

SAFETY DATA SHEET

(in accordance with Regulation (EU) 2015/830)

0020AZ-ASTRAL pH Plus solid



Version: 4
Revision date: 10/02/2020

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SECTION 1: IDENTIFICATION OF THE MIXTURE AND OF THE COMPANY/UNDERTAKING.

1.1 Product identifier.

Product Name: ASTRAL pH Plus solid
Product Code: 0020AZ

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

pH regulator

Uses advised against:

Uses other than those recommended.

Exposure scenarios covering uses can be found in the Annex.

1.3 Details of the supplier of the safety data sheet.

Company: **FLUIDRA COMMERCIAL, S.A.U.**
Address: Avda. Francesc Macià, 60, 20ª planta
City: 08208 Sabadell (Barcelona) Spain
Province: Barcelona
Telephone: Tel:34 93 724 39 00 Fax:34 93 724 29 93
Fax: +34 93 713 41 11
E-mail: fds@inquide.com
Web: www.astralpool.com

1.4 Emergency telephone number:

Anti poisoning centre:

ITALY (Rome): 06/305 43 43

ITALY (Milan): 02/66 10 10 29

SPAIN: +34 91 562 04 20

FRANCE (Paris): 01 40 05 48 48 FRANCE (Toulouse): 05 61 77 74 47 FRANCE (Marseille): 04 91 75 25 25

PORTUGAL: 808 250 143

BELGIQUE (Brussel): (+34) 070 245 245

SECTION 2: HAZARDS IDENTIFICATION.

2.1 Classification of the mixture.

In accordance with Regulation (EU) No 1272/2008:

Eye Irrit. 2 : Causes serious eye irritation.

2.2 Label elements.

Labelling in accordance with Regulation (EU) No 1272/2008:

Pictograms:



Signal Word:

Warning

H statements:

H319 Causes serious eye irritation.

P statements:

P101 If medical advice is needed, have product container or label at hand.

P102 Keep out of reach of children.

P103 Read label before use.

P264 Wash hands thoroughly after handling.

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P280 Wear protective gloves/protective clothing/eye protection/face protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 If eye irritation persists: Get medical advice/attention.

2.3 Other hazards.

In normal use conditions and in its original form, the product itself does not involve any other risk for health and the environment.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS.

3.1 Substances.

Not Applicable.

3.2 Mixtures.

Substances posing a danger to health or the environment in accordance with the Regulation (EC) No. 1272/2008, assigned a Community exposure limit in the workplace, and classified as PBT/vPvB or included in the Candidate List:

Identifiers	Name	Concentrate	(*)Classification - Regulation (EC) No 1272/2008	
			Classification	specific concentration limit
Index No: 011-005-00-2 CAS No: 497-19-8 EC No: 207-838-8 Registration No: 01-2119485498-19-XXXX	sodium carbonate	10 - 100 %	Eye Irrit. 2, H319	-

(*) The complete text of the H phrases is given in section 16 of this Safety Data Sheet.

SECTION 4: FIRST AID MEASURES.

4.1 Description of first aid measures.

In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious.

Inhalation.

Take the victim into open air; keep them warm and calm. If breathing is irregular or stops, perform artificial respiration.

Eye contact.

Remove contact lenses, if present and if it is easy to do. Wash eyes with plenty of clean and cool water for at least 10 minutes while pulling eyelids up, and seek medical assistance. Don't let the person to rub the affected eye.

Skin contact.

Remove contaminated clothing. Wash skin vigorously with water and soap or a suitable skin cleaner. NEVER use solvents or thinners.

Ingestion.

If accidentally ingested, seek immediate medical attention. Keep calm. NEVER induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed.

Irritant Product, repeated or prolonged contact with skin or mucous membranes can cause redness, blisters or dermatitis, inhalation of spray mist or particles in suspension may cause irritation of the respiratory tract, some symptoms may not be immediate.

4.3 Indication of any immediate medical attention and special treatment needed.

In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious. Cover the affected area with a dry sterile bandage. Protect the affected area from pressure or friction.

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SECTION 5: FIREFIGHTING MEASURES.

The product does not present any particular risk in case of fire.

5.1 Extinguishing media.

Suitable extinguishing media:

Extinguisher powder or CO₂. In case of more serious fires, also alcohol-resistant foam and water spray.

Unsuitable extinguishing media:

Do not use a direct stream of water to extinguish. In the presence of electrical voltage, you cannot use water or foam as extinguishing media.

5.2 Special hazards arising from the mixture.

Special risks.

Fire can cause thick, black smoke. As a result of thermal decomposition, dangerous products can form: carbon monoxide, carbon dioxide. Exposure to combustion or decomposition products can be harmful to your health.

5.3 Advice for firefighters.

Use water to cool tanks, cisterns, or containers close to the heat source or fire. Take wind direction into account. Prevent the products used to fight the fire from going into drains, sewers, or waterways.

Fire protection equipment.

According to the size of the fire, it may be necessary to use protective suits against the heat, individual breathing equipment, gloves, protective goggles or facemasks, and boots.

SECTION 6: ACCIDENTAL RELEASE MEASURES.

6.1 Personal precautions, protective equipment and emergency procedures.

For exposure control and individual protection measures, see section 8.

