Bulk transfers[CS14] PROC8a	No specific measures identified[E118]
Automated process with (semi) closed systems.[CS93]Use in contained systems[CS38] PROC2	No specific measures identified[E118]
Automated process with (semi) closed systems.[CS93]Use in contained systems[CS38] PROC2	No specific measures identified[E118]
Automated process with (semi) closed systems.[CS93]Drum/batch transfers [CS8] PROC3	No specific measures identified[E118]
Automated process with (semi) closed systems.[CS93]Drum/batch transfers [CS8] PROC3	No specific measures identified[E118]
Application of cleaning products in closed systems [CS101] PROC2	No specific measures identified[E118]
Application of cleaning products in closed systems [CS101] PROC2	No specific measures identified[E118]

Filling / preparation of equipment from drums or containers.[CS45] PROC8b	No specific measures identified[EI18]
Filling / preparation of equipment from drums or containers.[CS45] PROC8b	No specific measures identified[EI18]
Use in contained batch processes [CS37] PROC4	No specific measures identified[EI18]
Use in contained batch processes [CS37] PROC4	No specific measures identified[EI18]
Degreasing small objects in cleaning station[CS41] PROC13	No specific measures identified[EI18]
Degreasing small objects in cleaning station[CS41] PROC13	No specific measures identified[EI18]
Cleaning with low-pressure washers[CS42] PROC10	No specific measures identified[EI18]
Cleaning with low-pressure washers[CS42] PROC10	No specific measures identified[EI18]
Cleaning with high pressure washers [CS44] PROC7	No specific measures identified[EI18]
Cleaning with high pressure washers [CS44] PROC7	No specific measures identified[EI18]
Manual[CS34]Surfaces[CS48]Cleaning[CS47]no spraying[CS60] PROC10	No specific measures identified[EI18]
Manual[CS34]Surfaces[CS48]Cleaning[CS47]no spraying[CS60] PROC10	No specific measures identified[EI18]

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3

Section 2.2 Control of environmental exposure

Product characteristics

Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].

Amounts used

Fraction of EU tonnage used in region	0.1
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Regional use tonnage (tonnes/year)	4.3e0
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Fraction of Regional tonnage used locally	1
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Annual site tonnage (tonnes/year)	4.3e0
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Maximum daily site tonnage (kg/day)	2.2e2
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Frequency and duration of use

Continuous release [FD2].

Emission days (days/year)	20
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Environmental factors not influenced by risk management

Local freshwater dilution factor	10
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Local marine water dilution factor	100
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Other given operational conditions affecting environmental exposure

Release fraction to air from process (initial release prior to RMM)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-6
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	70
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d).	1.5e7
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – "LocalCSR" worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 4.4a.v1.	

Exposure Estimation:

Human Health

See Appendix 2.b.

Environment

See PETRORISK file (Annex III).

1.6 Use as a Blowing Agent – Industrial

1.6.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use as a Blowing Agent – Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 3, 8b, 9, 12 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	4
Specific Environmental Release Category	ESVOC 4.9.v1
Processes, tasks, activities covered	
Use as a blowing agent for rigid and flexible foams, including material transfers, mixing and injection, curing, cutting, storage and packing.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Bulk transfers[CS14] PROC8b	No specific measures identified[EI18]
Mixing operations (closed systems)[CS29] PROC1	No specific measures identified[EI18]
Extrusion and expansion of polymer mass[CS122] PROC12	No specific measures identified[EI18]
Cutting and shaving[CS134] PROC12	No specific measures identified[EI18]
Collection and re-processing of shavings, cuttings, etc[CS123] PROC12	No specific measures identified[EI18]
Product packaging[CS124] PROC12	No specific measures identified[EI18]
Material storage[CS67] PROC12	No specific measures identified[EI18]
Mixing operations (closed systems)[CS29]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC3	No specific measures identified[EI18]
Intermediate polymer storage [CS66]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC3	No specific measures identified[EI18]
Centrifuging including discharging[CS127]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC3	No specific measures identified[EI18]
Drying and storage [CS12] PROC12	No specific measures identified[EI18]
Semi-bulk packaging[CS128] PROC8b	No specific measures identified[EI18]
Treatment by heating[CS129]Operation is carried out at elevated temperature (> then 20°C above ambient	No specific measures identified[EI18]

temperature)[OC7] PROC12	
Drying and storage [CS12] PROC12	No specific measures identified[EI18]
Article formation in mould (re-wording of CS89?)[CS130]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC12	No specific measures identified[EI18]
Cutting by heated wire[CS131]Manual[CS34] PROC12	No specific measures identified[EI18]
Mixing operations (closed systems)[CS29] PROC3	No specific measures identified[EI18]
Drum and small package filling[CS6]Filling / preparation of equipment from drums or containers.[CS45] PROC9	No specific measures identified[EI18]
Foaming[CS132] PROC12	No specific measures identified[EI18]
Compression[CS133] PROC12	No specific measures identified[EI18]
Cutting by heated wire[CS131] PROC12	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	9.6e2
Fraction of Regional tonnage used locally	1
Annual site tonnage (tonnes/year)	9.6e2
Maximum daily site tonnage (kg/day)	4.8e4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0
Release fraction to wastewater from process (initial release prior to RMM)	3.0e-5
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency ≥ (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of ≥ (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M _{safe}) based on release following total wastewater treatment removal (kg/d).	5.0e6
Assumed domestic sewage treatment plant flow (m3/d)	2000

Conditions and measures related to external treatment of waste for disposal
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]
Conditions and measures related to external recovery of waste
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 4.9.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.7 Use as a Fuel – Professional

1.7.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use as a Fuel – Professional	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 8a, 8b, 16
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	Specific Environmental Release Category
Processes, tasks, activities covered	
Covers the use as a fuel (or fuel additives and additive components) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Bulk transfers[CS14] PROC8b	No specific measures identified[EI18]
Drum/batch transfers [CS8] PROC8b	No specific measures identified[EI18]
General exposures (closed systems) [CS15]Use in contained batch processes [CS37] PROC1	No specific measures identified[EI18]
General exposures (closed systems) [CS15]Use in contained batch processes [CS37] PROC2	No specific measures identified[EI18]
General exposures (closed systems) [CS15]Use in contained batch processes [CS37] PROC3	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC1	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[EI18]
General exposures (closed systems) [CS15](closed systems)[CS107] PROC16	No specific measures identified[EI18]
General exposures (closed systems) [CS15](closed systems)[CS107] PROC3	No specific measures identified[EI18]
Equipment cleaning and maintenance[CS39] PROC8a	No specific measures identified[EI18]

Vessel and container cleaning[CS103] PROC8a	No specific measures identified[EI18]
Material storage[CS67] PROC1	No specific measures identified[EI18]
Material storage[CS67] PROC2	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	7.0e1
Fraction of Regional tonnage used locally	5.0e-4
Annual site tonnage (tonnes/year)	3.5e-2
Maximum daily site tonnage (kg/day)	9.6e-2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
Release fraction to soil from process (initial release prior to RMM)	0.00001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a].	
No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	9.4e3
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – "LocalCSR" worksheet.	
Section 3 Exposure Estimation	
3.1. Health	

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 7.12a.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.8 Use as a Fuel - Consumer

1.8.1 Exposure Scenario

Section 1 Exposure Scenario Title		
Title		
Use as a Fuel – Consumer		
Use Descriptor		
Sector(s) of Use	21	
Product Categories	13 <i>Further information on the mapping and allocation of PC codes is contained in Appendix 1.b.</i>	
Environmental Release Categories	9a, 9b	
Specific Environmental Release Category	ESVOC 9.12c.v1	
Processes, tasks, activities covered		
Covers consumer uses in fuels		
Assessment Method		
See Section 3.		
Section 2		Operational conditions and risk management measures
<i>Field for additional statements to explain scenario if required - pending better understanding from ECHA</i>		
Section 2.1		Control of consumer exposure
Product characteristics		
Physical form of product		liquid
Vapour pressure		300000
Concentration of substance in product		Unless otherwise stated, cover concentrations up to 100% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to 37500g [ConsOC2]; covers skin contact area up to 420cm ² [ConsOC5]
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 2 hours per event [ConsOC14]
Other Operational Conditions affecting exposure		Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m ³ room [ConsOC11]; assumes use with typical ventilation [ConsOC8].
Section 2.1.1		Product categories
PC13:Fuels--Liquid - subcategories added: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm ² [ConsOC5]; for each use event, covers use amounts up to 37500g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m ³ [ConsOC11]; for each use event, covers exposure up to 0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - subcategories added: Scooter Refuelling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm ² [ConsOC5]; for each use event, covers use amounts up to 3750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m ³ [ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs

		stated
PC13:Fuels--Liquid - subcategories added: Garden Equipment - Use	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 750g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to 2.00hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid (subcategories added): Garden Equipment - Refueling	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 420.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 750g [ConsOC2]; Covers use in a one car garage (34m3) under typical ventilation [ConsOC10]; covers use in room size of 34m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid (subcategories added): Home space heater fuel	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 365 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 3000g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated
PC13:Fuels--Liquid - subcategories added: Lamp oil	OC	Unless otherwise stated, covers concentrations up to 100% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; covers skin contact area up to 210.00 cm2 [ConsOC5]; for each use event, covers use amounts up to 100g [ConsOC2]; covers use under typical household ventilation [ConsOC8]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.01hr/event[ConsOC14];
	RMM	No specific RMMs developed beyond those OCs stated

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3

Section 2.2 Control of environmental exposure

Product characteristics

Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].

Fraction of EU tonnage used in region	5.0e-4
Regional use tonnage (tonnes/year)	2.1e4
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	1.0e1
Maximum daily site tonnage (kg/day)	2.9e1

Frequency and duration of use

Continuous release [FD2].	
Emission days (days/year)	365

Environmental factors not influenced by risk management

Local freshwater dilution factor	10
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Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	0.00001
Release fraction to soil from process (initial release prior to RMM)	0.00001
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d).	2.4e6
Assumed domestic sewage treatment plant flow (m^3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
Combustion emissions limited by required exhaust emission controls [ETW1]. Combustion emissions considered in regional exposure assessment [ETW2]. External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
This substance is consumed during use and no waste of the substance is generated. [ERW3]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].	

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.9 Use as Functional Fluids – Industrial

1.9.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use as Functional Fluids – Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	1, 2, 4, 8a, 8b, 9 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	7
Specific Environmental Release Category	ESVOC 7.13a.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Bulk transfers[CS14](closed systems)[CS107] PROC1	No specific measures identified[EI18]
Bulk transfers[CS14](closed systems)[CS107] PROC2	No specific measures identified[EI18]
Drum/batch transfers [CS8] PROC8b	No specific measures identified[EI18]
Filling of articles/equipment[CS84](closed systems)[CS107] PROC9	No specific measures identified[EI18]
Filling / preparation of equipment from drums or containers.[CS45] PROC8a	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[EI18]
General exposures (open systems) [CS16] PROC4	No specific measures identified[EI18]
General exposures (open systems) [CS16]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC4	No specific measures identified[EI18]
General exposures (open systems) [CS16]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC4	No specific measures identified[EI18]

Remanufacture of reject articles[CS19] PROC9	No specific measures identified[EI18]
Equipment maintenance [CS5] PROC8a	No specific measures identified[EI18]
Material storage[CS67] PROC1	No specific measures identified[EI18]
Material storage[CS67] PROC2	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	4.6e1
Fraction of Regional tonnage used locally	2.2e-1
Annual site tonnage (tonnes/year)	1.0e1
Maximum daily site tonnage (kg/day)	5.0e2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	
	1.0e-2
Release fraction to wastewater from process (initial release prior to RMM)	
	3.0e-5
Release fraction to soil from process (initial release prior to RMM)	
	0.001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a]. Prevent discharge of undissolved substance to or recover from onsite wastewater [TCR14]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	5.0e6
Assumed domestic sewage treatment plant flow (m3/d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	

Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.
Section 3 Exposure Estimation
3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 7.13a.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.10 Use as Functional Fluids – Professional

1.10.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use as Functional Fluids – Professional	
Use Descriptor	
Sector(s) of Use	22
Process Categories	1, 2, 3, 8a, 9, 20 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	9a, 9b
Specific Environmental Release Category	ESVOC 9.13b.v1
Processes, tasks, activities covered	
Use as functional fluids e.g. cable oils, transfer oils, insulators, refrigerants, hydraulic fluids in professional equipment including maintenance and related material transfers.	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Drum/batch transfers [CS8] PROC8a	No specific measures identified[EI18]
Transfer from/pouring from containers [CS22] PROC9	No specific measures identified[EI18]
Filling / preparation of equipment from drums or containers.[CS45] PROC9	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC1	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC2	No specific measures identified[EI18]
General exposures (closed systems) [CS15] PROC3	No specific measures identified[EI18]
General exposures (open systems) [CS16] PROC20	No specific measures identified[EI18]
General exposures (open systems) [CS16]Operation is carried out at elevated temperature (> then 20°C above ambient temperature)[OC7] PROC20	No specific measures identified[EI18]
Remanufacture of reject articles[CS19] PROC9	No specific measures identified[EI18]

Equipment maintenance [CS5] PROC8a	No specific measures identified[EI18]
Material storage[CS67] PROC1	No specific measures identified[EI18]
Material storage[CS67] PROC2	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	2.3e1
Fraction of Regional tonnage used locally	5.0e-4
Annual site tonnage (tonnes/year)	1.1e-2
Maximum daily site tonnage (kg/day)	3.1e-2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	
	0.05
Release fraction to wastewater from process (initial release prior to RMM)	
	0.025
Release fraction to soil from process (initial release prior to RMM)	
	0.025
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a].	
No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	N/A
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	2.1e3
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	

3.1. Health
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.
3.2. Environment
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].
Section 4 Guidance to check compliance with the Exposure Scenario
4.1. Health
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
4.2. Environment
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 9.13b.v1.

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.11 Other Consumer Uses – Consumer

1.11.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Other Consumer Uses – Consumer	
Use Descriptor	
Sector(s) of Use	21
Product Categories	28, 39
Environmental Release Categories	8a, 8d
Specific Environmental Release Category	ESVOC 8.16.v1
Processes, tasks, activities covered	
Consumer uses not covered in consumer examples listed above e.g. use as a carrier in cosmetics/personal care products, perfumes and fragrances. Note: For cosmetic and personal care products, risk assessment only required for the environment under REACH as human health is covered by alternative legislation.	
Assessment Method	
See Section 3.	
Section 2 Operational conditions and risk management measures	
Section 2.1 Control of consumer exposure	
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Vapour pressure (kPa)	>10
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Frequency and duration of use/exposure	
Other Operational Conditions affecting exposure	
Product Category	Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)
General measures (dermal irritants)	Not applicable
General measures (carcinogens)	Not applicable
PC28	Not applicable
PC39	Not applicable
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	1.0e1
Fraction of Regional tonnage used locally	0.0005
Annual site tonnage (tonnes/year)	5.0e-3
Maximum daily site tonnage (kg/day)	1.4e-2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.95

Release fraction to wastewater from process (initial release prior to RMM)	0.025
Release fraction to soil from process (initial release prior to RMM)	0.025
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1.0
Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/d).	1.1e3
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate consumer exposures, consistent with the content of ECETOC Report #107 and the Chapter R15 of the IR&CSA TGD. Where exposure determinants differ to these sources, then they are indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].	

Exposure Estimation:

Human Health

See Appendix 2.b.

Environment

See PETRORISK file (Annex III).

1.12 Use in Laboratories – Industrial

1.12.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use in Laboratories – Industrial	
Use Descriptor	
Sector(s) of Use	3
Process Categories	10, 15 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	2, 4
Specific Environmental Release Category	<i>Not Applicable</i>
Processes, tasks, activities covered	
Use of the substance within laboratory settings, including material transfers and equipment cleaning	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Laboratory activities [CS36] PROC15	No specific measures identified[E118]
Cleaning[CS47] PROC10	No specific measures identified[E118]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5.0e0
Fraction of Regional tonnage used locally	4.0e-1
Annual site tonnage (tonnes/year)	2.0e0
Maximum daily site tonnage (kg/day)	1.0e2
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.025

Release fraction to wastewater from process (initial release prior to RMM)	0.02
Release fraction to soil from process (initial release prior to RMM)	0.0001
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater sediment [TCR1b]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	7.5e3
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3].	

