



Unilever

Checking use coverage of a raw material – a practical example from a formulator

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- *(Use mapping – prepare yourself)*
- **Analysing the supplier SDS – understanding use descriptors and exposure scenarios**
- **Assessing compliance – the need for scaling**
- *(Un-covered uses – what are the remedies)*

Analysing the supplier SDS



Start with the main body of the SDS

In accordance with Regulations (EC) No 1907/2006, (EC) No 1272/2008 and (EU) No 453/2010 (Annex I)

Is it REACH & CLP compliant?

SECTION 1 IDENTIFICATION OF SUBSTANCE AND COMPANY

1.1. Substance identifier

Substance name:	Benzenesulfonic acid, C10-13-alkyl derivs., sodium salts
Synonyms:	Linear alkylbenzene sulfonates; LAS
CAS number:	68411-30-3
CAS name:	Benzenesulfonic acid, C10-13-alkyl derivs., sodium salts
REACH registration number:	01-2119489428-22

Does the substance correspond with the substance we are using?

1.2. Relevant identified uses of the substance and uses advised against

Identified uses:	<ul style="list-style-type: none">- in formulation- in washing and cleaning products- in plant protection products- in textile and leather finishing products- as processing aid in emulsion polymerization- in glues- in biocidal products- in cosmetics and personal care products- in metalworking- in concrete industry
Uses advised against:	There are no specific uses of LAS advised against.

Are our uses included?

Is the substance registered?

Selecting the correct ES

- LAS eSDS

(developed by ChemSafe as commissioned by the LAB & Derivatives REACH consortium)

contains 20 Exposure scenarios:

- Only 5 are relevant to Unilever:
 - Formulation with Substance - Industrial use
 - Use in Washing and Cleaning Products - Industrial use
 - Use in Washing and Cleaning Products - Professional use
 - Use in Washing and Cleaning Products - Consumer use
 - Use in Cosmetic and Personal Care Products - Consumer use

Exposure Scenario for Preparation with Substances (Formulation)				
1.0. Exposure scenario				
Name of exposure scenario	Estimated exposure		Risk characterisation index	
	Inhalation (mg/h)	Dermal (mg/kg bw/day)	Inhalation	Dermal
Formulation with Substance (Formulation)	1.43	3.43	1.19 x 10 ⁻⁰¹	2.02 x 10 ⁻⁰¹
Use in Washing and Cleaning Products - Industrial use	1.43	3.43	1.19 x 10 ⁻⁰¹	2.02 x 10 ⁻⁰¹
Use in Washing and Cleaning Products - Professional use	1.43	3.43	1.19 x 10 ⁻⁰¹	2.02 x 10 ⁻⁰¹
Use in Washing and Cleaning Products - Consumer use	1.43	3.43	1.19 x 10 ⁻⁰¹	2.02 x 10 ⁻⁰¹
Use in Cosmetic and Personal Care Products - Consumer use	1.43	3.43	1.19 x 10 ⁻⁰¹	2.02 x 10 ⁻⁰¹

Assessing a relevant ES



- Industrial worker use

Exposure Scenario 4a: Use in Washing and Cleaning Products (liquids) - Industrial use	
Use descriptors:	Sectors of use: SU3: Industrial uses: Uses of substances as such or in preparations at industrial sites.
	Process categories: PROC2: Use in closed, continuous process with occasional controlled evaporation; PROC3: Use in closed batch process (synthesis or formulation); PROC4: Use in batch and other process (synthesis) where significant pressure arises; PROC5: Mixing or blending in batch processes for formulations and articles (multistage and/or significant contact); PROC7: Industrial spraying; PROC8a: Transfer of substance (charging/discharging) from/ to vessels/ large containers at non-dedicated facilities; PROC8b: Transfer of substance (charging/discharging) from/ to vessels/ large containers at dedicated facilities; PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing); PROC10: Application or brushing; PROC11: Treatment of articles by dipping and pouring; PROC19: Hand-mixing with intimate contact and only PPE available.
	Product categories: PC3: Air care products; PC8: Biocidal products (e.g. Disinfectants, pest control); PC31: Polishes and wax blends; PC35: Washing and cleaning products (including solvent based products).
	Environmental release categories: ERC4: Industrial use of processing aids in processes and products, not becoming part of articles.