6.2 Environmental precautions.

Prevent the contamination of drains, surface or subterranean waters, and the ground.

6.3 Methods and material for containment and cleaning up.

The contaminated area should be immediately cleaned with an appropriate de-contaminator. Pour the decontaminator on the remains in an opened container and let it act various days until no further reaction is produced.

6.4 Reference to other sections.

For exposure control and individual protection measures, see section 8.

For later elimination of waste, follow the recommendations under section 13.

SECTION 7: HANDLING AND STORAGE.

7.1 Precautions for safe handling.

For personal protection, see section 8. Never use pressure to empty the containers. They are not pressure-resistant containers.

In the application area, smoking, eating, and drinking must be prohibited.

Follow legislation on occupational health and safety.

Keep the product in containers made of a material identical to the original.

7.2 Conditions for safe storage, including any incompatibilities.

Store according to local legislation. Observe indications on the label. Store the containers at room temperature, in a dry and well-ventilated place, far from sources of heat and direct solar light. Keep far away from ignition points. Keep away from oxidising agents and from highly acidic or alkaline materials. Do not smoke. Prevent the entry of non-authorized persons. Once the containers are open, they must be carefully closed and placed vertically to prevent spills.

The product is not affected by Directive 2012/18/EU (SEVESO III).

7.3 Specific end use(s).

PH regulator for swimming pool water

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION.

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8.1 Control parameters.

The product does NOT contain substances with Professional Exposure Environmental Limit Values. The product does NOT contain substances with Biological Limit Values.

8.2 Exposure controls.

Measures of a technical nature:

Provide adequate ventilation, which can be achieved by using good local exhaust-ventilation and a good general exhaust system.

Concentration:	100 %				
Uses:	pH regulator				
Breathing protection:					
PPE:	Particle filter mask				
Characteristics:	«CE» marking, category III. Made of filtering material, it covers nose, mouth and chin.				
CEN standards:	EN 149				
Maintenance:	Check for any tears, defects, etc. before use. Since it is disposable individual protection equipment, it should be replaced after use.				
Observations:	Does not protect worker unless properly adjusted. Follow the manufacturer's instructions regarding suitable use of the equipment.				
Filter Type needed:	P2				
Hand protection:					
PPE:	Non-disposable protective gloves against chemicals.				
Characteristics:	«CE» marking, category III. Check the list of chemicals for which the glove has been tested.				
CEN standards:	EN 374-1, EN 374-2, EN 374-3, EN 420				
Maintenance:	A schedule for the periodical replacement of gloves should be established in order to guarantee their replacement before pollutants permeate them. The use of contaminated gloves could be more dangerous than not using gloves, since the pollutant can gradually accumulate in the glove's material.				
Observations:	They are to be replaced whenever tears, cracks or deformations are observed or when exterior dirt could reduce their strength.				
Material:	PVC (polyvinyl chloride)	Breakthrough time (min.):	> 480	Material thickness (mm):	0,35
Eye protection:					
PPE:	Protective goggles with built-in frame.				
Characteristics:	«CE» marking, category II. Eye protector with built-in frame for protection against dust, smoke, fog and vapour.				
CEN standards:	EN 165, EN 166, EN 167, EN 168				
Maintenance:	Visibility through lenses should be ideal. Therefore, these parts should be cleaned daily. Protectors should be disinfected periodically following the manufacturer's instructions.				
Observations:	Some signs of wear and tear include: yellow colouring of the lenses, superficial scratching of the lenses, scraping etc.				
Skin protection:					
PPE:	Protective clothing.				
Characteristics:	«CE» marking, category II. Protective clothing should not be too tight or loose in order not to obstruct the user's movements.				
CEN standards:	EN 340				
Maintenance:	In order to guarantee uniform protection, follow the washing and maintenance instructions provided by the manufacturer.				
Observations:	The protective clothing should offer a level of comfort in line with the level of protection provided in terms of the hazard against which it protects, bearing in mind environmental conditions, the user's level of activity and the expected time of use.				
PPE:	Work footwear.				
Characteristics:	«CE» marking, category II.				
CEN standards:	EN ISO 13287, EN 20347				
Maintenance:	This product adapts to the first user's foot shape. That is why, as well as for hygienic reasons, it should not be used by other people.				
Observations:	Work footwear for professional use includes protection elements aimed at protecting users against any injury resulting from an accident				

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES.

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9.1 Information on basic physical and chemical properties.

Appearance: Crystalline solid
Colour: White
Odour: Odourless
Odour threshold: N.A./N.A.
pH: 11,17 (0,4%)
Melting point: 851 °C
Boiling Point: N.A./N.A.
Flash point: N.A./N.A.
Evaporation rate: N.A./N.A.
Inflammability (solid, gas): N.A./N.A.
Lower Explosive Limit: N.A./N.A.
Upper Explosive Limit: N.A./N.A.
Vapour pressure: N.A./N.A.
Vapour density: N.A./N.A.
Relative density: 1.05 (20 °C) g/cm³
Solubility: N.A./N.A.
Liposolubility: N.A./N.A.
Hydrosolubility: 215 g/l (20°C)
Partition coefficient (n-octanol/water): N.A./N.A.
Auto-ignition temperature: N.A./N.A.
Decomposition temperature: N.A./N.A.
Viscosity: N.A./N.A.
Explosive properties: N.A./N.A.
Oxidizing properties: No

N.A./N.A. = Not Available/Not Applicable due to the nature of the product

9.2 Other information.

Pour point: N.A./N.A.
Blink: N.A./N.A.
Kinematic viscosity: N.A./N.A.
N.A./N.A. = Not Available/Not Applicable due to the nature of the product

SECTION 10: STABILITY AND REACTIVITY.