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.13 Use in Laboratories – Professional

1.13.1 Exposure Scenario

Section 1 Exposure Scenario Title	
Title	
Use in Laboratories – Professional	
Use Descriptor	
Sector(s) of Use	22
Process Categories	10, 15 <i>Further information on the mapping and allocation of PROC codes is contained in Appendix 1.a.</i>
Environmental Release Categories	8a
Specific Environmental Release Category	ESVOC 8.17.v1
Processes, tasks, activities covered	
Use of the substance within laboratory settings, including material transfers and equipment cleaning	
Assessment Method	
See Section 3.	
Section 2	Operational conditions and risk management measures
Section 2.1	Control of worker exposure
Product characteristics	
Physical form of product	Liquid, vapour pressure >10KPa at STP [OC5]
Concentration of substance in product	Covers percentage substance in the product up to 100% (unless stated differently) [G13]
Amounts used	No Limit
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated) [G2]
Other Operational Conditions affecting worker exposure	Assumes use at not > 20oC above ambient [G15]
	Assumes a good basic standard of occupational hygiene has been implemented [G1]
Risk Management Measures	
Laboratory activities [CS36] PROC15	No specific measures identified[EI18]
Cleaning[CS47] PROC10	No specific measures identified[EI18]
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Appendices 1 to 3	
Section 2.2 Control of environmental exposure	
Product characteristics	
Substance is isomeric mixture [PrC2].Predominantly hydrophobic [PrC4a].	
Amounts used	
Fraction of EU tonnage used in region	0.1
Regional use tonnage (tonnes/year)	5.0e-1
Fraction of Regional tonnage used locally	5.0e-4
Annual site tonnage (tonnes/year)	2.5e-4
Maximum daily site tonnage (kg/day)	6.9e-4
Frequency and duration of use	
Continuous release [FD2].	
Emission days (days/year)	365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10
Local marine water dilution factor	100
Other given operational conditions affecting environmental exposure	
Release fraction to air from process (initial release prior to RMM)	0.5

Release fraction to wastewater from process (initial release prior to RMM)	0.5
Release fraction to soil from process (initial release prior to RMM)	0
Technical conditions and measures at process level (source) to prevent release	
Common practices vary across sites thus conservative process release estimates used [TCS1].	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk from environmental exposure is driven by freshwater [TCR1a]. No wastewater treatment required [TCR6].	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency \geq (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of \geq (%)	0
Organisation measures to prevent/limit release from site	
Do not apply industrial sludge to natural soils [OMS2]. Sludge should be incinerated, contained or reclaimed [OMS3].	
Conditions and measures related to municipal sewage treatment plant	
Estimated substance removal from wastewater via domestic sewage treatment (%)	97.1
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	97.1
Maximum allowable site tonnage (M_{safe}) based on release following total wastewater treatment removal (kg/d).	5.6e1
Assumed domestic sewage treatment plant flow (m ³ /d)	2000
Conditions and measures related to external treatment of waste for disposal	
External treatment and disposal of waste should comply with applicable local and/or national regulations. [ETW3]	
Conditions and measures related to external recovery of waste	
External recovery and recycling of waste should comply with applicable local and/or national regulations. [ERW1]	
Additional information on the basis for the allocation of the identified OCs and RMMs is contained in Petrorisk file in IUCLID section 13 – “LocalCSR” worksheet.	
Section 3 Exposure Estimation	
3.1. Health	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	
3.2. Environment	
The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model [EE2].	
Section 4 Guidance to check compliance with the Exposure Scenario	
4.1. Health	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
4.2. Environment	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1]. Required removal efficiency for wastewater can be achieved using onsite/offsite technologies, either alone or in combination [DSU2]. Required removal efficiency for air can be achieved using onsite technologies, either alone or in combination [DSU3]. Further details on scaling and control technologies are provided in factsheet for ESVOC 8.17.v1.	

Exposure Estimation:

Human Health

See Appendix A.

Environment

See PETRORISK file (Annex III).

1.14 Regional Environment Exposure Estimation

See PETRORISK file (Annex III).

1.15 Qualitative Risk Assessments

The purpose of the qualitative risk characterisation is to assess:

"the likelihood that effects are avoided when implementing the exposure scenario..." (REACH Annex 1, Section 6.5).

This qualitative CSA approach aims to reduce/avoid contact when there is no basis for setting a DNEL or DMEL for a certain human health endpoint, i.e. when the available data for this effect do not provide quantitative dose-response information, but there exist toxicity data of a qualitative nature. The endpoints for which the available data may trigger a qualitative risk characterisation includes aspiration hazard (R65) and defatting of the skin (R66).

1.15.1 Aspiration Hazard Assessment (R65)

'Aspiration' means the entry of a liquid substance directly into the trachea and lower respiratory tract. Aspiration of hydrocarbon substances can result in severe acute effects such as chemical pneumonitis, varying degrees of pulmonary injury or death. This property relates to the potential for low viscosity material to spread quickly into the deep lung and cause severe pulmonary tissue damage. Classification of a hydrocarbon substance for aspiration hazard is made on the basis of reliable human evidence or on the basis of physical properties.

The R65 risk phrase (Harmful: may cause lung damage if swallowed) relates to potential for aspiration, a non-quantifiable hazard determined by physico-chemical properties (i.e. viscosity) that can occur during ingestion and also if it is vomited following ingestion. A DNEL cannot be derived.

This general qualitative CSA approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance. Exposures should be controlled to at least the levels that represent an acceptable level of risk such that the implementation of the chosen RMMs will ensure that the likelihood of an event occurring due to the substance hazard is negligible, and the risk is considered to be controlled to a level of no concern.

There are no routine anticipated exposures by ingestion related to any supported uses of the substance. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific risk. For any substance, classified as R65, these measures should be communicated via the safety data sheet by use of the following phrase:

- Do not ingest. If swallowed then seek immediate medical assistance.

Furthermore it should be noted that where the substance is sold for use in lamp oils and grill lighters by the general public (Consumers), then these must be visibly, legibly and indelibly marked as follows, in accordance with REACH Annex XVII update of 1.4.2010:

- Keep lamps filled with this liquid out of the reach of children.
- Just a sip of lamp oil – or even sucking the wick of lamps may lead to life threatening lung damage.

1.15.2 Skin Defatting Hazard Assessment (R66)

For substances and preparations that do not meet the criteria for R38 but which may cause concern as a result of skin dryness, flaking or cracking, the risk phrase R66 (Repeated exposure may cause skin dryness or cracking) shall be used. Decisions for applying this phrase are derived either from practical observation after normal handling and use or from other relevant information used to predict effects on the skin.

The R66 risk phrase is generally applied to petroleum substances and solvents that have the capacity to extract lipids from the skin and that are not classified as skin irritant. R66 does not relate to a classifiable endpoint, and there is no standardized test method to quantify the effect. Thus, a DNEL cannot be derived.

Note that R66 is an “additional” risk phrase which means that it shall be applied only to substances or preparations that are already classified whilst assignment of the risk phrase R66 does not, in itself, have any impact on the formal classification of the substance.

This general qualitative CSA approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance. Exposures should be controlled to at least the levels that represent an acceptable level of risk such that the implementation of the chosen RMMs will ensure that the likelihood of an event occurring due to the substance hazard is negligible, and the risk is considered to be controlled to a level of no concern.

For skin defatting a qualitative risk characterisation has been conducted. Handling and storage risk management measures that are generally identified for skin defatting risks are outlined in Appendix 3.b. A review of these RMMs indicates that if the user complies with the following generic statement, risks due to skin defatting are considered to be controlled. For any substance, classified as R66, these measures should be communicated via the safety data sheet by use of the following phrase:

- PPE20: If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes

2 RISK CHARACTERISATION

2.1 Manufacture of Substance – Industrial

2.1.1 Human Health

See Appendix A.

2.1.2 Environment

See PETRORISK file (Annex III).

2.2 Distribution of Substance – Industrial

2.2.1 Human Health

See Appendix A.

2.2.2 Environment

See PETRORISK file (Annex III).

2.3 Formulation & (Re)packing of Substances and Mixtures – Industrial

2.3.1 Human Health

See Appendix A.

2.3.2 Environment

See PETRORISK file (Annex III).

2.4 Uses in Coatings – Industrial

2.4.1 Human Health

See Appendix A.

2.4.2 Environment

See PETRORISK file (Annex III).

2.5 Uses in Cleaning – Industrial

2.5.1 Human Health

See Appendix A.

2.5.2 Environment

See PETRORISK file (Annex III).

2.6 Use in Blowing Agents – Industrial

2.6.1 Human Health

See Appendix A.

2.6.2 Environment

See PETRORISK file (Annex III).

2.7 Use in Fuels – Professional

2.7.1 Human Health

See Appendix A.

2.7.2 Environment

See PETRORISK file (Annex III).

2.8 Use in Fuels – Consumer

2.8.1 Human Health

See Appendix A.

2.8.2 Environment

See PETRORISK file (Annex III).

2.9 Use in Functional Fluids – Industrial

2.9.1 Human Health

See Appendix A.

2.9.2 Environment

See PETRORISK file (Annex III).

2.10 Use in Functional Fluids – Professional

2.10.1 Human Health

See Appendix A.

10.10.2 Environment

See PETRORISK file (Annex III).

2.11 Use in Other Consumer Uses – Consumer

2.11.1 Human Health

See Appendix A.

2.11.2 Environment

See PETRORISK file (Annex III).

2.11 Use in Laboratories – Industrial

2.11.1 Human Health

See Appendix A.

2.11.2 Environment

See PETRORISK file (Annex III).

2.13 Use in Laboratories – Professional

10.13.1 Human Health

See Appendix A.

2.13.2 Environment

See PETRORISK file (Annex III).

215 Overall exposure (combined for all relevant emission/release sources)

2.15.1 Human health (combined for all exposure routes)

Combined exposures can be calculated with information provided on the individual exposure scenarios presented in section 9. However, it is unclear how to define risk management measures resulting from this analysis.

2.15.2 Environment (combined for all exposure routes)

Combined exposures can be calculated with information provided on the individual exposure scenarios presented in section 9. However, it is unclear how to define risk management measures resulting from this analysis.

2.16 Regional Environment

See PETRORISK file

2.17 Qualitative Risk Assessments

2.17.1 Aspiration Hazard Assessment

The implementation of relevant RMMs will ensure that the likelihood of an event occurring due to the aspiration hazard of the substance is negligible and the risk is considered to be controlled to a level of no concern.

For aspiration hazard a qualitative risk characterisation has been conducted consistent with the considerations and risk management measures identified in the Table below.

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
Aspiration Toxicity (R65)	• Liquid	R65 / H304	<p>Response:</p> <ul style="list-style-type: none"> (S2): Keep out of the reach of children (for dangerous products sold to the general public must include this safety phrase) S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label P102: Keep out of reach of children. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P331: Do NOT induce vomiting. <p>Storage:</p> <ul style="list-style-type: none"> P405: Store locked up. <p>Disposal:</p> <ul style="list-style-type: none"> P501 : Dispose of contents/container 	<p>Worker</p> <ul style="list-style-type: none"> Do not ingest Implementation of basic standards of occupational hygiene Avoid splashes and spills Avoidance of contact with contaminated tools and objects Management/supervision to check that the RMMs in place are being used correctly and OCs followed Training for staff on good practice Good standard of personal hygiene <p>Consumer</p> <p>Do not ingest</p> <p>For lamp oils and grill lighters, follow the provisions of REACH – Annex XVII, including:</p> <ul style="list-style-type: none"> Marketing in black opaque containers not exceeding 1 litre Labelling with specific safe use instruction

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
			to.... in accordance with local/regional/national/international regulations (to be specified)	

For any substance, classified as R65, these risk management measures should be communicated via the safety data sheet by use of the following phrase:

- Do not ingest. If swallowed then seek immediate medical assistance.

2.17.2 Skin Defatting Hazard Assessment

The implementation of relevant RMMs will ensure that the likelihood of an event occurring due to the substance hazard of skin defatting is negligible and the risk is considered to be controlled to a level of no concern.

For skin defatting a qualitative risk characterisation has been conducted consistent with the considerations and risk management measures identified in the Table below.

Hazard	Material	Risk / Hazard Phrase	Examples of Relevant S Phrases and P Statements	Components of the Qualitative Risk Assessment
Skin defatting (R66)	• Liquid	R66 / EUH066 Repeated exposure may cause skin dryness or cracking	No designated S and P phrases are assigned, though the following phrase may be appropriate: S24 Avoid contact with skin Response: <ul style="list-style-type: none"> P280: Wear protective gloves/protective clothing/eye protection/face protection. P281: Use personal protective equipment as required. 	<ul style="list-style-type: none"> Implementation of basic standards of occupational hygiene; Avoid repeated and/or prolonged skin contact with product; Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination promptly; Avoid splashes and spills; Avoidance of contact with contaminated tools and objects; Clean up contamination/spills; Regular cleaning of equipment and work area; Management/supervision to check that the RMMs in place are being used correctly and OCs followed; Training for staff on good practice to prevent / minimise exposures and to report any skin effects that may develop; Good standard of personal hygiene.

For any substance, classified as R66, these measures should be communicated via the safety data sheet by use of the following phrase:

- PPE20: If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes

APPENDIX A – EXPOSURE USE MAPPING

A1.1.1 Manufacture of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Manufacture of substance	Industrial - SU8/9/3	General process exposures (no sampling)	CS15	Continuous; daily; 15 - 1 hour; product temp. Outdoor	Closed processes	Closed process. No exposure.	PROC1 Closed process (no sampling)
	Industrial - SU8/9/3	General process exposures and sample collection	CS15	Continuous; daily; 15 mins - 1 hour; product temp. Outdoor	Enclosed process; Outdoor location; closed/semi-closed sampling	With LEV	PROC2 Closed continuous process (with sampling)
	Industrial - SU8/9/3	General process exposures	CS15	Batch process; daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Closed equipment, enclosed or vented sampling points	With LEV	PROC3 Closed batch process (with sampling)
	Industrial - SU8/9/3	General exposures open batch process	CS16	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC4 batch process with exposure
	Industrial - SU8/9/3	Sample collection	CS2	Daily; <15 mins; product temp.; Indoor/Outdoor	Closed or ventilated sampling points	With LEV	PROC8b Dedicated discharging to/from vessels
	Industrial - SU8/9/3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard. PPE.	With LEV	PROC15 Use in laboratory
	Industrial - SU8/9/3	Bulk transfers (no lev)	CS14, CS108	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels
	Industrial - SU8/9/3	Open bulk transfers (aerosols)	CS14, CS108	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels
	Industrial - SU8/9/3	Bulk transfers (with lev)	CS14, CS107	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels
	Industrial - SU8/9/3	Clean down and Maintenance	CS39	Daily; 15 mins - 1 hour; product temp; collection of line waste in container;	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels
	Industrial - SU3/SU10	Storage	CS67	Daily; 8 hrs; product temp;	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)
	Industrial - SU3/SU10	Storage	CS67	Daily; 8 hrs; product temp;	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)

A1.1.2 Manufacture of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
Utker Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure				Dermal exposure				Comments	
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d) - no	TRA Predicted Dermal Local Exposure (mg/kg/d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified		
Industrial SUB/6/2	General process exposures (no sampling)	CS 15	Continuous, daily 15 - 1 hour, product temp. Outdoor	Closed process	Closed process, No exposure.	PROC1 Closed process (no sampling)	0.03		0.03	0.34	0.1		0.1	0.1		
Industrial SUB/6/2	General process exposures and sample collection	CS 15	Continuous, daily 15 mins - 1 hour, product temp. Outdoor	Enclosed process; Outdoor location; closed/semi-closed sampling	With LEV	PROC2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2		0.2	0.2		
Industrial SUB/6/2	General process exposures	CS 15	Batch process; daily 15 - 1 hour, product temp.; Indoor/Outdoor	Closed equipment, enclosed or vented sampling points	With LEV	PROC3 Closed batch process (with sampling)	296.09		206.56	0.34	0.1		0.1	0.1		
Industrial SUB/6/2	General exposures open batch process	CS 16	Daily, 15 - 1 hour, product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC4 batch process with exposure	296.09		206.56	6.86	1		0.2	0.2		
Industrial SUB/6/2	Sample collection	CS 2	Daily, <15 mins, product temp.; Indoor/Outdoor	Closed or ventilated sampling points	With LEV	PROC5b Dedicated discharging to/from vessels	442.64		265.58	6.86	1		0.2	0.2		
Industrial SUB/6/2	Laboratory activities	CS 36	Daily, 15 mins - 1 hour, product temp.; Indoor	Fume cupboard/PPE.	With LEV	PROC15 Use in laboratory	147.55		147.55	0.34	0.1		0.1	0.1		
Industrial SUB/6/2	Bulk transfers (no lev)	CS 14, CS 108	Daily, 15 - 1 hour, product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC5b Dedicated discharging to/from vessels	442.64		13.28	6.86	1		0.02	0.02		
Industrial SUB/6/3	Open bulk transfers (no lev)	CS 14, CS 108	Daily, 15 - 1 hour, product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC5b Dedicated discharging to/from vessels	5.00	0	0.00	6.86	1	0	0	0		
Industrial SUB/6/2	Bulk transfers (with lev)	CS 14, CS 107	Daily, 15 - 1 hour, product temp.; Indoor/Outdoor	Enclosed transfers, vented transfer points, clear lines prior to decoupling	With LEV	PROC5b Dedicated discharging to/from vessels	442.64		13.28	6.86	1	0	0.02	0.02		
Industrial SUB/6/2	Clean down and Maintenance	CS 39	Daily, 15 mins - 1 hour, product temp; collection of fine waste in container	Enclosed lines, retain waste down in sealed storage pending disposal of waste	No LEV	PROC5a Non-dedicated discharging to/from vessels	737.73		221.32	13.71	1	0	0.2	0.2		
Industrial SUB/6/2	Storage	CS 67	Daily, 8 hrs, product temp.	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)	0.03		0.03	0.34	0.1		0.1	0.1		
Industrial SUB/6/2	Storage	CS 67	Daily, 8 hrs, product temp.	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2		0.2	0.2		