Assess the Use Descriptors (SU3-PROC9-PC35-ERC4)



Other ES parameters to check include

Amounts used

*Maximum daily site tonnage:
5000 kg/day*

*Fraction main source to local
environment: 0.5%*

Frequency & duration of use

Emission days per year: 20

Technical onsite operational conditions

Wastewater treatment efficiency: 88%

Organizational measures

Good housekeeping

4a.1. Exposure scenario	
4a.2. Contributing scenario controlling environmental exposure	
Amounts used	
Amounts used in the EU (tonnes/year)	19780
Fraction of main source to local environment	0.005
Maximum daily site tonnage (kg/day)	5000
Frequency and duration of use	
Emission days (days/year)	20
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other operational conditions affecting environmental exposure	
Release fraction to air from process	3.00×10^{-1}
Release fraction to wastewater from process	1.00×10^{-4}
Release fraction to soil from process (regional only)	0
Technical onsite conditions and measures to reduce or limit discharges, air emissions and release to soil	
Wastewater treatment (prior to discharge to receiving water) to provide the required removal efficiency of :	88%
Organizational measures to prevent/limit release from site	
Good housekeeping, e.g. inspection procedures, will ensure that there are no leaks to soil. Dispose of waste product or used containers according to local regulations.	

Contributing scenarios



Additional information on how to ensure safe use

Worked example: worker exposure

4a.3. Contributing scenarios controlling worker exposure	
Product characteristics	
Physical form:	Liquid, vapour pressure < 0.5 kPa
Concentration in preparations:	5 - 25%
Frequency and duration of use	
Duration of Exposure:	> 4 hours/ day
Operational conditions affecting workers exposure	
Place of Use:	Indoors (industrial settings)
Technical and organizational measures to prevent/limit releases, dispersion and exposure	
Name of contributing scenario	Risk Management Measures
General exposures (closed systems) [PROC2]	Closed process. Clear up spills immediately and dispose of waste safely.
Use in contained batch processes [PROC3]	Closed process. Clear spills immediately.
Automated process with (semi) closed systems [PROC4]	Clear spills immediately.
Mixing operations (open systems) [PROC5]	Clear spills immediately.
Spraying [PROC7]	Handle all packages and containers carefully to minimise spills.
Non-dedicated facility [PROC8a]	Handle all packages and containers carefully to minimise spills.
Dedicated facility [PROC8b]	Handle all packages and containers carefully to minimise spills.
Transfer from/pouring from containers [PROC9]	Clear spills immediately.

Regular concentration range

Full working day covered

'Regular' indoor factory

Good housekeeping sufficient to ensure safe use

Risk Characterisation Ratios



With these measures all RCRs are <1

4a.4. Exposure estimation and reference to its sources

Workers exposure has been estimated using ECETOC TRA tool.

Environmental exp
4a.4.a. Environm
Comp
STP
Freshwater
Freshwater sedime
Soil
Marine water
Marine water sedit

4a.4.b. Worker exposure				
Name of contributing scenario	Estimated exposure		RCR Risk characterization ratios	
	Inhalation (mg/m ³)	Dermal (mg/kg/ bw/day)	Inhalation	Dermal
	Long term		Long term	
General exposures (closed systems) [PROC2]	1.00 x 10 ⁻²	1.37	8.33 x 10 ⁻⁴	8.07 x 10 ⁻³
Use in contained batch processes [PROC3]	1.00 x 10 ⁻¹	3.43 x 10 ⁻¹	8.33 x 10 ⁻³	2.02 x 10 ⁻³
Automated process with (semi) closed systems [PROC4]	5.00 x 10 ⁻¹	6.86	4.17 x 10 ⁻²	4.03 x 10 ⁻²
Mixing operations (open systems) [PROC5]	5.00 x 10 ⁻¹	1.37 x 10 ¹	4.17 x 10 ⁻²	8.07 x 10 ⁻²
Spraying [PROC7]	1.00	4.29 x 10 ¹	8.33 x 10 ⁻²	2.52 x 10 ⁻¹
Non-dedicated facility [PROC8a]	5.00 x 10 ⁻¹	1.37 x 10 ¹	4.17 x 10 ⁻²	8.07 x 10 ⁻²
Dedicated facility [PROC8b]	1.00 x 10 ⁻¹	6.86	8.33 x 10 ⁻³	4.03 x 10 ⁻²

4b.5. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, resulting risk characterization ratios are expected to be less than 1. Confirm that the adopted RMMs and OCs are as described or of equivalent efficiency. For environmental assessment, check the compliance with the ES by the equation described in the section "General remarks".

What if ES conditions are not met?