10.1 Reactivity.

The product does not present hazards by their reactivity.

10.2 Chemical stability.

Unstable in contact with:
- Acids.

10.3 Possibility of hazardous reactions.

Neutralization can occur on contact with acids.

10.4 Conditions to avoid.

- Avoid contact with acids.

10.5 Incompatible materials.

Avoid the following materials:
- Acids.

10.6 Hazardous decomposition products.

Depending on conditions of use, can be generated the following products:
- Corrosive vapors or gases.

SECTION 11: TOXICOLOGICAL INFORMATION.

IRRITANT MIXTURE. Splatters in the eyes can cause irritation.

11.1 Information on toxicological effects.

Repeated or prolonged contact with the product can cause the elimination of oil from the skin, giving rise to non-allergic contact dermatitis and absorption of the product through the skin.
Splatters in the eyes can cause irritation and reversible damage.

Toxicological information about the substances present in the composition.

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Name	Acute toxicity			
	Type	Test	Kind	Value
sodium carbonate CAS No: 497-19-8 EC No: 207-838-8	Oral	LD50	Rat	2800 mg/kg bw [1]
		[1] Rinehart, WE, Acute Oral Toxicity Study in Rats, Toxicological Resources Unit, Bio/dynamics Inc., May 15, 1978.		
	Dermal	LD50	Rabbit	2000 mg/kg bw [1]
		[1] Rinehart, WE, Acute Dermal Toxicity Study in Rabbits, Toxicological Resources Unit, Bio/dynamics Inc., 1978.		
Inhalation	LC50	Mouse	1.2 mg/l (2 h)	

a) acute toxicity;

Not conclusive data for classification.

b) skin corrosion/irritation;

Not conclusive data for classification.

c) serious eye damage/irritation;

Product classified:

Eye irritation, Category 2: Causes serious eye irritation.

d) respiratory or skin sensitisation;

Not conclusive data for classification.

e) germ cell mutagenicity;

Not conclusive data for classification.

f) carcinogenicity;

Not conclusive data for classification.

g) reproductive toxicity;

Test: Reproductive Toxicity - Route: Oral = 179 mg/kg
sodium carbonate - CAS: 497-19-8

h) STOT-single exposure;

Not conclusive data for classification.

i) STOT-repeated exposure;

Not conclusive data for classification.

j) aspiration hazard;

Not conclusive data for classification.

SECTION 12: ECOLOGICAL INFORMATION.

12.1 Toxicity.

Name	Ecotoxicity			
	Type	Test	Kind	Value
sodium carbonate	Fish	LC50	Lepomis macrochirus	300 mg/L (96 h) [1] [2]

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CAS No: 497-19-8 EC No: 207-838-8		[1] Cairns J, Scheier A (1959). The relationship of bluegill sunfish body size to tolerance for some common chemicals. Proc. 13th Ind. Work. Conf., Purdue Univ., Engineering Bull., 43, 242-253. [2] McKee & Wolf (1963). Water quality criteria. California State Water Resources Control Board. Publication 3-A.
	Aquatic invertebrates	EC50 Ceriodaphnia sp. 200 mg/L (48 h) [1] EC50 Culex sp. 600 mg/L (48 h) [2] [1] Warne MS, Schifko AD (1999). Toxicity of laundry detergent components to a freshwater cladoceran and their contribution to detergent toxicity. Ecotoxicol. Environ. Saf., 44, 196-206. [2] Dowden BF, Bennett HJ (1965). Toxicity of selected chemicals to certain animals. Journal WPCF, 37, 1308-1316.
	Aquatic plants	

12.2 Persistence and degradability.

There is no information available on the degradability of the substances present.
No information is available regarding the degradability of the substances present.No information is available about persistence and degradability of the product.

12.3 Bioaccumulative potential.

No information is available regarding the bioaccumulation of the substances present.

12.4 Mobility in soil.

No information is available about the mobility in soil.
The product must not be allowed to go into sewers or waterways.
Prevent penetration into the ground.

12.5 Results of PBT and vPvB assessment.

No information is available about the results of PBT and vPvB assessment of the product.

12.6 Other adverse effects.

No information is available about other adverse effects for the environment.

SECTION 13 DISPOSAL CONSIDERATIONS.

13.1 Waste treatment methods.

Do not dump into sewers or waterways. Waste and empty containers must be handled and eliminated according to current, local/national legislation.
Follow the provisions of Directive 2008/98/EC regarding waste management.

SECTION 14: TRANSPORT INFORMATION.

Transportation is not dangerous. In case of road accident causing the product's spillage, proceed in accordance with point 6.

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14.1 UN number.