A1.1.3 Manufacture of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk				
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)	
				Text	LEV						
							TRA Predicted Exposure (mg/m ³) no modifiers				
Manufacture of substance	Industrial SUB/9/3	General process exposures (no sampling)	CS15	Continuous; daily; 15 - 1 hour; product temp.; Outdoor	Closed processes	Closed process. No exposure.	PROC1 Closed process (no sampling)	0.03	0.000	0.001	0.001
	Industrial SUB/9/3	General process exposures and sample collection	CS15	Continuous; daily; 15 mins - 1 hour; product temp.; Outdoor	Enclosed process; Outdoor location; closed/semi-closed sampling	With LEV	PROC2 Closed continuous process (with sampling)	147.55	0.049	0.002	0.051
	Industrial SUB/9/3	General process exposures	CS15	Batch process; daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Closed equipment, enclosed or vented sampling points	With LEV	PROC3 Closed batch process (with sampling)	295.09	0.069	0.001	0.070
	Industrial SUB/9/3	General exposures open batch process	CS16	Daily; 15 - 1 hour; product temp.; indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC4 batch process with exposure	295.09	0.069	0.002	0.071
	Industrial SUB/9/3	Sample collection	CS2	Daily; <15 mins; product temp.; Indoor/Outdoor	Closed or ventilated sampling points	With LEV	PROC8b Dedicated discharging to/from vessels	442.64	0.089	0.002	0.091
	Industrial SUB/9/3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard; PPE.	With LEV	PROC15 Use in laboratory	147.55	0.049	0.001	0.050
	Industrial SUB/9/3	Bulk transfers (no lev)	CS14, CS108	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels	442.64	0.004	0.000	0.005
	Industrial SUB/9/3	Open bulk transfers (aerosols)	CS14, CS108	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels	5.00	#DIV/0!	0.000	#DIV/0!
	Industrial SUB/9/3	Bulk transfers (with lev)	CS14, CS107	Daily; 15 - 1 hour; product temp.; Indoor/Outdoor	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels	442.64	0.004	0.000	0.005
	Industrial SUB/9/3	Clean down and Maintenance	CS39	Daily; 15 mins -1 hour; product temp; collection of line waste in container;	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels	737.73	0.074	0.002	0.076
	Industrial SUB/9/3	Storage	CS67	Daily; 8 hrs; product temp;	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)	0.03	0.000	0.001	0.001
	Industrial SUB/9/3	Storage	CS67	Daily; 8 hrs; product temp;	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)	147.55	0.049	0.002	0.051

A1.2.1 Distribution of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Distribution of substance	Industrial - SU3	General process exposures - closed process (e.g. In-line additive dosing)	CS15	Continuous; Outdoor; daily; 15 - 1 hour; product temp.	Closed process. No exposure.	Closed process. No exposure.	PROC1 Closed process (no sampling)
Combine in narrative	Industrial - SU3	General process exposures (occasional controlled exposure)	CS15	Continuous; Outdoor; daily; 15 mins - 1 hour; product temp.	Enclosed process; closed/semi-closed sampling point	No LEV	PROC2 Closed continuous process (with sampling)
	Industrial - SU3	General process exposures - closed batch process	CS15	Batch process; Outdoor; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PROC3 Closed batch process (with sampling)
	Industrial - SU3	General exposures open batch process	CS16	Daily; Indoor/Outdoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC4 batch process with exposure
	Industrial - SU3	Sample collection	CS2	Daily; <15 mins; product temp.; Outdoor;	Closed or ventilated sampling points	No LEV	PROC3 Closed batch process (with sampling)
	Industrial - SU3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard. PPE.	With LEV	PROC15 Use in laboratory
Combine in narrative as Bulk Transfer CS14 unless differentiation	Industrial - SU3	Bulk closed loading and unloading NEW CS (e.g. road/rail car bottom)	CS14, CS107 Bulk transfers (closed systems)	Outdoor; Daily; 15 - 1 hour; product temp.; exposure potential during breaking of hose	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC8b Dedicated Discharging to/from vessels
LEV option	Industrial - SU3	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve LEV)	CS14, CS108 Bulk transfers (open systems)	Outdoor; Daily; 1 - 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank opening.	With LEV	PROC8b Dedicated discharging to/from vessels
RPE option	Industrial - SU3	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve RPE)	CS14, CS108 Bulk transfers (open systems)	Outdoor; Daily; 1 - 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank opening.	No LEV	PROC8b Dedicated discharging to/from vessels
	Industrial - SU3	Drum and small package filling	CS6	Indoor; Continuous; daily; 8 hour; product temp.	Enclosed transfers, vented transfer points, dedicated filling line	With LEV	PROC9 Transfer of substance/mixture into small containers
	Industrial - SU3	Clean down and Maintenance	CS39	Daily; 15 min - 1 hour; product temp; collection of line waste in container	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PROC1 Closed continuous process (sometimes with sampling)
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (sometimes with sampling)

A1.2.2 Distribution of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use										
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure					Dermal exposure					Comments
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d), no	TRA Predicted Dermal Local Exposure (mg/cm ² /d), no	DERMAL RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified			
Distribution of substance	Industrial - S013	CS 15	General process: Outdoor, daily; 15 min; product temp.	Closed process: No exposure.	Closed process: No exposure.	PRO C1 Closed process (no sampling)	0.03		0.03	0.34	0.1			0.1	0.1		
Continue in narrative	Industrial - S013	CS 15	General process: Outdoor, daily; 15 min; - 1 hour; product temp.	Enclosed process: closed/semi-closed sampling point	No LEV	PRO C2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2			0.2	0.2		
	Industrial - S013	CS 15	General process: closed batch process	Batch process: Outdoor, daily; 15 min; - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PRO C3 Closed batch process (with sampling)	296.09		29.51	0.34	0.1		0.01	0.01		
	Industrial - S013	CS 16	General process: open batch process	Daily: Indoor/Outdoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling	With LEV	PRO C4 batch process with exposure	296.09		29.51	6.86	1		0.1	0.1		
	Industrial - S013	CS 2	Sample collection	Daily, < 15 mins; Outdoor.	Closed or ventilated sampling points	No LEV	PRO C3 Closed batch process (with sampling)	296.09		29.51	0.34	0.1		0.01	0.01		
	Industrial - S013	CS 36	Laboratory activities	Daily, 15 mins - 1 hour; product temp. Indoor	Fume cupboard PPE.	With LEV	PRO C15 Use in laboratory	147.55		147.55	0.34	0.1		0.1	0.1		
Combine in narrative as Bulk Transfer CS 4 unless otherwise specified	Industrial - S013	CS 14, CS 107 Bulk transfers (closed systems)	Bulk closed loading and unloading NEW CS (e.g. road/rail car bottom)	Outdoor, Daily; 15 min; product temp.; exposure potential during breaking of hose	Enclosed transfers, clear lines prior to decoupling	No LEV	PRO C6b Dedicated Discharging to/from vessels	442.64		13.28	6.86	1		0.1	0.1		
LEV option	Industrial - S013	CS 14, CS 108 Bulk transfers (open systems)	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve LEV)	Outdoor, Daily; 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank openings	With LEV	PRO C6b Dedicated Discharging to/from vessels	442.64		13.28	6.86	1		0.1	0.1		
RPC option	Industrial - S013	CS 14, CS 108 Bulk transfers (open systems)	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve RPE)	Outdoor, Daily; 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank openings	No LEV	PRO C6b Dedicated Discharging to/from vessels	442.64		44.26	6.86	1		0.2	0.2		
	Industrial - S013	CS 6	Drum and small package filling	Indoor; Continuous, daily; 8 hour; product temp.	Enclosed transfers, vented transfer points, dedicated filling line	With LEV	PRO C9 Transfer of substance/mixture into small containers	590.18		59.02	6.86	1		0.1	0.1		
	Industrial - S013	CS 39	Clean down and Maintenance	Daily, 15 min - 1 hour; product temp; collection of line waste in container	Enclosed lines, clean wash down in sealed storage pending disposal of waste	No LEV	PRO C8a Non-dedicated discharging to/from vessels	737.73		73.77	13.71	1		0.2	0.2		
	Industrial - S013	CS 67	Storage	Daily, 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PRO C1 Closed continuous process (with sampling)	0.03		0.03	0.34	0.1		0.1	0.1		
	Industrial - S013	CS 67	Storage	Daily, 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PRO C2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2	0	0	0		

A1.2.3 Distribution of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Distribution of substance	Industrial - SU3	General process exposures - closed process (e.g. In-line additive dosing)	CS15	Continuous; Outdoor; daily; 15 - 1 hour; product temp.	Closed process. No exposure.	Closed process. No exposure.	PROC1 Closed process (no sampling)	0.000	0.001	0.001
Combine in narrative	Industrial - SU3	General process exposures (occasional controlled exposure)	CS15	Continuous; Outdoor; daily; 15 mins - 1 hour; product temp.	Enclosed process; closed/semi-closed sampling point	No LEV	PROC2 Closed continuous process (with sampling)	0.049	0.002	0.051
	Industrial - SU3	General process exposures - closed batch process	CS15	Batch process; Outdoor; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PROC3 Closed batch process (with sampling)	0.010	0.000	0.010
	Industrial - SU3	General exposures open batch process	CS16	Daily; Indoor/Outdoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling	With LEV	PROC4 batch process with exposure	0.010	0.001	0.011
	Industrial - SU3	Sample collection	CS2	Daily; <15 mins; product temp.; Outdoor;	Closed or ventilated sampling points	No LEV	PROC3 Closed batch process (with sampling)	0.010	0.000	0.010
	Industrial - SU3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard. PPE.	With LEV	PROC15 Use in laboratory	0.049	0.001	0.050
Combine in narrative as Bulk Transfer CS14 unless differentiation	Industrial - SU3	Bulk closed loading and unloading NEW CS (e.g. road/rail car bottom)	CS14, CS107 Bulk transfers (closed systems)	Outdoor; Daily; 15 - 1 hour; product temp.; exposure potential during breaking of hose	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC8b Dedicated Discharging to/from vessels	0.004	0.001	0.005
LEV option	Industrial - SU3	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve LEV)	CS14, CS108 Bulk transfers (open systems)	Outdoor; Daily; 1 - 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank opening.	With LEV	PROC8b Dedicated discharging to/from vessels	0.004	0.001	0.005
RPE option	Industrial - SU3	Bulk open loading NEW CS (e.g. road/rail car top loading, may involve RPE)	CS14, CS108 Bulk transfers (open systems)	Outdoor; Daily; 1 - 4 hours; product temp ambient; exposure potential from	Enclosed transfers, submerged loading via tank opening.	No LEV	PROC8b Dedicated discharging to/from vessels	0.015	0.002	0.017
	Industrial - SU3	Drum and small package filling	CS6	Indoor; Continuous; daily; 8 hour; product temp.	Enclosed transfers, vented transfer points, dedicated filling line	With LEV	PROC9 Transfer of substance/mixture into small containers	0.020	0.001	0.021
	Industrial - SU3	Clean down and Maintenance	CS39	Daily; 15 min - 1 hour; product temp; collection of line waste in container	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels	0.025	0.002	0.027
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PROC1 Closed continuous process (sometimes with sampling)	0.000	0.001	0.001
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; product temp; Outdoors	Samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (sometimes with sampling)	0.049	0.000	0.049

A1.3.1 Formulation of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Formulation & (re)packing of substances and mixtures	Industrial SU2/SU10	General process exposures (no sampling) (e.g. In-line additive dosing)	CS15	Continuous; daily; 15 - 1 hour; product temp.	Closed processes	Closed process. No exposure.	PROC1 Closed process (no sampling)
Combine in with above row in narrative	Industrial SU10	General process exposures and sample collection	CS15	Continuous; daily; 15 mins - 1 hour	Enclosed process; closed/semi-closed sampling point	No LEV	PROC2 Closed continuous process (with sampling)
	Industrial SU10	General process exposures (e.g. In-line additive dosing equipment, in-line)	CS15	Batch process; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PROC3 Closed batch process (with sampling)
Combine in narrative	Industrial SU10	General exposures open batch process	CS16	Daily; Indoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure
Aerosol potential. Value for moderate dusty	Industrial SU10	General exposures open batch process (aerosols)	CS16	Daily; Indoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure
Elevated temperature therefore applied value for medium volatility	Industrial SU10	Batch processes at elevated temperatures (e.g. solvents resin)	CS136	Batch process; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points, vented	With LEV	PROC3 Closed batch process (with sampling)
	Industrial SU10	Sample collection	CS2	Daily; <15 mins; product temp.	Closed or ventilated sampling points	No LEV	PROC3 Closed batch process (with sampling)
	Industrial SU3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard. PPE.	With LEV	PROC15 Use in laboratory
	Industrial SU10	Bulk transfers	CS14	Daily; 15 min - 1 hour; product temp; collection of line waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels
Combine in narrative	Industrial SU10	Mixing operations (open systems)	CS30	Indoor. Batch process; daily; 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending
	Industrial SU10	Mixing operations - open systems (aerosols)	CS30	Indoor. Batch process; daily; 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending
Combine in narrative	Industrial SU10	Transfer from/pouring from containers , Manual	CS34 + CS22	Indoor; daily; 15 - 1 hour; product temp.	Manual transfers, LEV, PPE, RPE	With LEV	PROC8a Non-dedicated discharging to/from vessels
	Industrial SU10	Drum/Batch transfers	CS8	Indoor; daily; 15 - 1 hour; product temp.	Drum pump or dedicated drum handling equipment	With LEV	PROC8b Dedicated discharging to/from vessels
	Industrial SU10	Tabletting, compression, extrusion or pelletisation	CS100	Indoor; daily; 8 hours; product temp.	LEV, PPE	With LEV	PROC14 Production of preparation by tabletting, compression,
	Industrial SU10	Drum and small package filling	CS6	Indoor, Continuous; daily; 8 hour; product temp.	Enclosed transfers, vented transfer points	With LEV	PROC9 Transfer of substance/mixture into small containers
	Industrial SU10	Clean down and Maintenance	CS39	Indoor, Daily; 1-4 hours; product temp; collection of line waste in container	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels
	Industrial SU10	Storage	CS67	Daily; <15 mins (sampling) product temp (ambient);	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)
	Industrial SU10	Storage	CS67	Daily; <15 mins (sampling) product temp (ambient);	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)