- Major deviation: use descriptors not covered
 - Contact supplier; or
 - Make DU Chemical Safety Report
- Minor deviation: scaling possible?
 - Daily tonnage: 3000 kg/d
 - Wastewater treatment: 80% (site) vs. 88% (ES)
 - Fraction emitted: 0.1% (site) vs. 0.05% (ES)
 - Emission days: 200 (site) vs. 20 (ES)

Environmental scaling example



Highest Environmental RCR: 0.04

Variable	eSDS	DU use	Scaling factor
Amount used at factory	5000 kg/d	3000 kg/d	0.6
Local freshwater dilution	10	10	1
Fraction discharge to wastewater	0.5%	0.1%	0.2
Estimated substance removal from wastewater via domestic sewage treatment plant	88%	80%	1.7
Emission days	20	200	10
Total scaling factor			2.04

Environmental RCR after scaling still < 1

Needs to be documented for compliance by DU

Assessing a relevant ES



- consumer use

Exposure Scenario 15c:

Use in Washing and Cleaning Products (liquids, powders, granules) - Consumer use

Exposure Scenario 15c: Use in Washing and Cleaning Products (liquids, powders, granules) - Consumer use

Use descriptors:

Sectors of use:

SU21: Consumer uses: Private households (= general consumers).

Products categories:

PC3: Air care products;

PC8: Biocidal products (e.g. Disinfectants, pest control);

PC14: Metal surface treatment products, including galvanic and electroplating products;

PC15: Non-metal surface treatment products;

PC24: Lubricants and release products;

PC31: Wax blends;

PC35: Solvent based cleaning products (including solvent based products).

Environmental release categories:

ERC8a: Wide dispersive indoor use of processing aids in open systems.

Asses the Use Descriptors (SU21 -PC35-ERC8a)

Consumer ES parameters to check



- Amounts used
 - Maximum daily 'site' tonnage: 480 kg/day
(vs 5000 kg/d industrial)
 - Fraction main source to local environment: 0.05%
(vs. 0.5% industrial)
- Frequency & duration of use
 - Emission days per year: 365
- Other operational conditions
 - Release fraction to air: none
 - Release fraction to water: 99%
 - Release fraction to soil: 1%

15c.1. Exposure scenario	
15c.2. Contributing scenario controlling environmental exposure	
Amounts used	
Amounts used in the EU (tonnes/year)	352600
Fraction of main source to local environment	0.0005
Maximum daily site tonnage (kg/day)	480
Frequency and duration of use	
Emission days (days/year)	up to 365
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other operational conditions affecting environmental exposure	
Release fraction to air from process	0
Release fraction to wastewater from process	9.90×10^{-1}
Release fraction to soil from process (regional only)	1.00×10^{-2}



Additional information on how to ensure safe use for consumers

18 (!) contributing scenarios

14 for liquid applications

4 for solid applications

Covered preparation concentration levels:

Up to 30% in liquid preparations

Up to 60% in solid preparations

General exposure data

Annual exposure frequency

Contact information

Direct dermal contact with the product

Vapour exposure



Contributing scenarios for consumer use 2



- Additional information on how to ensure safe consumer use
 - Worked example: Inhalation of and skin contact with aerosols from cleaning sprays

Exposure to vapour (evaporation):

- weight fraction compound: 0.06 (fraction)
- exposure duration: 60 minute
- room volume: 15 m³
- ventilation rate: 2.5 l/hr
- mass generation rate: 0.78 g/sec
- spray duration: 0.41 minute
- room height: 2.5 meter;
- inhalation cutoff diameter: 15 micrometer
- uptake fraction: 1 fraction
- inhalation rate: 24.1 liter/min

General Exposure Data:

exposure frequency: 365 /year

Direct dermal contact with product

(instant application):

- exposed area: 1.9 x 10³ cm²
- contact rate: 100 mg/min
- release duration: 24.6 second
- uptake fraction: 1 (fraction)

Inhalation of and skin contact with aerosols from cleaning sprays

General Exposure Data:

exposure frequency: 365/year

Exposure to vapour (evaporation):

weight fraction compound: 0.06 fraction; exposure duration: 60 minute; room volume: 15 m³; ventilation rate: 2.5 l/hr; mass generation rate: 0.78 g/sec; spray duration: 0.41 minute; room height: 2.5 meter; inhalation cutoff diameter: 15 micrometer; uptake fraction: 1 fraction; inhalation rate: 24.1 liter/min

Direct dermal contact with product (instant application):

exposed area: 1.9 x 10³ cm²; contact rate: 100 mg/min; release duration: 24.6 second; uptake fraction: 1 fraction