Transportation is not dangerous.

14.2 UN proper shipping name.

Description:

ADR: Transportation is not dangerous.

IMDG: Transportation is not dangerous.

ICAO/IATA: Transportation is not dangerous.

14.3 Transport hazard class(es).

Transportation is not dangerous.

14.4 Packing group.

Transportation is not dangerous.

14.5 Environmental hazards.

Transportation is not dangerous.

14.6 Special precautions for user.

Transportation is not dangerous.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code.

Transportation is not dangerous.

SECTION 15: REGULATORY INFORMATION.

15.1 Safety, health and environmental regulations/legislation specific for the mixture.

The product is not affected by the Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer.

Product classification according to Annex I of Directive 2012/18/EU (SEVESO III): N/A

The product is not affected by Regulation (EU) No 528/2012 concerning the making available on the market and use of biocidal products.

The product is not affected by the procedure established Regulation (EU) No 649/2012, concerning the export and import of dangerous chemicals.

Kind of pollutant to water (Germany): WGK 1: Slightly hazardous to water. (Autoclassified according to the AwSV Regulations)

15.2 Chemical safety assessment.

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

Available Product Exposure Scenario.

SECTION 16: OTHER INFORMATION.

Complete text of the H phrases that appear in section 3:

H319 Causes serious eye irritation.

Classification codes:

Eye Irrit. 2 : Eye irritation, Category 2

It is advisable to carry out basic training with regard to health and safety at work in order to handle this product correctly.

Available Product Exposure Scenario.

Abbreviations and acronyms used:

AwSV: Facility Regulations for handling substances that are hazardous for the water.

CEN: European Committee for Standardization.

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EC50: Half maximal effective concentration.
PPE: Personal protection equipment.
LC50: Lethal concentration, 50%.
LD50: Lethal dose, 50%.
WGK: Water hazard classes.

Key literature references and sources for data:

<http://eur-lex.europa.eu/homepage.html>

<http://echa.europa.eu/>

Regulation (EU) 2015/830.

Regulation (EC) No 1907/2006.

Regulation (EU) No 1272/2008.

The information given in this Safety Data Sheet has been drafted in accordance with COMMISSION REGULATION (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

The information in this Safety Data Sheet on the Preparation is based on current knowledge and on current EC and national laws, as far as the working conditions of the users is beyond our knowledge and control. The product must not be used for purposes other than those that are specified without first having written instructions on how to handle. It is always the responsibility of the user to take the appropriate measures in order to comply with the requirements established by current legislation. The information contained in this Safety Sheet only states a description of the safety requirements for the preparation, and it must not be considered as a guarantee of its properties.

**Exposure Scenario for communication:
ES 1: Manufacturing of sodium carbonate**

0. General information

ES identifier	ES 1
Version no	01
Revision date	28.10.2010
EC #	207-838-8
CAS #	497-19-8

1. Use descriptors

Manufacturing of sodium carbonate

Market sector: SU 3 (Industrial uses)
Sector of use: SU 8 (Manufacture of bulk, large scale chemicals)

Environment: (Environmental Release Category) Manufacture of substances ERC 1

Worker (Process Category -Phrase)

Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9
Potentially closed processing operations with minerals/metals at elevated temperature	PROC 22

Processes, tasks, activities covered

Manufacturing, maintenance, loading, packaging, sampling and monitoring.

2. Conditions of use affecting exposure

2.0 Default Product Characteristics

Physical form of product/article	Solid
Volatility	Not relevant
Dustiness	Medium (PROCs 1, 2, 3, 4, 8a, 8b, 9) Low (PROC 22)

2.1. Control of environmental exposure:

Manufacture of substances – ERC 1

Amounts used		
Annual site tonnage (tonnes/year): up to 1 500 000.		
Frequency and duration of use		
Continuous		
Other given operational conditions affecting environmental exposure		
Not applicable.		
Technical and organizational conditions and measures		
See section 8 of Safety data sheet.		
Conditions and measures related to municipal sewage treatment plant		
Wastewater streams from sodium carbonate production sites contain inorganic substances and are therefore not treated in sewage treatment plants.		
Conditions and measures related to external treatment of waste		
In Chapter 2.3.5 of the Reference Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Solids and Others Industry (EC, 2007) two types of solid waste, generated during the manufacturing of sodium carbonate, are discussed. Both types of solid waste originate from raw materials and the concentration of sodium carbonate in the solid waste is negligible. For this reason specific waste related measures are not needed.		
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)		
See sections 6 and 13 of Safety Data Sheet		
2.2. Control of workers exposure		
Valid for PROCs 1, 2, 3, 4, 8a, 8b, 9, 22.		
Amounts used, frequency and duration of use		
Amounts used	Not Relevant Parameter does not influence exposure estimations for this ES	
Frequency and duration of use	Daily 8h/day	
Technical and organizational conditions and measures		
See section 8 of Safety Data Sheet. Ensure workers are trained to minimize exposures.		
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)		
See sections 7 and 8 of Safety Data Sheet		
3. Exposure estimation and reference to its source		
3.1 Environment exposure estimation and reference to its source		
The table below gives the summary of the environment exposure estimation made in the Chemical Safety Report, referring to Document on Best Available Techniques for the Manufacture of Large Volume Inorganic Chemicals - Solids and Others Industry.		
Compartments	Measured release (kg/d)	Explanation / source of measured data
Aquatic	Negligible	Reference Document on Best Available Techniques (EC, 2007)
Air (direct)	2.2 - 118	
Soil (direct only)	Negligible	Reference Document on Best Available Techniques (EC, 2007)