A1.3.2 Formulation of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain										Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalation exposure						Dermal exposure				Comments		
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d) - no	TRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified					
Formulation & re-packing of substances and residues Combine in with above row in narrative	Industrial: S140/S149/S150	General process exposures (no sampling) e.g. in-line additive dosing	CS 15	Continuous, daily 15 - 1 hour, product temp.	Closed processes	Closed process - No exposure.	PROC1 Closed process (no sampling)	0.03		0.03	0.34	0.1		0.1	0.1				
	Industrial: S140/S149/S150	General process exposures and sample collection	CS 15	Continuous, daily 15 mins - 1 hour	Enclosed process; closed/semi-closed sampling point	No LEV	PROC2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2		0.2	0.2				
	Industrial: S140/S149/S150	General process exposures (e.g. in-line additive dosing equipment, in-line)	CS 15	Batch process, daily: 15 - 1 hour, product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PROC3 Closed batch process (with sampling)	296.09		206.56	0.34	0.1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	General exposures open batch process	CS 16	Daily, Indoor: 15 1 hour, product temp.	Enclosed transfer, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure	296.09		206.56	6.86	1		0.2	0.2				
	Industrial: S140/S149/S150	General exposures open batch process (no nois)	CS 16	Daily, Indoor: 15 1 hour, product temp.	Enclosed transfer, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure	5.00	0	0.00	6.86	1	0	0	0				
Aerosol potential. Value for moderate dusty	Industrial: S140/S149/S150	General exposures open batch process	CS 16	Daily, Indoor: 15 1 hour, product temp.	Enclosed transfer, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure	5.00	0	0.00	6.86	1	0	0	0				
Elevated temperature therefore applied value for medium volatility	Industrial: S140/S149/S150	Batch processes at elevated temperatures (e.g. solvents remain)	CS 136	Batch process, daily: 15 - 1 hour, product temp.	Closed equipment, enclosed or vented sampling points	With LEV	PROC3 Closed batch process (with sampling)	296.09		206.56	0.34	0.1		0.1	0.1				
	Industrial: S140/S149/S150	Sample collection	CS 2	Daily, <15 mins, product temp.	Closed or ventilated sampling points	No LEV	PROC3 Closed batch process (with sampling)	296.09		206.56	0.34	0.1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	Laboratory activities	CS 36	Daily, 15 mins - 1 hour, product temp. - Indoor	Fume cupboard, PPE.	With LEV	PROC15 Use in laboratory	147.55		147.55	0.34	0.1		0.1	0.1				
	Industrial: S140/S149/S150	Bulk transfers	CS 14	Daily, 15 min - 1 hour, product temp; collection of line waste in container	Enclosed transfer points, clear lines prior to decoupling	With LEV	PROC2b Dedicated discharging to/from vessels	442.64		147.55	6.86	1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	Mixing operations (open systems)	CS 30	Indoor, Batch process, daily: 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending	737.73		13.28	13.71	2		0.1	0.1				
	Industrial: S140/S149/S150	Mixing operations (open systems) (no nois)	CS 30	Indoor, Batch process, daily: 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending	5.00	0	0.00	13.71	2	0	0	0				
Combine in narrative	Industrial: S140/S149/S150	Transfer from/pouring from containers - Manual	CS 34 + CS 22	Indoor, daily: 15 1 hour, product temp.	Manual transfers, LEV, PPE, RPE	With LEV	PROC2a Non-dedicated discharging to/from vessels	737.73		73.77	13.71	1		0.01	0.01				
	Industrial: S140/S149/S150	Drum/batch transfers	CS 8	Indoor, daily: 15 1 hour, product temp.	Drum pump or dedicated drum handling equipment	With LEV	PROC2b Dedicated discharging to/from vessels	442.64		13.28	6.86	1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	Tableting, compression, extrusion or pelletisation	CS 100	Indoor, daily: 8 hours; product temp.	LEV, PPE	With LEV	PROC14 Production of preparation by tableting, compression	737.73		73.77	3.43	0.5		0.05	0.05				
	Industrial: S140/S149/S150	Drum and small package filling	CS 6	Indoor, Continuous: daily 8 hour, product temp.	Enclosed transfer, vented transfer points	With LEV	PROC2b Transfer of substance/mixture into small containers	590.18		59.02	6.86	1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	Clean down and Maintenance	CS 39	Indoor, Daily: 1 - 4 hours, product temp; collection of line waste in container	Enclosed lines, retain wash down in sealed storage pending disposal or use as	No LEV	PROC2b Non-dedicated discharging to/from vessels	737.73		73.77	13.71	1		0.01	0.01				
	Industrial: S140/S149/S150	Storage	CS 67	Daily, <15 mins (sampling) product temp (ambient).	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)	0.03		0.03	0.34	0.1		0.1	0.1				
Combine in narrative	Industrial: S140/S149/S150	Storage	CS 67	Daily, <15 mins (sampling) product temp (ambient).	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)	147.55		147.55	1.37	0.2		0.2	0.2				

A1.3.3 Formulation of Substance – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Formulation & (re)packing of substances and mixtures	Industrial - SU3/SU10	General process exposures (no sampling) (e.g. In-line additive dosing)	CS15	Continuous; daily; 15 - 1 hour; product temp.	Closed processes	Closed process. No exposure.	PROC1 Closed process (no sampling)	0.000	0.001	0.001
	Combine in with above row in narrative									
	Industrial - SU3/SU10	General process exposures and sample collection	CS15	Continuous; daily; 15 mins - 1 hour	Enclosed process; closed/semi-closed sampling point	No LEV	PROC2 Closed continuous process (with sampling)	0.049	0.002	0.051
	Industrial - SU3/SU10	General process exposures (e.g. In-line additive dosing equipment, in-line)	CS15	Batch process; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points	No LEV	PROC3 Closed batch process (with sampling)	0.069	0.001	0.070
Combine in narrative	Industrial - SU3/SU10	General exposures open batch process	CS16	Daily; Indoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure	0.069	0.002	0.071
Aerosol potential. Value for moderate dusty	Industrial - SU3/SU10	General exposures open batch process (aerosols)	CS16	Daily; Indoor; 15 - 1 hour; product temp.	Enclosed transfers, clear lines prior to decoupling, ventilation at	With LEV	PROC4 batch process with exposure	#DIV/0!	0.000	#DIV/0!
Elevated temperature therefore applied value for medium volatility	Industrial - SU3/SU10	Batch processes at elevated temperatures (e.g. solvents resin)	CS136	Batch process; daily; 15 - 1 hour; product temp.	Closed equipment, enclosed or vented sampling points, vented	With LEV	PROC3 Closed batch process (with sampling)	0.069	0.001	0.070
	Industrial - SU3/SU10	Sample collection	CS2	Daily; <15 mins; product temp.	Closed or ventilated sampling points	No LEV	PROC3 Closed batch process (with sampling)	0.069	0.001	0.070
	Industrial - SU3/SU3	Laboratory activities	CS36	Daily; 15 mins - 1 hour; product temp.; Indoor	Fume cupboard. PPE.	With LEV	PROC15 Use in laboratory	0.049	0.001	0.050
	Industrial - SU3/SU10	Bulk transfers	CS14	Daily; 15 min - 1 hour; product temp; collection of line waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b Dedicated discharging to/from vessels	0.049	0.001	0.050
Combine in narrative	Industrial - SU3/SU10	Mixing operations (open systems)	CS30	Indoor. Batch process; daily; 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending	0.004	0.001	0.005
	Industrial - SU3/SU10	Mixing operations open systems (aerosols)	CS30	Indoor. Batch process; daily; 8 hours; product temp	LEV, PPE	With LEV	PROC5 Mixing or blending	#DIV/0!	0.000	#DIV/0!
Combine in narrative	Industrial - SU3/SU10	Transfer from/pouring from containers, Manual	CS34 + CS22	Indoor, daily; 15 - 1 hour; product temp.	Manual transfers, LEV, PPE, RPE	With LEV	PROC8a Non-dedicated discharging to/from vessels	0.025	0.000	0.025
	Industrial - SU3/SU10	Drum/Batch transfers	CS8	Indoor; daily; 15 - 1 hour; product temp.	Drum pump or dedicated drum handling equipment	With LEV	PROC8b Dedicated discharging to/from vessels	0.004	0.001	0.005
	Industrial - SU3/SU10	Tabletting, compression, extrusion or pelletsation	CS100	Indoor; daily; 8 hours; product temp.	LEV, PPE	With LEV	PROC14 Production of preparation by tabletting, compression,	0.025	0.001	0.025
	Industrial - SU3/SU10	Drum and small package filling	CS6	Indoor, Continuous; daily; 8 hour; product temp.	Enclosed transfers, vented transfer points	With LEV	PROC9 Transfer of substance/mixture into small containers	0.020	0.001	0.021
	Industrial - SU3/SU10	Clean down and Maintenance	CS39	Indoor, Daily; 1 - 4 hours; product temp; collection of line waste in container	Enclosed lines; retain wash down in sealed storage pending disposal or use as	No LEV	PROC8a Non-dedicated discharging to/from vessels	0.025	0.000	0.025
	Industrial - SU3/SU10	Storage	CS67	Daily; <15 mins (sampling) product temp (ambient);	samples collected at dedicated sample point	outdoor activity	PROC1 Closed process (no sampling)	0.000	0.001	0.001
	Industrial - SU3/SU10	Storage	CS67	Daily; <15 mins (sampling) product temp (ambient);	samples collected at dedicated sample point	outdoor activity	PROC2 Closed continuous process (with sampling)	0.049	0.002	0.051

A1.4.1 Use of Substance in Coatings – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent
					Text	LEV	
Use in Coatings (Industrial Application)	Industrial - SU3	General exposures (closed systems) [CS15].	[CS15]	Continuous; daily; 8hour	Enclosed process; closed/semi-closed sampling point	NO LEV	PROC1 - Use in closed process, no likelihood of exposure
	Industrial - SU3	General exposures (closed systems) [CS15].	[CS15] [CS56] [CS38]	Continuous; daily; 8hour	Enclosed process; closed/semi-closed sampling point	With LEV	PROC2 - Use in closed, continuous process with occasional
	Industrial - SU3	Film formation-force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	[CS94]		enclosed in situ in workplace	With LEV	PROC2 - Use in closed, continuous process with occasional
	Industrial - SU3	Mixing operations (closed systems) [CS29].	[CS29] [CS15]			With LEV	PROC3 - Use in closed batch process (synthesis or formulation)
Duration Option	Industrial - SU3	Film formation-air drying [CS95].	[CS95]	Duration		With LEV	PROC4 - Use in batch and other process (synthesis) where opportunity for
RPE Option	Industrial - SU3	Film formation-air drying [CS95].	[CS95]	RPE		With LEV	PROC4 - Use in batch and other process (synthesis) where opportunity for
Duration Option	Industrial - SU3	Preparation of material for application [CS96].	[CS96] [CS30]	Duration	liquid/ powder products) - batch, indoor/ outdoor.	With LEV	PROC5 -Mixing or blending in batch processes (multistage and/or significant
RPE Option	Industrial - SU3	Preparation of material for application [CS96].	[CS96] [CS30]	RPE	liquid/ powder products) - batch, indoor/ outdoor.	With LEV	PROC5 -Mixing or blending in batch processes (multistage and/or significant
	Industrial - SU3	Spraying (automatic/robotic) [CS97].	[CS97]	Daily; >4 hours, ambient	Enclosed. Vented spray booth; specific workforce education, PPE	With LEV	PROC7 -Industrial spraying
	Industrial - SU3	Manual [CS34].	[CS34] [CS10]		Open , Air supplied masks, respirator.	NO LEV	PROC7 -Industrial spraying
Duration Option	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8a -Transfer of chemicals from/to vessels/ large containers at non dedicated
RPE Option	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8a -Transfer of chemicals from/to vessels/ large containers at non dedicated
	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b -Transfer of chemicals from/to vessels/ large containers at dedicated
	Industrial - SU3	Roller, spreader, flow application [CS98].	[CS98]	Daily; >4 hours, ambient. Range from 2-3% upto 40-50%	Local exhaust ventilation at rollers; remove spills as they occur, PPE.	With LEV	PROC10 - Roller application or brushing
	Industrial - SU3	Dipping, immersion and pouring [CS4].	[CS4]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	With LEV	PROC13 - Treatment of articles by dipping and pouring
	Industrial - SU3	Laboratory activities [CS36].	[CS36]	small scale activities small amount, daily 15 min		With LEV	PROC15 - Use of laboratory reagents in small scale laboratories
Duration Option	Industrial - SU3	Material transfers [CS3].	[CS3] [CS8] [CS22]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC9 -Transfer of chemicals into small containers (dedicated filling line)
RPE Option	Industrial - SU3	Material transfers [CS3].	[CS3] [CS8] [CS22]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC9 -Transfer of chemicals into small containers (dedicated filling line)
Duration Option	Industrial - SU3	Production or preparation of articles by tableting, compression.	[CS100]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC14 - Production of preparations or articles by tableting.
RPE Option	Industrial - SU3	Production or preparation of articles by tableting, compression.	[CS100]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC14 - Production of preparations or articles by tableting.

A1.4.2 Use of Substance in Coatings – Industrial

	Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure					Dermal exposure					Comments
					Text	LEV		TRA Predicted Exposure (mg/m ³) - no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d) - no	TRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified			
Use in Coatings (Industrial Application)	Industrial - SU3	General exposures (closed systems) (CS19)	(CS19)	Continuous, daily (hour)	Enclosed process; closed/semi-closed sampling point	NO LEV	PRO C1 - Use in closed process, no likelihood of exposure	0.03		0.03	0.34	0.1		0.1	0.1			
	Industrial - SU3	General exposures (closed systems) (CS19)	(CS19) (CS36) (CS38)	Continuous, daily (hour)	Enclosed process; closed/semi-closed sampling point	With LEV	PRO C2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2			
	Industrial - SU3	Film formation (face drying (50-100°C), Stoving (>100°C), UV/EB radiation curing)	(CS94)		enclosed in situ in workplace	With LEV	PRO C2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2			
	Industrial - SU3	Mixing operations (closed systems) (CS29)	(CS29) (CS19)			With LEV	PRO C3 - Use in closed batch process synthesis or formulation	296.09		29.51	0.34	0.1	0	0.01	0.01			
Duration Option	Industrial - SU3	Film formation air drying (CS95)	(CS95)	Duration		With LEV	PRO C4 - Use in batch and other process (synthesis) where opportunity for	296.09		29.51	6.86	1	0	0.1	0.1			
RPE Option	Industrial - SU3	Film formation air drying (CS95)	(CS95)	RPE		With LEV	PRO C4 - Use in batch and other process (synthesis) where opportunity for	296.09		29.51	6.86	1	0	0.1	0.1			
Duration Option	Industrial - SU3	Preparation of material for application (CS96)	(CS96) (CS30)	Duration	liquid powder products) - batch, indoor/ outdoor.	With LEV	PRO C5 - Mixing or blending in batch processes (multistage and/or significant)	737.73		73.77	13.71	2		0.01	0.01			
RPE Option	Industrial - SU3	Preparation of material for application (CS96)	(CS96) (CS30)	RPE	liquid powder products) - batch, indoor/ outdoor.	With LEV	PRO C5 - Mixing or blending in batch processes (multistage and/or significant)	737.73		73.77	13.71	2		0.01	0.01			
	Industrial - SU3	Spraying (automatic/cabotoc) (CS97)	(CS97)	Daily, ~4 hours, ambient	Enclosed, vented spray booth, specific workpiece education, PPE	With LEV	PRO C7 - industrial spraying	1475.46	LEV (0.95)	73.77	42.86	2	LEV (0.95)	0.1	0.1			
	Industrial - SU3	Manual (CS34)	(CS34) (CS10)		Open, Air supplied mask, respirator.	NO LEV	PRO C7 - industrial spraying	1475.46	Vent (0.7) RPE (0.9)	44.26	42.86	2		0.4	0.4			
Duration Option	Industrial - SU3	Material transfers (CS3)	(CS3)	Daily, 15 min - 1 hour, ambient temp, collection of line waste in container	Enclosed transfers, vented transfer points, clear lines prior to decoupling	With LEV	PRO C8a - Transfer of chemicals from vessels/ large containers at non-dedicated	737.73		73.77	13.71	1		0.01	0.01			
RPE Option	Industrial - SU3	Material transfers (CS3)	(CS3)	Daily, 15 min - 1 hour, ambient temp, collection of line waste in container	Enclosed transfers, vented transfer points, clear lines prior to decoupling	With LEV	PRO C8a - Transfer of chemicals from vessels/ large containers at non-dedicated	737.73		73.77	13.71	1		0.01	0.01			
	Industrial - SU3	Material transfers (CS3)	(CS3)	Daily, 15 min - 1 hour, ambient temp, collection of line waste in container	Enclosed transfers, vented transfer points, clear lines prior to decoupling	With LEV	PRO C8b - Transfer of chemicals from vessels/ large containers at dedicated	442.64		13.28	6.86	1		0.1	0.1			
	Industrial - SU3	Roller, spreader, low application (CS98)	(CS98)	Daily, ~4 hours, ambient, Range from 2-3% upto 40-50%	Local exhaust ventilation at rollers, remove spills as they occur, PPE	With LEV	PRO C9 - Roller application or brushing	737.73		73.77	27.43	2		0.1	0.1			
	Industrial - SU3	Dipping, immersion and pouring (CS4)	(CS4)	Daily, ~4 hours, ambient	Local exhaust ventilation at open surface, remove spills as they occur, PPE	With LEV	PRO C13 - Treatment of articles by dipping and pouring	737.73		73.77	13.71	2		0.1	0.1			
	Industrial - SU3	Laboratory activities (CS9)	(CS9)	small scale activities small amount, daily 15 min		With LEV	PRO C15 - Use of laboratory reagents in small scale laboratories	147.55		147.55	0.34	0.1		0.1	0.1			
Duration Option	Industrial - SU3	Material transfers (CS3)	(CS3) (CS22)	Daily, 15 min - 1 hour, ambient temp.	wear goggles and gloves	With LEV	PRO C9 - Transfer of chemicals into small containers (dedicated filling line)	590.18		59.02	6.86	1		0.1	0.1			
RPE Option	Industrial - SU3	Material transfers (CS3)	(CS3) (CS22)	Daily, 15 min - 1 hour, ambient temp.	wear goggles and gloves	With LEV	PRO C9 - Transfer of chemicals into small containers (dedicated filling line)	590.18		59.02	6.86	1		0.1	0.1			
Duration Option	Industrial - SU3	Production or preparation of articles by tabletting, compression	(CS10)	Daily, 15 min - 1 hour, ambient temp.	wear goggles and gloves	With LEV	PRO C14 - Production of preparations or articles by tabletting	737.73		73.77	3.43	0.5		0.05	0.05			
RPE Option	Industrial - SU3	Production or preparation of articles by tabletting, compression	(CS10)	Daily, 15 min - 1 hour, ambient temp.	wear goggles and gloves	With LEV	PRO C14 - Production of preparations or articles by tabletting	737.73		73.77	3.43	0.5		0.05	0.05			