Risk Characterisation Ratios



If these conditions are met, all RCRs are <1 for consumers

15c.4b. Consumer exposure							
Liquid preparations							
Name of contributing scenario	Estimated exposure				RCR Risk characterization ratios		
	Oral (mg/kg bw/day)	Dermal systemic (mg/kg bw/day)	Dermal local (mg/cm ² /day)	Inhalation (mg/m ³ /day)	Oral	Dermal	Inhalation
	Long term				Long term		
Direct skin contact from hand washed laundry	-	8.32 x 10 ⁻¹	1.00 x 10 ⁻¹	-	-	9.79 x 10 ⁻³	-
Direct skin contact from pre-treatment of clothes	-	4.91 x 10 ⁻¹	1.08 x 10 ⁻¹	-	-	5.78 x 10 ⁻³	-
Direct skin contact and inhalation from hand dishwashing	-	7.8 x 10 ⁻¹	5.16 x 10 ⁻³	3.90 x 10 ⁻²⁰	-	2.07 x 10 ⁻³	1.30 x 10 ⁻²⁰
Indirect skin contact from wearing clothes	-	2.83 x 10 ¹	1.05 x 10 ⁻¹	-	-	3.33 x 10 ⁻¹	-
Inhalation of and skin contact with aerosols from cleaning sprays	-	3.78 x 10 ⁻²	1.29 x 10 ⁻³	1.31 x 10 ⁻⁵	-	4.45 x 10 ⁻⁴	4.37 x 10 ⁻⁶
Oral exposure to dishwashing residue on dinnerware	1.94 x 10 ⁻³	-	-	-	2.28 x 10 ⁻³	-	-
Laundry pretreatment products: Spray Spot Removers	-	1.74 x 10 ⁻³	3.83 x 10 ⁻⁴	3.51 x 10 ⁻⁶	-	2.05 x 10 ⁻⁵	1.17 x 10 ⁻⁶

please be aware that not all contributing scenarios could be shown in this overview!

Consumer ES – Solvents example



Section 1 Exposure Scenario Title	
Title:	
Use as a fuel - Consumer	
Use Descriptor	
Sector(s) of Use	SU21
Product Categories	PC13
Environmental Release Categories	ERC8B
Specific Environmental Release Category	ESVOC 9.12c.v1
Processes, tasks, activities covered	
Covers consumer uses in liquid fuels.	

Section 1 contains

- A simple title describing the identified use of the substance/product
- A more extensive explanation describing the range of activities covered by the title
- A listing of the REACH Use Descriptors (UDs) that are likely to be associated with the use
 - Sector of Use (SU) : industrial, professional or consumers
 - Process Categories (PROCs) : workers
 - Product Categories (PCs) : consumers
 - Environmental Release Categories (ERCs/SpERCs) : environment

Consumer ES – Solvents example



Section 2 Operational conditions and risk management measures
Section 2.1 Control of consumer exposure
Product Characteristic
Liquid
Duration, frequency and amount
Covers concentrations up to 100 % Covers daily use up to 1 times per day
Other given operational conditions affecting consumer exposure
Covers use at ambient temperatures.

Section 2.1: Includes baseline Operational Conditions applied in the Exposure Scenario

Product characteristics: Physical form of substance, which may be supported by the volatility range linked to the ECETOC TRA. Actual Vapour Pressure may be found in Chapter 9 of the SDS

Frequency, duration and amounts

Other given conditions

Consumer ES – Solvents example



Contributing Scenarios/Specific Risk Management Measures and Operating Conditions (only required controls to demonstrate safe use listed)

Liquid: Automotive Refuelling PC13

Covers annual use up to 52 days/yr
Covers skin contact area up to 210 cm²
For each use event, covers use amounts up to 37500 grams
Covers outdoor use.
Covers use in room size of 100 m³
Covers exposure up to 0.05 hour(s)

Liquid Scooter Refuelling PC13

Covers annual use up to 52 days/yr
Covers skin contact area up to 210 cm²
For each use event, covers use amounts up to 3750 grams
Covers outdoor use.
Covers use in room size of 100 m³
Covers exposure up to 0.03 hour(s)

Liquid, Garden Equipment - Use PC13

Covers annual use up to 26 days/yr
For each use event, covers use amounts up to 750 grams
Covers outdoor use.
Covers use in room size of 100 m³
Covers exposure up to 2 hour(s)
Covers skin contact area up to 420 cm²

Typical consumer uses
of fuels identified with
associated OC and
RMM controls.

Also:

Liquid, garden equipment refuelling

Liquid, lamp oil

Liquid, home space heater fuel

Consumer ES – Solvents example



SECTION 3	EXPOSURE ESTIMATION
Section 3.1 - Health	
The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated.	

Advise on tool used to estimate exposure

SECTION 4	GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO
Section 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.	

DU are able to carry out their own safety assessment using alternative parameters to those in Section 2