3.2 Workers exposure estimation and reference to its source

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Production of sodium carbonate: long-term exposure concentrations to workers

Routes of exposure	Exposure concentrations (mg/m ³)	Explanation / source of measured data (Characteristics, Duration, Frequency, OC and RMM described above)
Modeled exposure data		
Dermal exposure	Not relevant	No assessment for dermal exposure because of no local skin effects and no systemic availability after dermal contact.
Inhalation exposure	0.01	ECETOC TRA V2. PROC 1
	0.5	ECETOC TRA V2. PROC 2
	1	ECETOC TRA V2. PROC 3
	5	ECETOC TRA V2. PROC 4
	5	ECETOC TRA V2. PROC 8a
	5	ECETOC TRA V2. PROC 8b
	5	ECETOC TRA V2. PROC 9
	1	ECETOC TRA V2. PROC 22
Measured exposure data		
Inhalation exposure	7.9	An extensive set (in total: 698 observations) of worker exposure data from 4 sites that manufacture sodium carbonate. Measurements are representative for a workday of 8 hours.

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

4.1 Environment.

Not Applicable: this scenario does not concern DU.

4.2 Health.

Not Applicable: this scenario does not concern DU.

Substance: Sodium Carbonate ; EC : 207-838-8 ; CAS : 497-19-8

Exposure Scenario for communication:
ES 2: Glass production

0. General information

ES identifier	ES 2
Version no	01
Revision date	28.10.2010
EC #	207-838-8
CAS #	497-19-8

1. Use descriptors

Glass Production

Market sector: SU 3 (Industrial uses)
Sector of use: SU 3 (Industrial uses)

Environment: (Environmental Release Category) Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6a

Worker (Process Category -Phrase)

Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Potentially closed processing operations with minerals/metals at elevated temperature	PROC 22
Open processing and transfer operations with minerals/metals at elevated temperature	PROC 23
Handling of solid inorganic substances at ambient temperature.	PROC 26

Processes, tasks, activities covered

Manufacturing, maintenance, loading, packaging, sampling and monitoring.

2. Conditions of use affecting exposure

2.0 Default Product Characteristics

Physical form of product/article	Solid
Volatility	Not relevant

Dustiness	Medium (PROCs 1, 2, 3, 4, 8a, 8b, 26) High (PROCs 22 and 23)
Mixture Article Concentration	
For PROCs 1, 2, 3, 4, 8a, 8b and 26 the neat substance is taken into account, because the neat substance is transferred to the process. Percentage of 5-25% sodium carbonate in the mixture during the melting process is assumed.	
2.1. Control of environmental exposure:	
Use as intermediate: industrial use resulting in manufacture of another substance.	
Amounts used	
Up to 200 000 tonnes/year.	
Frequency and duration of use	
Continuous.	
Other given operational conditions affecting environmental exposure	
The impact of glass manufacturing on the environment has been described extensively in the Reference Document on Best Available Techniques in the Glass Manufacturing Industry (EC, 2001). The document was established in the context of the EU Directive on Integrated Pollution Prevention and Control (Directive 96/61/EC).	
Technical and organizational conditions and measures	
See section 8 of Safety Data Sheet. In case of dust formation, use filter to reduce atmospheric emissions.	
Conditions and measures related to municipal sewage treatment plant	
Wastewater streams of the glass industry do not contain sodium carbonate as it is stored in covered silos and not linked to internal sewage systems. For this reason an emission assessment for the sewage treatment plant is not needed for the industrial end use of sodium carbonate in the glass industry.	
Conditions and measures related to external treatment of waste	
No specific waste related measures are to be defined.	
Additional good practice advice beyond the REACH CSA	
See sections 6 and 13 of Safety Data Sheet	
2.2. Control of workers exposure	
Valid for PROCs 1, 2, 3, 4, 8a, 8b, 9, 22, 26.	
Amounts used, frequency and duration of use	
Amounts used	Not Relevant Parameter does not influence exposure estimations for this ES
Frequency and duration of use	Daily 8h/day
Technical and organisational conditions and measures	
See section 8 of Safety Data Sheet	
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)	
See sections 7 and 8 of Safety Data Sheet	
3. Exposure estimation and reference to its source	
3.1 Environment exposure estimation and reference to its source	

The table below gives the summary of the environment exposure estimation made in the Chemical Safety Report, referring to Document on Best Available Techniques in the Glass Manufacturing Industry (EC, 2001).