A1.4.3 Use of Substance in Coatings – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Use in Coatings (Industrial Application)	Industrial - SU3	General exposures (closed systems) [CS15].	[CS15]	Continuous; daily; 8hour	Enclosed process; closed/semi-closed sampling point	NO LEV	PROC1 - Use in closed process, no likelihood of exposure	0.000	0.001	0.001
	Industrial - SU3	General exposures (closed systems) [CS15].	[CS15] [CS56] [CS38]	Continuous; daily; 8hour	Enclosed process; closed/semi-closed sampling point	With LEV	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
	Industrial - SU3	Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing	[CS94]		enclosed in situ in workplace	With LEV	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
	Industrial - SU3	Mixing operations (closed systems) [CS29].	[CS29] [CS15]			With LEV	PROC3 - Use in closed batch process (synthesis or formulation)	0.010	0.000	0.010
Duration Option	Industrial - SU3	Film formation - air drying [CS95].	[CS95]	Duration		With LEV	PROC4 - Use in batch and other process (synthesis) where opportunity for	0.010	0.001	0.011
RPE Option	Industrial - SU3	Film formation - air drying [CS95].	[CS95]	RPE		With LEV	PROC4 - Use in batch and other process (synthesis) where opportunity for	0.010	0.001	0.011
Duration Option	Industrial - SU3	Preparation of material for application [CS96].	[CS96] [CS30]	Duration	liquid/ powder products) - batch, indoor/ outdoor.	With LEV	PROC5 - Mixing or blending in batch processes (multistage and/or significant	0.025	0.000	0.025
RPE Option	Industrial - SU3	Preparation of material for application [CS96].	[CS96] [CS30]	RPE	liquid/ powder products) - batch, indoor/ outdoor.	With LEV	PROC5 - Mixing or blending in batch processes (multistage and/or significant	0.025	0.000	0.025
	Industrial - SU3	Spraying (automatic/robotic) [CS97].	[CS97]	Daily; >4 hours, ambient	Enclosed. Vented spray booth; specific workforce education, PPE	With LEV	PROC7 - Industrial spraying	0.025	0.001	0.026
	Industrial - SU3	Manual [CS34].	[CS34] [CS10]		Open , Air supplied masks, respirator.	NO LEV	PROC7 - Industrial spraying	0.015	0.004	0.019
Duration Option	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	0.025	0.000	0.025
RPE Option	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	0.025	0.000	0.025
	Industrial - SU3	Material transfers [CS3].	[CS3]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container.	Enclosed transfers, vented transfer points; clear lines prior to decoupling	With LEV	PROC8b - Transfer of chemicals from/to vessels/ large containers at dedicated	0.004	0.001	0.005
	Industrial - SU3	Roller, spreader, flow application [CS98].	[CS98]	Daily; >4 hours, ambient. Range from 2-3% upto 40-50%	Local exhaust ventilation at rollers; remove spills as they occur, PPE.	With LEV	PROC10 - Roller application or brushing	0.025	0.001	0.026
	Industrial - SU3	Dipping, immersion and pouring [CS4].	[CS4]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	With LEV	PROC13 - Treatment of articles by dipping and pouring	0.025	0.001	0.026
	Industrial - SU3	Laboratory activities [CS36].	[CS36]	small scale activities small amount, daily 15 min		With LEV	PROC15 - Use of laboratory reagents in small scale laboratories	0.049	0.001	0.050
Duration Option	Industrial - SU3	Material transfers [CS3].	[CS3] [CS8] [CS22]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC9 - Transfer of chemicals into small containers (dedicated filling line)	0.020	0.001	0.021
RPE Option	Industrial - SU3	Material transfers [CS3].	[CS3] [CS8] [CS22]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC9 - Transfer of chemicals into small containers (dedicated filling line)	0.020	0.001	0.021
Duration Option	Industrial - SU3	Production or preparation of articles by tableting, compression	[CS100]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC14 - Production of preparations or articles by tableting	0.025	0.001	0.025
RPE Option	Industrial - SU3	Production or preparation of articles by tableting, compression.	[CS100]	Daily; 15 min - 1 hour; ambient temp;	wear goggles and gloves	With LEV	PROC14 - Production of preparations or articles by tableting.	0.025	0.001	0.025

A1.5.1 Use of Substance in Cleaning Agents – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Duration option	Industrial - SU3	Bulk transfers [CS14].	[CS14]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container	Enclosed transfers; vented transfer points; clear lines prior to decoupling	Yes	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated
RPE Option	Industrial - SU3	Bulk transfers [CS14].	[CS14]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container	Enclosed transfers; vented transfer points; clear lines prior to decoupling	Yes	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated
Duration option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional
RPE Option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional
Duration option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 15min - 1 hour; ambient temp	Enclosed process; closed/semi-closed	No	PROC3 - Use in closed batch process (synthesis or formulation)
RPE Option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 15min - 1 hour; ambient temp	Enclosed process; closed/semi-closed	No	PROC3 - Use in closed batch process (synthesis or formulation)
Duration option	Industrial - SU3	Application of cleaning products in closed systems [CS101].	[CS101]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional
RPE Option	Industrial - SU3	Application of cleaning products in closed systems [CS101].	[CS101]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional
Duration option	Industrial - SU3	Filling / preparation of equipment from drums or containers.	[CS45]	daily; 15min - 1 hour; ambient temp	Pumped transfer from drum to equipment	Yes	PROC8b - Transfer of chemicals from/to vessels/ large containers at dedicated
RPE Option	Industrial - SU3	Filling / preparation of equipment from drums or containers.	[CS45]	daily; 15min - 1 hour; ambient temp	Pumped transfer from drum to equipment	Yes	PROC8b - Transfer of chemicals from/to vessels/ large containers at dedicated
Duration option	Industrial - SU3	Use in contained batch processes [CS37].	[CS37]	Daily; 1-4 hours, temperature above boiling point	Closed equipment, enclosed or vented transfer points	Yes	PROC4 - Use in batch and other process (synthesis) where opportunity for
RPE Option	Industrial - SU3	Use in contained batch processes [CS37].	[CS37]	Daily; 1-4 hours, temperature above boiling point	Closed equipment, enclosed or vented transfer points	Yes	PROC4 - Use in batch and other process (synthesis) where opportunity for
Duration option	Industrial - SU3	Degreasing small objects in cleaning station [CS41].	[CS41]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	Yes	PROC13 - Treatment of articles by dipping and pouring
RPE Option	Industrial - SU3	Degreasing small objects in cleaning station [CS41].	[CS41]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	Yes	PROC13 - Treatment of articles by dipping and pouring
Duration option	Industrial - SU3	Cleaning with low-pressure washers [CS42].	[CS42]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC10 - Roller application or brushing
RPE Option	Industrial - SU3	Cleaning with low-pressure washers [CS42].	[CS42]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC10 - Roller application or brushing
Duration option	Industrial - SU3	Cleaning with high pressure washers [CS44].	[CS44]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC7 - Industrial spraying
RPE Option	Industrial - SU3	Cleaning with high pressure washers [CS44].	[CS44]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC7 - Industrial spraying
Duration option	Industrial - SU3	Manual [CS34].	[CS34]	Daily; 15 min - 1 hour; ambient temp;	collection of waste and wipe cloths in container.	No	PROC10 - Roller application or brushing
RPE Option	Industrial - SU3	Manual [CS34].	[CS34]	Daily; 15 min - 1 hour; ambient temp;	collection of waste and wipe cloths in container.	No	PROC10 - Roller application or brushing

A1.5.2 Use of Substance in Cleaning Agents – Industrial

Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalation exposure				Dermal exposure				Comments	
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Exposure (mg/kg/d) - no	TRA Predicted Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified		
Duration option	Industrial - SU3	[CS14]	Daily, 15 min - 1 hour, ambient temp; collection of fine waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	Yes	PROCBa - Transfer of chemicals from to vessels/ large containers if non dedicated	737.73		73.77	13.71	1		0.01	0.01		
RPE Option	Industrial - SU3	[CS14]	Daily, 15 min - 1 hour, ambient temp; collection of fine waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	Yes	PROCBa - Transfer of chemicals from to vessels/ large containers if non dedicated	737.73		73.77	13.71	1		0.01	0.01		
Duration option	Industrial - SU3	[CS83]	Automated process with (semi) closed systems. [CS83]	Enclosed process; closed/semi-closed	No	PROCC2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2		
RPE Option	Industrial - SU3	[CS83]	Automated process with (semi) closed systems. [CS83]	Enclosed process; closed/semi-closed	No	PROCC2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2		
Duration option	Industrial - SU3	[CS90]	Automated process with (semi) closed systems. [CS90]	Enclosed process; closed/semi-closed	No	PROCC3 - Use in closed batch process (synthesis or formulation)	296.09		177.06	0.34	0.1		0.1	0.1		
RPE Option	Industrial - SU3	[CS90]	Automated process with (semi) closed systems. [CS90]	Enclosed process; closed/semi-closed	No	PROCC3 - Use in closed batch process (synthesis or formulation)	296.09		29.51	0.34	0.1		0.1	0.1		
Duration option	Industrial - SU3	[CS101]	Application of cleaning products in closed systems [CS101]	Enclosed process; closed/semi-closed	No	PROCC2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2		
RPE Option	Industrial - SU3	[CS101]	Application of cleaning products in closed systems [CS101]	Enclosed process; closed/semi-closed	No	PROCC2 - Use in closed, continuous process with occasional	147.55		147.55	1.37	0.2		0.2	0.2		
Duration option	Industrial - SU3	[CS48]	Filing / preparation of equipment from drums or containers	Pumped transfer from drum to equipment	Yes	PROCBb - Transfer of chemicals from to vessels/ large containers if dedicated	442.64		13.28	6.86	1		0.1	0.1		
RPE Option	Industrial - SU3	[CS48]	Filing / preparation of equipment from drums or containers	Pumped transfer from drum to equipment	Yes	PROCBb - Transfer of chemicals from to vessels/ large containers if dedicated	442.64		13.28	6.86	1		0.1	0.1		
Duration option	Industrial - SU3	[CS37]	Use in contained batch processes [CS37]	Closed equipment, enclosed or vented transfer points	Yes	PROCC4 - Use in batch and other process (synthesis) where opportunity for	296.09		29.51	6.86	1		0.1	0.1		
RPE Option	Industrial - SU3	[CS37]	Use in contained batch processes [CS37]	Closed equipment, enclosed or vented transfer points	Yes	PROCC4 - Use in batch and other process (synthesis) where opportunity for	296.09		29.51	6.86	1		0.1	0.1		
Duration option	Industrial - SU3	[CS41]	Degreasing small objects in cleaning station [CS41]	Local exhaust ventilation at open surface; remove spills as they occur. PPE	Yes	PROCC3 - Treatment of articles by dipping and pouring	737.73		73.77	13.71	2		0.1	0.1		
RPE Option	Industrial - SU3	[CS41]	Degreasing small objects in cleaning station [CS41]	Local exhaust ventilation at open surface; remove spills as they occur. PPE	Yes	PROCC3 - Treatment of articles by dipping and pouring	737.73		73.77	13.71	2		0.1	0.1		
Duration option	Industrial - SU3	[CS42]	Cleaning with low-pressure washers [CS42]	specific workforce education, PPE	No	PROCC10 - Roller application or brushing	737.73		221.32	27.43	2		0.4	0.4		
RPE Option	Industrial - SU3	[CS42]	Cleaning with low-pressure washers [CS42]	specific workforce education, PPE	No	PROCC10 - Roller application or brushing	737.73		221.32	27.43	2		0.4	0.4		
Duration option	Industrial - SU3	[CS44]	Cleaning with high-pressure washers [CS44]	specific workforce education, PPE	No	PROCC7 - industrial spraying	1475.46	Vent (0.7) Duration (0.4)	265.88	42.86	2	Gloves 0.8	0.4	0.4		
RPE Option	Industrial - SU3	[CS44]	Cleaning with high-pressure washers [CS44]	specific workforce education, PPE	No	PROCC7 - industrial spraying	1475.46	RPE (0.9)	147.55	42.86	2	0	0.4	0.4		
Duration option	Industrial - SU3	[CS34]	Manual [CS34]	collection of waste and wipe cloths in container.	No	PROCC10 - Roller application or brushing	737.73		221.32	27.43	2		0.4	0.4		
RPE Option	Industrial - SU3	[CS34]	Manual [CS34]	collection of waste and wipe cloths in container.	No	PROCC10 - Roller application or brushing	737.73		221.32	27.43	2		0.4	0.4		

A1.5.3 Use of Substance in Cleaning Agents – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Duration option	Industrial - SU3	Bulk transfers [CS14].	[CS14]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	Yes	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	0.025	0.000	0.025
RPE Option	Industrial - SU3	Bulk transfers [CS14].	[CS14]	Daily; 15 min - 1 hour; ambient temp; collection of line waste in container	Enclosed transfers, vented transfer points; clear lines prior to decoupling	Yes	PROC8a - Transfer of chemicals from/to vessels/ large containers at non dedicated	0.025	0.000	0.025
Duration option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
RPE Option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
Duration option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 15min - 1 hour; ambient temp	Enclosed process; closed/semi-closed	No	PROC3 - Use in closed batch process (synthesis or formulation)	0.059	0.001	0.060
RPE Option	Industrial - SU3	Automated process with (semi) closed systems. [CS93].	[CS93]	daily; 15min - 1 hour; ambient temp	Enclosed process; closed/semi-closed	No	PROC3 - Use in closed batch process (synthesis or formulation)	0.010	0.001	0.011
Duration option	Industrial - SU3	Application of cleaning products in closed systems [CS101].	[CS101]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
RPE Option	Industrial - SU3	Application of cleaning products in closed systems [CS101].	[CS101]	daily; 8hour	Enclosed process; closed/semi-closed	No	PROC2 - Use in closed, continuous process with occasional	0.049	0.002	0.051
Duration option	Industrial - SU3	Filling / preparation of equipment from drums or containers.	[CS45]	daily; 15min - 1 hour; ambient temp	Pumped transfer from drum to equipment	Yes	PROC8b - Transfer of chemicals from/to vessels/ large containers at dedicated	0.004	0.001	0.005
RPE Option	Industrial - SU3	Filling / preparation of equipment from drums or containers.	[CS45]	daily; 15min - 1 hour; ambient temp	Pumped transfer from drum to equipment	Yes	PROC8b - Transfer of chemicals from/to vessels/ large containers at dedicated	0.004	0.001	0.005
Duration option	Industrial - SU3	Use in contained batch processes [CS37].	[CS37]	Daily; 1-4 hours, temperature above boiling point	Closed equipment, enclosed or vented transfer points	Yes	PROC4 - Use in batch and other process (synthesis) where opportunity for	0.010	0.001	0.011
RPE Option	Industrial - SU3	Use in contained batch processes [CS37].	[CS37]	Daily; 1-4 hours, temperature above boiling point	Closed equipment, enclosed or vented transfer points	Yes	PROC4 - Use in batch and other process (synthesis) where opportunity for	0.010	0.001	0.011
Duration option	Industrial - SU3	Degreasing small objects in cleaning station [CS41].	[CS41]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	Yes	PROC13 - Treatment of articles by dipping and pouring	0.025	0.001	0.026
RPE Option	Industrial - SU3	Degreasing small objects in cleaning station [CS41].	[CS41]	Daily; >4 hours, ambient	Local exhaust ventilation at open surface; remove spills as they occur, PPE	Yes	PROC13 - Treatment of articles by dipping and pouring	0.025	0.001	0.026
Duration option	Industrial - SU3	Cleaning with low-pressure washers [CS42].	[CS42]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC10 - Roller application or brushing	0.074	0.004	0.078
RPE Option	Industrial - SU3	Cleaning with low-pressure washers [CS42].	[CS42]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC10 - Roller application or brushing	0.074	0.004	0.078
Duration option	Industrial - SU3	Cleaning with high pressure washers [CS44].	[CS44]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC7 -Industrial spraying	0.089	0.004	0.093
RPE Option	Industrial - SU3	Cleaning with high pressure washers [CS44].	[CS44]	Daily; 15min - 1hour; ambient temp	specific workforce education, PPE	No	PROC7 -Industrial spraying	0.049	0.004	0.053
Duration option	Industrial - SU3	Manual [CS34].	[CS34]	Daily; 15 min - 1 hour; ambient temp;	collection of waste and wipe cloths in container.	No	PROC10 - Roller application or brushing	0.074	0.004	0.078
RPE Option	Industrial - SU3	Manual [CS34].	[CS34]	Daily; 15 min - 1 hour; ambient temp;	collection of waste and wipe cloths in container.	No	PROC10 - Roller application or brushing	0.074	0.004	0.078