Compartments	Measured release (kg/d)	Explanation / source of measured data
Aquatic	Negligible	Reference Document on Best Available Techniques (EC, 2001)
Air (direct)	Negligible	Reference Document on Best Available Techniques (EC, 2001)
Soil (direct only)	Negligible	Reference Document on Best Available Techniques (EC, 2001)

3.2 Workers exposure estimation and reference to its source

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Glass production: long-term exposure concentrations to workers

Routes of exposure	Estimated exposure concentrations (mg/m ³)	Explanation / source of measured data (Characteristics, Duration, Frequency, OC and RMM described above)
Dermal exposure	Not relevant	No assessment for dermal exposure because of no local skin effects and no systemic availability after dermal contact.
Inhalation exposure	0.01	ECETOC TRA V2. PROC 1
	0.5	ECETOC TRA V2. PROC 2
	1	ECETOC TRA V2. PROC 3
	5	ECETOC TRA V2. PROC 4
	5	ECETOC TRA V2. PROC 8a
	5	ECETOC TRA V2. PROC 8b
	1	ECETOC TRA V2. PROC 22a
	1	ECETOC TRA V2. PROC 23a

PROC26 is not foreseen in ECETOC TRA but it involves activities which are described by PROC 8a and 8b. Therefore the calculation with PROC 8a and 8b covers PROC 26.

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

4.1 Environment.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

4.2 Health.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Substance: Sodium Carbonate ; EC : 207-838-8 ; CAS : 497-19-8	
Exposure Scenario for communication: ES 3: Formulation	
0. General information	
ES identifier	ES 3
Version no	01
Revision date	28.10.2010
EC #	207-838-8
CAS #	497-19-8
1. Use descriptors	
Formulation	
Market sector: SU 3 (Industrial uses) Sector of use: SU 10 (Formulation [mixing] of preparations and/or re-packaging (excluding alloys))	
Environment: (Environmental Release Category) Formulation of preparations	ERC 2
Worker (Process Category -Phrase)	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	PROC 5
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9
Production of preparations or articles by tableting, compression, extrusion, pelletisation	PROC 14
Use as laboratory reagent	PROC 15
Processes, tasks, activities covered storage, materials transfers, mixing, maintenance, sampling and associated laboratory activities.	
2. Conditions of use affecting exposure	
2.0 Default Product Characteristics	
Physical form of product/article	Solid
Volatility	Not relevant
Dustiness	Medium
Mixture Article Concentration Not relevant: for exposure estimation the neat substance is taken into account, because the neat substance is added to the formulation process.	

2.1. Control of environmental exposure:		
Formulation of preparations – ERC 2 SPERC (AISE, 2010E) are also used (http://www.aise.eu/reach/exposureass_sub4.htm).		
Amounts used		
Up to 5 000 tonnes/year		
Frequency and duration of use		
Continuous		
Other given operational conditions affecting environmental exposure		
See sections 8 and 13 of Safety Data Sheet		
Technical and organizational conditions and measures		
In case of dust formation, use filter to reduce atmospheric emissions.		
Conditions and measures related to municipal sewage treatment plant		
Control the pH of the liquid effluent if the effluent is sent to STP.		
Conditions and measures related to external treatment of waste		
No specific waste related measures are to be defined.		
Additional good practice advice beyond the REACH CSA		
See sections 6 and 13 of Safety Data Sheet		
2.2. Control of workers exposure		
Valid for PROCs 1, 2, 3, 5, 4, 8a, 8b, 9, 14, 15.		
Amounts used, frequency and duration of use		
Amounts used	Not Relevant Parameter does not influence exposure estimations for this ES	
Frequency and duration of use	Daily 8h/day	
Technical and organisational conditions and measures		
See section 8 of Safety Data Sheet		
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)		
See sections 7 and 8 of Safety Data Sheet		
3. Exposure estimation and reference to its source		
3.1 Environment exposure estimation and reference to its source		
The table below gives the summary of the environment exposure estimation made in the Chemical Safety Report and in Specific Environmental Release Categories (SPERC) (AISE, 2010):		
Compartments	Measured release (kg/d)	Explanation / source of data
Aquatic	Negligible	
Air (direct)	2.7	Specific Environmental Release Categories (SPERC) (AISE, 2010)
Soil (direct only)	Negligible	Specific Environmental Release Categories (SPERC) (AISE, 2010)

3.2 Workers exposure estimation and reference to its source

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Formulation: long-term exposure concentrations to worker

Routes of exposure	Estimated exposure concentrations (mg/m ³)	Explanation / source of measured data (Characteristics, Duration, Frequency, OC and RMM described above)
Dermal exposure	Not relevant	No assessment for dermal exposure because of no local skin effects and no systemic availability after dermal contact.
Inhalation exposure	0.01	ECETOC TRA V2. PROC 1
	0.5	ECETOC TRA V2. PROC 2
	1	ECETOC TRA V2. PROC 3
	5	ECETOC TRA V2. PROC 4
	5	ECETOC TRA V2. PROC 5
	5	ECETOC TRA V2. PROC 8a
	5	ECETOC TRA V2. PROC 8b
	5	ECETOC TRA V2. PROC 9
	1	ECETOC TRA V2. PROC 14
	0.5	ECETOC TRA V2. PROC 15

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

4.1 Environment.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

4.2 Health.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Substance: Sodium Carbonate ; EC : 207-838-8 ; CAS : 497-19-8

Exposure Scenario for communication:
ES 4: Other industrial and professional uses

0. General information

ES identifier	ES 4
Version no	01
Revision date	28.10.2010
EC #	207-838-8
CAS #	497-19-8

1. Use descriptors

1.1 Industrial end uses

Market sector: SU 3 (Industrial uses)
Sector of use: No restriction (SUs 0-20, 23, 24)

Environment: (Environmental Release Category)

Formulation of preparations	ERC 4
Industrial use resulting in inclusion into or onto a matrix	ERC 5
Industrial use resulting in manufacture of another substance (use of intermediates)	ERC 6a
Industrial use of reactive processing aids	ERC 6b
Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers	ERC 6d
Industrial use of sub-stances in closed systems	ERC 7

Worker (Process Category -Phrase)

Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2
Use in closed batch process (synthesis or formulation)	PROC 3
Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Spraying in industrial settings and applications	PROC 7
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9

Roller application or brushing of adhesive and other coating	PROC 10
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Lubrication at high energy conditions and in partly open process	PROC 17
Greasing at high energy conditions	PROC 18
Hand-mixing with intimate contact and only PPE available	PROC 19
Potentially closed processing operations with minerals/metals at elevated temperature. The process temperature is higher than the melting point (High fugacity)	PROC 22
Open processing and transfer operations with minerals/metals at elevated temperature. The process temperature is higher than the melting point (High fugacity)	PROC 23
Handling of solid inorganic substances at ambient temperature	PROC 26
Processes, tasks, activities covered: Manufacturing, mixing, maintenance, loading, packaging, sampling and monitoring.	
1.2 Professional end uses	
Market sector: SU 22 (Professional uses) Sector of use: SU 22 (Professional uses)	
Environment: (Environmental Release Category)	
Wide dispersive indoor use of processing aids in open systems	ERC 8a
Wide dispersive indoor use of reactive substances in open systems	ERC 8b
Wide dispersive indoor use resulting in inclusion into or onto a matrix	ERC 8c
Wide dispersive outdoor use of processing aids in open systems	ERC 8d
Wide dispersive outdoor use of reactive substances in open systems	ERC 8e
Wide dispersive outdoor use resulting in inclusion into or onto a matrix	ERC 8f
Wide dispersive indoor use of substances in closed systems	ERC 9a
Wide dispersive outdoor use of substances in closed systems	ERC 9b
Worker (Process Category -Phrase)	
Use in closed process, no likelihood of exposure	PROC 1
Use in closed, continuous process with occasional controlled exposure	PROC 2

Use in batch and other process (synthesis) where opportunity for exposure arises	PROC 4
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities	PROC 8a
Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	PROC 8b
Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	PROC 9
Roller application or brushing of adhesive and other coating	PROC 10
Non industrial spraying	PROC 11
Treatment of articles by dipping and pouring	PROC 13
Use as laboratory reagent	PROC 15
Hand-mixing with intimate contact and only PPE available	PROC 19
Processes, tasks, activities covered Manufacturing, mixing, maintenance, loading, packaging, sampling and monitoring.	
2. Conditions of use affecting exposure	
2.0 Default Product Characteristics	
Physical form of product/article	Solid
Volatility	Not relevant
Dustiness	Medium (PROCs 1, 2, 3, 4, 8a, 8b, 9, 15, 19) High (PROCs 22 and 23)
2.1. Control of environmental exposure:	
Industrial end uses: ERC4, ERC5, ERC 6a/6b/6d, ERC 7. Professional end uses: ERC 8a/8b/8c/8d/8e/8f; ERC 9a/9b.	
Amounts used	
Industrial use up to 100 000 tonnes/year. Professional use much lower	
Frequency and duration of use	
Up to continuous.	
Other given operational conditions affecting environmental exposure	
See sections 8 and 13 of Safety Data Sheet	
Technical and organizational conditions and measures	
In case of dust formation, use filter to reduce atmospheric emissions.	
Conditions and measures related to municipal sewage treatment plant	
Control the pH of the liquid effluent if the effluent is sent to STP.	
Conditions and measures related to external treatment of waste	
No specific waste related measures are to be defined.	
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)	

See sections 6 and 13 of Safety Data Sheet

2.2. Control of workers exposure

Valid for PROC 1-4, 7, 8a, 8b, 9, 10, 11, 13, 15, 17, 18, 19, 22, 23, 26.

Amounts used, frequency and duration of use

Amounts used	Not Relevant Parameter does not influence exposure estimations for this ES
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Frequency and duration of use (Exposure Frequency Duration)

Operational conditions related to the duration of use	Process Category	Industrial (Data Field)	Professional (Data Field)
Duration of exposure per day at workplace [for one worker]	PROC 1		Less than 15 min/day
	PROC 2		Less than 15 min/day
	PROC 3	> 4 hours/day (liquid mixture)	
	PROC 4		> 4 hours/day
	PROC 7	> 4 hours/day (liquid mixture)	
	PROC 8a		15 min/day to 1 hour/day
	PROC 8b		15 min/day to 1 hour/day
	PROC 9	> 4 hours/day (liquid mixture)	
	PROC 10		> 4 hours/day
	PROC 11		> 4 hours/day
	PROC 13		15 min/day to 1 hour/day
	PROC 15		15 min/day to 1 hour/day
	PROC 17	> 4 hours/day (liquid mixture)	
	PROC 18	> 4 hours/day (liquid mixture)	
PROC 19		15 min/day to 1 hour/day	

PROC26 is not foreseen in ECETOC TRA but it involves activities which are described by PROC 8a and 8b. Therefore the calculation with PROC 8a and 8b covers PROC 26.