A1.6.1 Use of Substance in Blowing Agents – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Blowing agents	Industrial - SU 3	Delivery of solvent to plant storage	CS14	Closed system, ambient temp. Filling point outdoors. Exposure	Dedicated line couplings. Operator in attendance.	NO LEV	PROC8b
	Industrial - SU 3	Injection and mixing into molten polymer mass in extruder	CS29	Closed system, high temp., high pressure	High integrity packings etc	NO LEV	PROC1
	Industrial - SU 3	Foam production through polymer extrusion	CS122	Indoor, ambient temp.	Extrusion area under LEV (slot design)	With LEV	PROC12
	Industrial - SU 3	Foam panel finishing (shaving/cutting)	CS134	Enclosed area (no operator) under LEV	Enclosure area under LEV	With LEV	PROC12
	Industrial - SU 3	Foam panel shavings recycling	CS123	Indoor, ambient temp.	Enclosure area under LEV	With LEV	PROC12
	Industrial - SU 3	Foam panel packing	CS124	Indoor, ambient temp.	General ventilation	NO LEV	PROC12
	Industrial - SU 3	Foam panel curing	CS67	Indoor, ambient temp. Warehouse operations with forklift truck. No direct contact	General ventilation	NO LEV	PROC12
	Industrial - SU 3	Mixing with polystyrene beads in reactor	CS29	Closed system, Operating Temp. 120-130 °C; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	With LEV	PROC3
	Industrial - SU 3	Transfer to and holding in waiting tank	CS66 OC7	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3
	Industrial - SU 3	Centrifuging of slurry of beads and process water	CS127 OC7	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3
	Industrial - SU 3	Drying of polystyrene powder/granules	CS12	Indoor, ambient temp. Dedicated equipment.	Vented silo	NO LEV	PROC12
	Industrial - SU 3	Loading/packaging for transport to customers	CS128	Indoor, ambient temp. Dedicated equipment.	Forced ventilation	NO LEV	PROC8b
	Industrial - SU 3	Steam-heating and expansion of expandable polystyrene granulate	CS129 OC7	4% blowing agent in granulate; Elevated temperature	Ventilation, waste air treatment	NO LEV	PROC12
	Industrial - SU 3	Storage and ageing of partially expanded polystyrene granulate	CS129	Open silo's; 3% blowing agent in granulate	Vented silo	NO LEV	PROC12
	Industrial - SU 3	Moulding and block forming with expanded polystyrene granulate	CS130 OC7	Use of steam in partially closed moulds; elevated temperature; 2% blowing agent in	Local exhaust ventilation (80%)	With LEV	PROC12
	Industrial - SU 3	Storage and cutting of expanded polystyrene articles	CS131	Vented storage; cutting by heated wire; 1% blowing agent in granulate	Forced ventilation	With LEV	PROC12
	Industrial - SU 3	Injection and mixing into pre-reaction component in blending tank	CS29	Closed system, ambient temp. Assume 5% agent in blend	Closed system	With LEV	PROC3
	Industrial - SU 3	Drum filling blended mix	CS6, CS45	Indoor, ambient temp.	Filling station under LEV; remotely operated	With LEV	PROC9
	Industrial - SU 3	Foam production through mixing of reactive components	CS132	Indoor, ambient temp. Automated machinery.	Foaming area under LEV (slot design and/or enclosure)	With LEV	PROC12
	Industrial - SU 3	Foam compression to expel residual blowing agent	CS133	Indoor, ambient temp. Automated machinery.	LEV/enclosure	With LEV	PROC12
	Industrial - SU 3	Foam article automated cutting	CS131	Enclosed area (no operator) under LEV; only traces of blowing agent left	LEV/enclosure	With LEV	PROC12

A1.6.2 Use of Substance in Blowing Agents – Industrial

User Group	Table 1: Mapping Uses in the Supply Chain						Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure				Dermal exposure					
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d) - no	TRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified		
Industrial - SU 3	Delivery of solvent to plant storage	CS14	Closed system, ambient temp. Filling point outdoors. Exposure	Dedicated line couplings. Operator in attendance	NO LEV	PROC2b	442.64		265.58	6.86	1			0.12	0.12	
Industrial - SU 3	Injection and mixing into molten polymer mass in extruder	CS29	Closed system, high temp., high pressure	High integrity packings etc.	NO LEV	PROC1	0.03		0.03	0.34	0.1			0.1	0.1	
Industrial - SU 3	Foam production through polymer extrusion	CS122	Indoor, ambient temp.	Extrusion area under LEV (safety design)	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	
Industrial - SU 3	Foam panel finishing (drawing/cutting)	CS134	Enclosed area (operator) under LEV	Enclosure area under LEV	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	
Industrial - SU 3	Foam panel shavings recycling	CS120	Indoor, ambient temp.	Enclosure area under LEV	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	
Industrial - SU 3	Foam panel packing	CS124	Indoor, ambient temp.	General ventilation	NO LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Foam panel curing	CS87	Indoor, ambient temp. Warehouse operations with forklift truck. No direct contact	General ventilation	NO LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Mixing with polystyrene beads in reactor	CS29	Closed system, Operating Temp. 120-130 °C; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	With LEV	PROC3	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Transfer to and holding in waiting tank	CS88 OCV	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Centrifuging of slurry of beads and process water	CS127 OCV	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Drying of polystyrene powder/granules	CS12	Indoor, ambient temp. Dedicated equipment.	Vented silo	NO LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Loading/packaging for transport to customers	CS128	Indoor, ambient temp. Dedicated equipment.	Forced ventilation	NO LEV	PROC2b	442.64		132.79	6.86	1			0.2	0.2	
Industrial - SU 3	Steam-heating and expansion of expandable polystyrene granulate	CS129 OCV	4% blowing agent in granulate; Elevated temperature	Ventilation, waste air treatment	NO LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Storage and ageing of partially expanded polystyrene granulate	CS129	Open silo; 3% blowing agent in mix	Vented silo	NO LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Moulding and block forming with expanded polystyrene granulate	CS130 OCV	Use of steam in partially closed mould; elevated temperature; 2% blowing agent in granulate	Local exhaust ventilation (80%)	With LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Storage and cutting of expanded polystyrene articles	CS131	Vented storage; cutting by heated wire; 1% blowing agent in granulate	Forced ventilation	With LEV	PROC12	296.09		206.56	0.34	0.1			0.1	0.1	
Industrial - SU 3	Injection and mixing into pre-reaction component in blending tank	CS29	Closed system, ambient temp. Assume 5% agent in blend	Closed system	With LEV	PROC3	296.09		29.51	0.34	0.1			0.1	0.1	
Industrial - SU 3	Drum filling blended mix	CS6, CS45	Indoor, ambient temp.	Filling station under LEV; remotely operated	With LEV	PROC8	590.18		59.02	6.86	1			0.1	0.1	
Industrial - SU 3	Foam production through mixing of reactive components	CS132	Indoor, ambient temp. Automated machinery.	Foaming area under LEV (safety design and/or enclosure)	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	
Industrial - SU 3	Foam compression to inject residual blowing agent	CS133	Indoor, ambient temp. Automated machinery.	LEV/enclosure	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	
Industrial - SU 3	Foam article automated cutting	CS131	Enclosed area (operator) under LEV; only traces of blowing agent left	LEV/enclosure	With LEV	PROC12	296.09		59.02	0.34	0.1			0.01	0.01	

A1.6.3 Use of Substance in Blowing Agents – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Blowing agents	Industrial - SU 3	Delivery of solvent to plant storage	CS14	Closed system, ambient temp. Filling point outdoors. Exposure	Dedicated line couplings. Operator in attendance.	NO LEV	PROC8b	0.089	0.001	0.090
	Industrial - SU 3	Injection and mixing into molten polymer mass in extruder	CS29	Closed system, high temp., high pressure	High integrity packings etc	NO LEV	PROC1	0.000	0.001	0.001
	Industrial - SU 3	Foam production through polymer extrusion	CS122	Indoor, ambient temp.	Extrusion area under LEV (slot design)	With LEV	PROC12	0.020	0.000	0.020
	Industrial - SU 3	Foam panel finishing (shaving/cutting)	CS134	Enclosed area (no operator) under LEV	Enclosure area under LEV	With LEV	PROC12	0.020	0.000	0.020
	Industrial - SU 3	Foam panel shavings recycling	CS123	Indoor, ambient temp.	Enclosure area under LEV	With LEV	PROC12	0.020	0.000	0.020
	Industrial - SU 3	Foam panel packing	CS124	Indoor, ambient temp.	General ventilation	NO LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Foam panel curing	CS67	Indoor, ambient temp. Warehouse operations with forklift truck. No direct contact	General ventilation	NO LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Mixing with polystyrene beads in reactor	CS29	Closed system, Operating Temp. 120-130 dC; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	With LEV	PROC3	0.069	0.001	0.070
	Industrial - SU 3	Transfer to and holding in waiting tank	CS66 OC7	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3	0.069	0.001	0.070
	Industrial - SU 3	Centrifuging of slurry of beads and process water	CS127 OC7	Closed system, elevated temperature; 4.5% agent in mix	Closed system; remotely controlled / automatic operation; forced	NO LEV	PROC3	0.069	0.001	0.070
	Industrial - SU 3	Drying of polystyrene powder/granules	CS12	Indoor, ambient temp. Dedicated equipment.	Vented silo	NO LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Loading/packaging for transport to customers	CS128	Indoor, ambient temp. Dedicated equipment.	Forced ventilation	NO LEV	PROC8b	0.044	0.002	0.046
	Industrial - SU 3	Steam-heating and expansion of expandable polystyrene granulate	CS129 OC7	4% blowing agent in granulate; Elevated temperature	Ventilation, waste air treatment	NO LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Storage and ageing of partially expanded polystyrene granulate	CS129	Open silo's; 3% blowing agent in granulate	Vented silo	NO LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Moulding and block forming with expanded polystyrene granulate	CS130 OC7	Use of steam in partially closed moulds; elevated temperature; 2% blowing agent in	Local exhaust ventilation (80%)	With LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Storage and cutting of expanded polystyrene articles	CS131	Vented storage; cutting by heated wire; 1% blowing agent in granulate	Forced ventilation	With LEV	PROC12	0.069	0.001	0.070
	Industrial - SU 3	Injection and mixing into pre-reaction component in blending tank	CS29	Closed system, ambient temp. Assume 5% agent in blend	Closed system	With LEV	PROC3	0.010	0.001	0.011
	Industrial - SU 3	Drum filling blended mix	CS6, CS45	Indoor, ambient temp.	Filling station under LEV; remotely operated	With LEV	PROC9	0.020	0.001	0.021
	Industrial - SU 3	Foam production through mixing of reactive components	CS132	Indoor, ambient temp. Automated machinery.	Foaming area under LEV (slot design and/or enclosure)	With LEV	PROC12	0.020	0.000	0.020
	Industrial - SU 3	Foam compression to expel residual blowing agent	CS133	Indoor, ambient temp. Automated machinery.	LEV/enclosure	With LEV	PROC12	0.020	0.000	0.020
	Industrial - SU 3	Foam article automated cutting	CS131	Enclosed area (no operator) under LEV; only traces of blowing agent left	LEV/enclosure	With LEV	PROC12	0.020	0.000	0.020

A1.7.1 Use of Substance in Fuels – Professional

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Use as a fuel	Professional - SU22	Bulk transfers (e.g. heating oil and diesel deliveries)	CS14	Daily; 1-4 hour; ambient temp., Outdoors	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC8b Dedicated Discharging to/from vessels
Combine in narrative	Professional - SU22	Transfers from drums and containers	CS8	Daily; 15 mins - 1 hour; ambient temp	Pumped transfer from drum to equipment	No LEV	PROC8b Dedicated Discharging to/from vessels
	Professional - SU22	Refuelling vehicles, light aircraft or marine	CS-1 Refuelling - Concawe	Daily; >4 hours, to 100%	Pumped transfer to vehicle	No LEV	PROC8b Dedicated Discharging to/from vessels
Combine in narrative	Professional - SU22	General use exposures as a fuel	CS15	Daily; >4 hours	Closed equipment	No LEV	PROC1 Use as a fuel
Combine in narrative	Professional - SU22	General use exposures as a fuel	CS15	Daily; >4 hours	Closed equipment	No LEV	PROC2 Use as a fuel
	Professional - SU22	Use a fuel additive diluent	GES16-- CS15 CS107	Daily; >4 hours, to 100%	Closed equipment	No LEV	PROC3 Closed batch process (with sampling)
	Professional - SU22	Use a fuel	GES16-- CS15 CS107	Daily; >4 hours, to 100%	Closed equipment	No LEV	PROC16 - use as a fuel
	Professional - SU22	Equipment maintenance e.g. Vehicle, boiler, pump maintenance,	CS39	Daily; >4 hours, to 100%	PPE. Operator training.	No LEV	PROC8a Discharging to/from vessels
	Professional - SU22	Vessel / container cleaning	CS103	Daily; >4 hours, to 100%	vessel entry procedures, retain wash down in sealed storage pending disposal.	With LEV	PROC8a Discharging to/from vessels
	Professional - SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)

A1.7.2 Use of Substance in Fuels – Professional

Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
Use Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure				Dermal exposure				Comments	
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d), no	TRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (Efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified		
Use as a fuel	Professional SUIZ	Bulk transfers (e.g. heating oil and diesel engines)	CS 14	Daily, 1-4 hours, ambient temp., Outdoors	Enclosed transfers, clear lines prior to decoupling	No LEV	PRO C2b Discharging to/from vessels	442.64		147.55	6.86	1		0.2	0.2	
Combine in narrative	Professional SUIZ	Transfers from drums and containers	CS 8	Daily, 15 mins - 1 hour, ambient temp	Pumped transfer from drum to equipment	No LEV	PRO C2b Discharging to/from vessels	442.64		147.55	6.86	1		0.2	0.2	
	Professional SUIZ	Refuelling vehicles, light aircraft or marine	CS 7 Refuelling Concave	Daily, >4 hours, to 100%	Pumped transfer to vehicle	No LEV	PRO C2b Discharging to/from vessels	442.64		147.55	6.86	1		0.2	0.2	
Combine in narrative	Professional SUIZ	General use exposures as a fuel	CS 15	Daily, >4 hours	Closed equipment	No LEV	PRO C1 Use as a fuel	0.03		0.30	0.34	0.1		0.1	0.1	
Combine in narrative	Professional SUIZ	General use exposures as a fuel	CS 15	Daily, >4 hours	Closed equipment	No LEV	PRO C2 Use as a fuel	147.55		147.55	1.37	0.2		0.2	0.2	
	Professional SUIZ	Use a fuel additive diluent	CS 34 - CS 15 CS 107	Daily, >4 hours, to 100%	Closed equipment	No LEV	PRO C3 Closed batch process (with sampling)	296.09		206.56	0.34	0.1		0.1	0.1	
	Professional SUIZ	Use a fuel	CS 34 - CS 15 CS 107	Daily, >4 hours, to 100%	Closed equipment	No LEV	PRO C16 use as a fuel	73.77		147.55	0.34	0.1		0.1	0.1	
	Professional SUIZ	Equipment maintenance e.g. vehicle, boiler, pump maintenance	CS 39	Daily, >4 hours, to 100%	PPE, Operator training	No LEV	PRO C2a Discharging to/from vessels	737.73		29.51	13.71	1		0.2	0.2	
	Professional SUIZ	Vessel / container cleaning	CS 103	Daily, >4 hours, to 100%	vessel entry procedures, retain wash down in sealed storage pending disposal, samples collected at dedicated sample point	With LEV	PRO C2a Discharging to/from vessels	737.73		29.51	13.71	1		0.2	0.2	
	Professional SUIZ	Storage	CS 67	Daily, 8 hrs, ambient temp.		No LEV	PRO C1 Closed continuous process (sometimes with sampling)	0.03		0.30	0.34	0.1		0.1	0.1	

A1.7.3 Use of Substance in Fuels – Professional

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Use as a fuel	Professional SU22	Bulk transfers (e.g. heating oil and diesel deliveries)	CS14	Daily; 1-4 hour; ambient temp., Outdoors	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC8b Dedicated Discharging to/from vessels	0.049	0.002	0.051
Combine in narrative	Professional SU22	Transfers from drums and containers	CS8	Daily; 15 mins - 1 hour; ambient temp	Pumped transfer from drum to equipment	No LEV	PROC8b Dedicated Discharging to/from vessels	0.049	0.002	0.051
	Professional SU22	Refuelling vehicles, light aircraft or marine	CS-1 Refuelling - Concave	Daily; >4 hours, to 100%	Pumped transfer to vehicle	No LEV	PROC8b Dedicated Discharging to/from vessels	0.049	0.002	0.051
Combine in narrative	Professional SU22	General use exposures as a fuel	CS15	Daily; >4 hours	Closed equipment	No LEV	PROC1 Use as a fuel	0.000	0.001	0.001
Combine in narrative	Professional SU22	General use exposures as a fuel	CS15	Daily; >4 hours	Closed equipment	No LEV	PROC2 Use as a fuel	0.049	0.002	0.051
	Professional SU22	Use a fuel additive diluent	GES46-- CS15 CS107	Daily; >4 hours, to 100%	Closed equipment	No LEV	PROC3 Closed batch process (with sampling)	0.069	0.001	0.070
	Professional SU22	Use a fuel	GES46-- CS15 CS107	Daily; >4 hours, to 100%	Closed equipment	No LEV	PROC16 - use as a fuel	0.049	0.001	0.050
	Professional SU22	Equipment maintenance e.g. Vehicle, boiler, pump maintenance.	CS39	Daily; >4 hours, to 100%	PPE. Operator training.	No LEV	PROC8a Discharging to/from vessels	0.010	0.002	0.012
	Professional SU22	Vessel / container cleaning	CS103	Daily; >4 hours, to 100%	vessel entry procedures, retain wash down in sealed storage pending disposal.	With LEV	PROC8a Discharging to/from vessels	0.010	0.002	0.012
	Professional SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.000	0.001	0.001

A1.8.1 Use of Substance in Fuels – Consumer - TRA

Table 1: Mapping Consumer Uses in the Supply Chain				Table 2a: Characterising the Risk - based on defaults (ECETOC TRA Consumers)														
Generic Exposure Scenario	Relevant Use Sentinel Product	Product sub Category Sentinels	Product ingredient	all			all			d			o			i		
				adult / child			frequency (events per day)	Skin surface contact area	Amount Swallowed (g)	Amount Used per event (g)	room volume (m3)	exposure time (hr)						
Short Title	Area of Application / UD																	
Fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Automotive Refuelling	0.5	A		A					1	857.5			5000	20	4
Covers consumer uses in liquid fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Scooter Refuelling	0.5	A		A					1	857.5			5000	20	4
PC13	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Garden Equipment - Use	0.5	A		A					1	857.5			5000	20	4
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Garden Equipment - Refuelling	0.5	A		A					1	857.5			5000	20	4
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Home space heater fuel	0.5	A		A					1	857.5			5000	20	4
	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Lamp oil	0.5	A		A					1	857.5			5000	20	4

TRA+

Table 1: Mapping Consumer Uses in the Supply Chain				Table 2b: Characterising the Risk - after refinement of exposure estimate																							
Generic Exposure Scenario	Relevant Use Sentinel Product	Product sub Category Sentinels	Product ingredient	all			all			d			o			i											
				adult / child			frequency (events per day)	Skin surface contact area	Amount Swallowed (g)	Amount Used per event (g)	room volume (m3)	exposure time (hr)															
Short Title	Area of Application / UD																										
Fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Automotive Refuelling	0.5	A		A					1	857.5			5000	20	4									
Covers consumer uses in liquid fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Scooter Refuelling	0.5	A		A					1	857.5			5000	20	4									
PC13	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Garden Equipment - Use	0.5	A		A					1	857.5			5000	20	4									
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Garden Equipment - Refuelling	0.5	A		A					1	857.5			5000	20	4									
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Home space heater fuel	0.5	A		A					1	857.5			5000	20	4									
	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Lamp oil	0.5	A		A					1	857.5			5000	20	4									

A1.8.2 Use of Substance in Fuels – Consumer

Table 1: Mapping Consumer Uses in the Supply Chain				Table 2: Characterising the Risk - after refinement of exposure estimate														
Generic Exposure Scenario	Relevant Use Sentinel Product	Product sub Category Sentinels	Product ingredient	all			all			d			o			i		
				adult / child			frequency (events per day)	Skin surface contact area	Amount Swallowed (g)	Amount Used per event (g)	room volume (m3)	exposure time (hr)						
Short Title	Area of Application / UD																	
Fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Automotive Refuelling	0.00000287											0.00358810		0.00359097	
Covers consumer uses in liquid fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Scooter Refuelling	0.00000189											0.00238020		0.00238210	
PC13	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Garden Equipment - Use												0.01696790		0.01696790	
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Garden Equipment - Refuelling	0.00000344											0.00188548		0.00188892	
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Home space heater fuel	0.00000172											0.00054144		0.00054316	
	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Lamp oil	0.00000075											0.00031443		0.00031517	

A1.8.3 Use of Substance in Fuels – Consumer

Table 1: Mapping Consumer Uses in the Supply Chain				Table 2: Characterising the Risk - after refinement of exposure estimate														
Generic Exposure Scenario	Relevant Use Sentinel Product	Product sub Category Sentinels	Product ingredient	all			all			d			o			i		
				adult / child			frequency (events per day)	Skin surface contact area	Amount Swallowed (g)	Amount Used per event (g)	room volume (m3)	exposure time (hr)						
Short Title	Area of Application / UD																	
Fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Automotive Refuelling	0.00000287											0.00358810		0.00359097	
Covers consumer uses in liquid fuels	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Scooter Refuelling	0.00000189											0.00238020		0.00238210	
PC13	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Garden Equipment - Use												0.01696790		0.01696790	
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Garden Equipment - Refuelling	0.00000344											0.00188548		0.00188892	
	Consumer-SU21	PC13:Fuels	Liquid (subcategories added): Home space heater fuel	0.00000172											0.00054144		0.00054316	
	Consumer-SU21	PC13:Fuels	Liquid - subcategories added: Lamp oil	0.00000075											0.00031443		0.00031517	

A1.9.1 Use of Substance in Functional Fluids – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Functional fluids	Industrial -SU10	Bulk transfers to/from storage	CS14, CS107	Daily; 15 min - 1 hour; ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC1 Closed continuous process (sometimes with sampling)
	Industrial -SU10	Bulk transfers to/from storage	CS14, CS107	Daily; 15 min - 1 hour; ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC2
10 and 50 checked and GESs revised	Industrial -SU10	Transfers from drums to filling machinery	CS8	Daily; 15 min - 1 hour; ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8b Discharging to/from vessels
	Industrial -SU10	filling articles from predominantly enclosed machines	(CS53 delete), CS84, CS107	Daily; >4 hours, ambient	enclosed operations, size of openings minimised	With LEV	PROC9 Transfer of chemicals into small containers
	Industrial -SU10	manual filling of machines	CS45	Daily; 1-4 hours, ambient	careful pouring, worker instructions	With LEV	PROC8a Discharging to/from vessels (non-dedicated)
	Industrial -SU10	operation of closed equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC2
Combine in narrative	Industrial -SU10	operation of open equipment containing functional fluids	CS16	Daily; >4 hours, ambient	Well ventilated area.	With LEV	PROC4 Use in batch and other process
elevated temperature	Industrial -SU10	operation of open equipment containing functional fluids at elevated	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC4 Use in batch and other process
elevated temperature	Industrial -SU10	operation of open equipment containing functional fluids at elevated temperatures (aerosols)	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC4 Use in batch and other process
	Industrial -SU10	Re-work on off specification articles	CS19	Daily; >4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 Transfer of chemicals into small containers
	Industrial -SU10	maintenance of equipment	CS5	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	With LEV	PROC8a Discharging to/from vessels (non-dedicated)
	Industrial -SU3	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)
	Industrial -SU3	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)

A1.9.2 Use of Substance in Functional Fluids – Industrial

	Table 1: Mapping Uses in the Supply Chain							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalation exposure				Dermal exposure				Comments		
				Text	LEV		TRA Predicted Exposure (mg/m ³) - no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³) modified	TRA Predicted Dermal Systemic Exposure (mg/kg/d) - no modifiers	TRA Predicted Dermal Local Exposure (mg/cm ² /d) - no modifiers	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d) modified	Predicted Local Dermal Exposure (mg/cm ² /d) modified			
Functional fluids	Industrial - SUIH	CS 14, CS 107	Daily, 15 min - 1 hour, ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.03		0.03	0.34	0.1		0.1	0.1			
	Industrial - SUIA	CS 14, CS 107	Daily, 15 min - 1 hour, ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC2	147.55		147.55	1.37	0.2		0.2	0.2			
19 and 59 checked and GEBs revised	Industrial - SUIH	CS 8	Daily, 15 min - 1 hour, ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8b Discharging to/from vessels	442.04		13.28	6.86	1		0.1	0.1			
	Industrial - SUIH	CS83 deleted, CS 84, CS 107	Daily, ambient	enclosed operations, size of openings minimised	With LEV	PROC9 Transfer of chemicals into small containers	590.18		59.02	6.86	1		0.1	0.1			
	Industrial - SUIH	CS 45	Daily, 1-4 hours, ambient	careful pouring, worker instructions	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	737.73		73.77	13.71	1		0.01	0.01			
	Industrial - SUIH	CS 15	Daily, >4 hours, ambient	None	With LEV	PROC2	147.55		147.55	1.37	0.2		0.2	0.2			
Combine in narrative	Industrial - SUIH	CS 16	Daily, >4 hours, ambient	Well ventilated area	With LEV	PROC4 Use in batch and other process	296.09		29.51	6.86	1		0.1	0.1			
elevated temperature	Industrial - SUIH	CS 16	Daily, >4 hours, ambient (product at 80°C)	None	With LEV	PROC4 Use in batch and other process	296.09		29.51	6.86	1		0.1	0.1			
elevated temperature	Industrial - SUIA	CS 16	Daily, >4 hours, ambient (product at 80°C)	None	With LEV	PROC4 Use in batch and other process	5.00	0	0.00	6.86	1	0	0	0			
	Industrial - SUIH	CS 19	Daily, >4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 Transfer of chemicals into small containers	590.18		59.02	6.86	1		0.1	0.1			
	Industrial - SUIA	CS 5	Daily, 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	737.73		73.77	13.71	1		0.01	0.01			
	Industrial - SUIH	CS 67	Daily, 8 hrs, ambient temp	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.03		0.03	0.34	0.1		0.1	0.1			
	Industrial - SUIH	CS 67	Daily, 8 hrs, ambient temp	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)	147.55		147.55	1.37	0.2		0.2	0.2			

A1.9.3 Use of Substance in Functional Fluids – Industrial

Table 1: Mapping Uses in the Supply Chain										
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor Process Category equivalent	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
					Text	LEV				
Functional fluids	Industrial - SU10	Bulk transfers to/from storage	CS14, CS107	Daily; 15 min - 1 hour; ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.000	0.001	0.001
	Industrial - SU10	Bulk transfers to/from storage	CS14, CS107	Daily; 15 min - 1 hour; ambient temp	Enclosed transfers, clear lines prior to decoupling	No LEV	PROC2	0.049	0.002	0.051
10 and 50 checked and GESs revised	Industrial - SU10	Transfers from drums to filling machinery	CS8	Daily; 15 min - 1 hour; ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8b Discharging to/from vessels	0.004	0.001	0.005
	Industrial - SU10	filling articles from predominantly enclosed machines	(CS53 delete), CS84, CS107	Daily; >4 hours, ambient	enclosed operations, size of openings minimised	With LEV	PROC9 Transfer of chemicals into small containers	0.020	0.001	0.021
	Industrial - SU10	manual filling of machines	CS45	Daily; 1-4 hours, ambient	careful pouring, worker instructions	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	0.025	0.000	0.025
	Industrial - SU10	operation of closed equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC2	0.049	0.002	0.051
Combine in narrative	Industrial - SU10	operation of open equipment containing functional fluids	CS16	Daily; >4 hours, ambient	Well ventilated area.	With LEV	PROC4 Use in batch and other process	0.010	0.001	0.011
elevated temperature	Industrial - SU10	operation of open equipment containing functional fluids at elevated	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC4 Use in batch and other process	0.010	0.001	0.011
elevated temperature	Industrial - SU10	operation of open equipment containing functional fluids at elevated temperatures (aerosols)	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC4 Use in batch and other process	#DIV/0!	0.000	#DIV/0!
	Industrial - SU10	Re-work on off specification articles	CS19	Daily; >4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 Transfer of chemicals into small containers	0.020	0.001	0.021
	Industrial - SU10	maintenance of equipment	CS5	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	0.025	0.000	0.025
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.000	0.001	0.001
	Industrial - SU3	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)	0.049	0.002	0.051

A1.10.1 Use of Substance in Functional Fluids – Professional

Table 1: Mapping							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Functional fluids	Professional - SU22	Transfers from drums to filling machinery	CS8	Daily; 15 min - 1 hour; ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8a Discharging to/from vessels (non-dedicated)
	Professional - SU22	filling from small containers e.g. cans	CS22	Daily; >4 hours, ambient	enclosed operations, size of openings minimised, LEV to emission	With LEV	PROC9 Transfer of chemicals into small containers
	Professional - SU22	manual filling from drums	CS45	Daily; 1-4 hours, ambient	Pumped transfer from drum to article/machine	With LEV	PROC9 Transfer of chemicals into small containers
	Professional - SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC1
	Professional - SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC2 Closed continuous process (sometimes with sampling)
	Professional - SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC3
Combine in narrative	Professional - SU22	operation of equipment containing functional fluids	CS16	Daily; >4 hours, ambient	None	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)
	Professional - SU22	operation of equipment containing functional fluids at elevated	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)
	Professional - SU22	Re-work on off specification articles	CS19	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 - Transfer of chemicals into small containers
	Professional - SU22	maintenance of equipment	CS5	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	No LEV	PROC8a Discharging to/from vessels (non-dedicated)
	Professional - SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)
	Professional - SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)

A1.10.2 Use of Substance in Functional Fluids – Professional

Table 1: Mapping							Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use									
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating	Typical Mapped DMs		Use Descriptor	Inhalatory exposure				Dermal exposure				Comments	
				Text	LEV		TRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	TRA Predicted Dermal Systemic Exposure (mg/kg/d)	TRA Predicted Dermal Local Exposure (mg/kg/d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	Predicted Local Dermal Exposure (mg/cm ² /d) modified		
Professional EU2	Transfer from drums to filling machinery	CS 8	Daily, 15 min - 1 hour, ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	737.73		59.02	13.71	1		0.01	0.01		
	Filling from small containers e.g. cans	CS 22	Daily, >4 hours, ambient	enclosed operations, size of openings minimised, LEV to emission	With LEV	PROC9 Transfer of chemicals into small containers	590.18		147.55	6.86	1		0.2	0.2		
	manual filling from drums	CS 45	Daily, 1-4 hours, ambient	Pumped transfer from drum to article/machine	With LEV	PROC9 Transfer of chemicals into small containers	590.18		147.55	6.86	1		0.2	0.2		
	operation of equipment containing functional fluids	CS 15	Daily, >4 hours, ambient	None	With LEV	PROC1	0.03		0.30	0.34	0.1		0.1	0.1		
	operation of equipment containing functional fluids	CS 15	Daily, >4 hours, ambient	None	With LEV	PROC2 Closed continuous process (sometimes with sampling)	147.55		147.55	1.37	0.2		0.2	0.2		
	operation of equipment containing functional fluids	CS 15	Daily, >4 hours, ambient	None	With LEV	PROC3	296.09		206.86	0.34	0.1		0.1	0.1		
	operation of equipment containing functional fluids	CS 16	Daily, >4 hours, ambient	None	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)	0.30		147.55	0.34	0.1		0.25	0.25		
	operation of equipment containing functional fluids at elevated	CS 16	Daily, >4 hours, ambient (product at 80°C)	None	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)	0.30		147.55	0.34	0.1		0.25	0.25		
	Re-work on off specification articles	CS 19	Daily, 1-4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 Transfer of chemicals into small containers	590.18		221.32	6.86	1		0.2	0.2		
	maintenance of equipment	CS 5	Daily, 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	No LEV	PROC8a Discharging to/from vessels (non-dedicated)	737.73		206.86	13.71	1		0.2	0.2		
Professional EU2	Storage	CS 67	Daily, 8 hrs, ambient temp	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.03		0.30	0.34	0.1		0.1	0.1		
	Storage	CS 67	Daily, 8 hrs, ambient temp	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)	147.55		147.55	1.37	0.2		0.2	0.2		

A1.10.3 Use of Substance in Functional Fluids – Professional

Table 1: Mapping										
User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating	Typical Mapped RMMs		Use Descriptor		Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
				Text	LEV	Process Category equivalent				
Professional SU22	Transfers from drums to filling machinery	CS8	Daily; 15 min - 1 hour; ambient temp	Pumped transfer from drum to holding tanks.	With LEV	PROC8a Discharging to/from vessels (non-dedicated)	0.020	0.000	0.020	
Professional SU22	filling from small containers e.g. cans	CS22	Daily; >4 hours, ambient	enclosed operations, size of openings minimised, LEV to emission	With LEV	PROC9 Transfer of chemicals into small containers	0.049	0.002	0.051	
Professional SU22	manual filling from drums	CS45	Daily; 1-4 hours, ambient	Pumped transfer from drum to article/machine	With LEV	PROC9 Transfer of chemicals into small containers	0.049	0.002	0.051	
Professional SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC1	0.000	0.001	0.001	
Professional SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC2 Closed continuous process (sometimes with sampling)	0.049	0.002	0.051	
Professional SU22	operation of equipment containing functional fluids	CS15	Daily; >4 hours, ambient	None.	With LEV	PROC3	0.069	0.001	0.070	
Combine in narrative	operation of equipment containing functional fluids	CS16	Daily; >4 hours, ambient	None	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)	0.049	0.003	0.052	
Professional SU22	operation of equipment containing functional fluids at elevated	CS16	Daily; >4 hours, ambient (product at 80oC)	None.	With LEV	PROC20 Heat and pressure transfer fluids (closed systems)	0.049	0.003	0.052	
Professional SU22	Re-work on off specification articles	CS19	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills	With LEV	PROC9 - Transfer of chemicals into small containers	0.074	0.002	0.076	
Professional SU22	maintenance of equipment	CS5	Daily; 1-4 hours, ambient	work methods, drain prior to work, retain spills, gloves	No LEV	PROC8a Discharging to/from vessels (non-dedicated)	0.069	0.002	0.071	
Professional SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC1 Closed continuous process (sometimes with sampling)	0.000	0.001	0.001	
Professional SU22	Storage	CS67	Daily; 8 hrs; ambient temp;	samples collected at dedicated sample point	No LEV	PROC2 Closed continuous process (sometimes with sampling)	0.049	0.002	0.051	

A1.11.1 Use of Substance in Laboratory Applications – Industrial

No environmental mapping

A1.11.2 Use of Substance in Laboratory Applications – Industrial

No environmental mapping

A1.11.2 Use of Substance in Laboratory Applications – Industrial

No environmental mapping

A1.12.1 Use of Substance in Laboratory Applications – Industrial

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Use in laboratories	Industrial - SUB 8, etc	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC15
		CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC10

A1.12.2 Use of Substance in Laboratory Applications – Industrial

Table 1: Mapping Uses in the Supply Chain				Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use													
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Inhalatory exposure				Dermal exposure				Comments	
					Text	LEV		Process Category equivalent	IRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	IRA Predicted Dermal Systemic Exposure (mg/kg/d) - see	IRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)		Predicted Local Dermal Exposure (mg/cm ² /d) modified
Use in laboratories	Industrial - SUB 8, etc	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC15	147.55		147.55	0.34	0.1			0.1	0.1	
		CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC10	737.73		737.77	27.43	2	0		0.1	0.1	

A1.12.3 Use of Substance in Laboratory Applications – Industrial

Table 1: Mapping Uses in the Supply Chain								Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor			
					Text	LEV	Process Category equivalent			
Use in laboratories	Industrial - SUB 8, etc	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC15	0.049	0.001	0.050
		CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Yes	PROC10	0.025	0.001	0.026

A1.13.1 Use of Substance in Laboratory Applications – Professional

Table 1: Mapping Uses in the Supply Chain							
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor
					Text	LEV	Process Category equivalent
Use in laboratories	Professional SU22	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	With LEV	PROC15
	Professional SU22	CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Without LEV	PROC10

A1.13.2 Use of Substance in Laboratory Applications – Professional

Table 1: Mapping Uses in the Supply Chain						Table 2: Characterising the Risk - High VP Liquids - Chemical Safety Assessment - Evaluation of Safe Use											
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs	Use Descriptor	Inhalatory exposure			Dermal exposure							Comments
							Text	LEV	Process Category equivalent	IRA Predicted Exposure (mg/m ³) no modifiers	Inhalation RMM (efficiency)	Predicted Inhalation Exposure (mg/m ³)	IRA Predicted Dermal Systemic Exposure (mg/kg/d) - see	IRA Predicted Dermal Local Exposure (mg/cm ² /d)	Dermal RMM (efficiency)	Predicted Systemic Dermal Exposure (mg/kg/d)	
Use in laboratories	Professional SU22	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	With LEV	PROC15	147.55		147.55	0.34	0.1			0.1	0.1	
	Professional SU22	CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Without LEV	PROC10	737.73		88.53	27.43	2	0	0.1	0.1		

A1.13.3 Use of Substance in Laboratory Applications – Professional

Table 1: Mapping Uses in the Supply Chain										Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)	Substance Specific RCR (all routes)
	User Group	Contributing Scenarios	CS Ref	Typical Mapped Operating Conditions	Typical Mapped RMMs		Use Descriptor	Substance Specific RCR (inhalation)	Substance Specific RCR (dermal)			
					Text	LEV	Process Category equivalent					
Use in laboratories	Professional SU22	CS36 Laboratory activities	CS36	Continuous; daily; > 4 hour; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	With LEV	PROC15	0.049	0.001	0.050		
	Professional SU22	CS47 Cleaning [wiping, brushing, flushing]	CS47	Continuous; daily; 15 min - 1 hour/d; ambient temp.	Fume cupboard or ventilated glove-box; Bench-mounted local extract	Without LEV	PROC10	0.030	0.001	0.031		

APPENDIX B – QUALITATIVE RISK ASSESSMENT OF RISKS FROM FLAMMABLE SUBSTANCES

The accident scenarios relevant for REACH are minor accidents which might occur in the workplace and those related to consumer use. Major accidents caused by chemicals and the requirements to manage these risks are regulated under the Seveso II Directive and do not need to be considered.

Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures tailored to each specific risk. For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished. For all flammable substances classified as R10, R11 or R12 (H220, H221, H224, H225, H226), safety data sheets should be made available in which the appropriate risk management measures are identified and communicated. Primary means of communication with the consumer is through the label.

Physicochemical Hazard Qualitative Risk Assessment

The regulatory framework for managing the risk arising from flammable materials is highly developed. The regulatory framework should be fully complied with and is sufficient to prevent minor accidents which occur at the workplace or during consumer use. Additional measures such as those shown below or those highlighted in the “check questionnaire for identifying accident risk factors due to physiochemical properties in the “Guidance on information requirements and chemical safety assessment – Part E: Risk Characterisation” or their equivalent should be implemented to further control this risk. -

Hazard	Material	Risk / Hazard Phrase	P Phrase	Qualitative Risk Assessment
Extremely Flammable	<ul style="list-style-type: none"> Gas 	<ul style="list-style-type: none"> R12 / H220 (Extremely flammable gas) R12 / H221 (Flammable gas) 	<p>Prevention:</p> <ul style="list-style-type: none"> P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking. <p>Response</p> <ul style="list-style-type: none"> P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. P381: Eliminate all ignition sources if safe to do so. <p>Storage:</p> <ul style="list-style-type: none"> P403: Store in a well-ventilated place. 	<p><u>Source of Ignition</u></p> <ul style="list-style-type: none"> Electrostatic discharge may cause fire (Industrial) Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional). .Do NOT use compressed air for filling, discharging or handling operations (Industrial). Electrostatic charges may be generated during pumping. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge.(industrial If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial). Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional). The vapour is heavier than air, spreads along the ground and

EC number:
201-142-8

2-methylbutane - HSRC

CAS number:
78-78-4

Hazard	Material	Risk / Hazard Phrase	P Phrase	Qualitative Risk Assessment
				<p><i>distant ignition is possible (Industrial).</i></p> <p>Substance</p> <ul style="list-style-type: none"> • <i>Avoid Overfilling (Industrial/ Professional).</i> • <i>Use appropriate equipment for filling IBCs and other containers. IBCs and other containers must be constructed of appropriate material) (Industrial).</i> • <i>Handle and open container with care in a well-ventilated area (Industrial/ Professional).</i> <p>Use only with adequate ventilation (Consumer).</p> <ul style="list-style-type: none"> • <i>Do NOT empty into drains (Industrial/ Professional).</i> <p>Oxidising Agents Keep away from oxidising agents (Industrial/ Professional).</p>
Extremely Flammable	<ul style="list-style-type: none"> • Liquid 	<ul style="list-style-type: none"> • R12 / H224 (Extremely flammable liquid and vapour) 	<p>Prevention:</p> <ul style="list-style-type: none"> • P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking • P233 Keep container tightly closed. • P240 : Ground/bond container and receiving equipment. • P241: Use explosion-proof electrical/ventilating/lighting/.../ equipment. • P242: Use only non-sparking tools. • P243: Take precautionary measures against static discharge. • P280: Wear protective gloves/eye protection/face protection. <p>Response:</p> <ul style="list-style-type: none"> • P303 + P361 + P353 : IF ON SKIN (or hair): Remove/Take off 	<p>Risks arising from Flammability Classification Source of Ignition</p> <ul style="list-style-type: none"> • <i>Electrostatic discharge may cause fire (Industrial)</i> • <i>Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).</i> • <i>.Do NOT use compressed air for filling, discharging or handling operations (Industrial).</i> • <i>Electrostatic charges may be generated during pumping.</i> • <i>Restrict line velocity during pumping in order to avoid generation of electrostatic discharge.(industrial</i> • <i>If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).</i> • <i>Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).</i> • <i>The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial).</i> <p>Substance</p> <ul style="list-style-type: none"> • <i>Avoid Overfilling (Industrial/ Professional).</i>

Hazard	Material	Risk / Hazard Phrase	P Phrase	Qualitative Risk Assessment
			<p>immediately all contaminated clothing. Rinse skin with water/shower</p> <ul style="list-style-type: none"> P370 + P378 : In case of fire: Use ... for extinction. <p>Storage:</p> <ul style="list-style-type: none"> P403 + P235 : Store in a well-ventilated place. Keep cool. P501 : Dispose of contents/container to 	<ul style="list-style-type: none"> Use appropriate equipment for filling IBCs and other containers. IBCs and other containers must be constructed of appropriate material) (Industrial). Handle and open container with care in a well-ventilated area (Industrial/ Professional). Do NOT empty into drains (Industrial/ Professional). <p>Oxidising Agents Keep away from oxidising agents (Industrial/ Professional).</p>
Highly Flammable	<ul style="list-style-type: none"> Liquid 	<ul style="list-style-type: none"> R11 / H224 (Extremely flammable liquid and vapour) R11 / H225 (Highly flammable liquid and vapour) 	<p>Prevention:</p> <ul style="list-style-type: none"> P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking P233 Keep container tightly closed. P240 : Ground/bond container and receiving equipment. P241: Use explosion-proof electrical/ventilating/lighting/.../ equipment. P242: Use only non-sparking tools. P243: Take precautionary measures against static discharge. P280: Wear protective gloves/eye protection/face protection. <p>Response:</p> <ul style="list-style-type: none"> P303 + P361 + P353 : IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower P370 + P378 : In case of fire: 	<p><u>Risks arising from Flammability Classification</u> <u>Source of Ignition</u></p> <ul style="list-style-type: none"> Electrostatic discharge may cause fire (Industrial) Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional). Do NOT use compressed air for filling, discharging or handling operations (Industrial). Electrostatic charges may be generated during pumping. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge.(industrial If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial). Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional). The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial). <p><u>Substance</u></p> <ul style="list-style-type: none"> Avoid Overfilling (Industrial/ Professional). Use appropriate equipment for filling IBCs and other containers. IBCs and other containers must be constructed of appropriate material) (Industrial). Handle and open container with care in a well-ventilated area

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Hazard	Material	Risk / Hazard Phrase	P Phrase	Qualitative Risk Assessment
			<p>Use ... for extinction.</p> <p>Storage:</p> <ul style="list-style-type: none"> • P403 + P235 : Store in a well-ventilated place. Keep cool. • P501 : Dispose of contents/container to 	<p><i>(Industrial/ Professional).</i></p> <ul style="list-style-type: none"> • <i>Do NOT empty into drains (Industrial/ Professional).</i> <p>Oxidising Agents Keep away from oxidising agents (Industrial/ Professional).</p>
Flammable	<ul style="list-style-type: none"> • Liquid 	<ul style="list-style-type: none"> • R10 / H225 (Highly flammable liquid and vapour) • R10 / H226 (Flammable liquid and vapour) 	<p>Prevention:</p> <ul style="list-style-type: none"> • P210: Keep away from heat/sparks/open flames/... /hot surfaces.... No smoking • P233 Keep container tightly closed. • P240 : Ground/bond container and receiving equipment. • P241: Use explosion-proof electrical/ventilating/lighting/.../ equipment. • P242: Use only non-sparking tools. • P243: Take precautionary measures against static discharge. • P280: Wear protective gloves/eye protection/face protection. <p>Response:</p> <ul style="list-style-type: none"> • P303 + P361 + P353 : IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower • P370 + P378 : In case of fire: Use ... for extinction. <p>Storage:</p> <ul style="list-style-type: none"> • P403 + P235 : Store in a well-ventilated place. Keep cool. 	<ul style="list-style-type: none"> • <u>Source of Ignition</u> <ul style="list-style-type: none"> • <i>Electrostatic discharge may cause fire (Industrial)</i> • <i>Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).</i> • <i>.Do NOT use compressed air for filling, discharging or handling operations (Industrial).</i> • <i>Electrostatic charges may be generated during pumping.</i> • <i>Restrict line velocity during pumping in order to avoid generation of electrostatic discharge.(industrial</i> • <i>If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).</i> • <i>Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).</i> • <i>The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial).</i> • <u>Substance</u> <ul style="list-style-type: none"> • <i>Avoid Overfilling (Industrial/ Professional).</i> • <i>Use appropriate equipment for filling IBCs and other containers. IBCs and other containers must be constructed of appropriate material) (Industrial).</i> • <i>Handle and open container with care in a well-ventilated area (Industrial/ Professional).</i> • <i>Use only with adequate ventilation (Consumer).</i> • <i>Do NOT empty into drains (Industrial/ Professional).</i>

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Hazard	Material	Risk / Hazard Phrase	P Phrase	Qualitative Risk Assessment
			<ul style="list-style-type: none"><li>• P501 : Dispose of contents/container to	Oxidising Agents Keep away from oxidising agents (Industrial/ Professional).