Technical and organisational conditions and measures

See section 8 of Safety Data Sheet.

Additional good practice advice beyond the REACH CSR (Chemical Safety Report)

See sections 7 and 8 of Safety Data Sheet

3. Exposure estimation and reference to its source

3.1 Environment exposure estimation and reference to its source

The table below gives the summary of the environment exposure estimation made in the Chemical Safety Report:

Compartments	Measured release (kg/d)
Aquatic	Negligible
Air (direct)	Small releases might be possible
Soil (direct only)	Negligible in all cases except agricultural use Max application use rates of soda ash as co-formulant in plant protection products: Professional agricultural: 0.0126 kg/ ha (tier 1 default use rate: 1 kg/ ha)

3.2 Workers exposure estimation and reference to its source

The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.

Routes of exposure	Explanation / source of measured data (Characteristics, Duration Frequency, OC and RMM described above)	Industrial estimated exposure concentrations (mg/m ³)	Professional estimated Exposure concentrations (mg/m ³)
Dermal exposure	No local effects and no systemic availability after dermal contact	Not relevant	Not relevant
Inhalation exposure	PROC 1	0.01	0.0044 (liquid) 0.001 (solid)
	PROC 2	0.5 (solid)	0.044 (liquid) 0.1 (solid)
	PROC 3	1 (solid)	0.044 (liquid)
	PROC 4	5	0.044 (liquid) 5 (solid)
	PROC 7	0.022	
	PROC 8a	5	0.088 (liquid) 1 (solid)
	PROC 8b	5 (solid)	0.088 (liquid)
	PROC 9	5 (solid)	0.044 (liquid)
	PROC 10		0.44 (liquid mixture only)
	PROC 11		0.44 (liquid mixture only)
	PROC 13		0.088 (liquid mixture only)
	PROC 15	5 (solid)	0.088 (liquid mixture only)
	PROC 17	0.022 (liquid mixture only)	
	PROC 18	0.022 (liquid mixture)	
	PROC 19	5	0.088 (liquid) 1 (solid)
	PROC 22	1	
	PROC 23	1	
	Professional agricultural with solid mixture, outdoor, no PPE (ECPA OWB Tier 1: default use rate)		0.142 (solid)

PROC 26 is not foreseen in ECETOC TRA but it involves activities which are described by PROC 8a and 8b. Therefore the calculation with PROC 8a and 8b covers PROC 26.

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

4.1 Environment.
Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.
4.2 Health.
Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

Substance: Sodium Carbonate ; EC : 207-838-8 ; CAS : 497-19-8	
Exposure Scenario for communication: ES 5: Consumer use	
0. General information	
ES identifier	ES 5
Version no	01
Revision date	28.10.2010
EC #	207-838-8
CAS #	497-19-8
1. Use descriptor	
Consumer use	
Market sector: SU 21 Consumer uses: Private households (= general public = consumers) Sector of use: SU 21 Consumer uses: Private households (= general public = consumers)	
Environment: Environmental Release Category: ERC 8 a/b/c/d/e/f; ERC 9 a/b.	
Product Category (PC): No restriction (from PC 0 to PC 40)	
Process Category: Not applicable	
Processes, tasks, activities covered Cleaning activities	
2. Conditions of use affecting exposure	
2.0 Default Product Characteristics	
Physical form of product/article	Solid or dissolved in water
Volatility	Not relevant
Dustiness	Medium for powdered detergents, low for household soda
Mixture Article Concentration Laundry detergents and surface cleaners: 30% Machine dish washing tablets: 45% Household soda (pure sodium carbonate decahydrate) : 37% content of sodium carbonate Surface cleaning sprays: 10% Air care products: 5% (PC 3) Furniture, floor and leather care: 10% (PC 31)	
2.1. Control of environmental exposure:	
Consumer use – ERC 8 a/b/c/d/e/f; ERC 9 a/b.	
Amounts used	
Not relevant as the exposure is estimated to be negligible	
Frequency and duration of use	
Not relevant as the exposure is estimated to be negligible	
Other given operational conditions affecting environmental exposure	

See sections 8 and 13 of Safety Data Sheet													
Technical and organizational conditions and measures													
See section 8 of Safety Data Sheet													
Conditions and measures related to municipal sewage treatment plant													
See section 13 of Safety Data Sheet													
Conditions and measures related to external treatment of waste													
See section 13 of Safety Data Sheet													
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)													
See sections 6 and 13 of Safety Data Sheet													
2.2. Control of consumers exposure													
Amounts used, frequency and duration of use													
Amounts used	Household soda: 37 g/l (worst case)												
Frequency and duration of use	Household soda: one time per week (frequency) and 5 min (duration) (worst case)												
Technical and organisational conditions and measures													
<i>Keep out of reach of children and avoid contact with eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.</i>													
Additional good practice advice beyond the REACH CSR (Chemical Safety Report)													
See sections 7 and 8 of Safety Data Sheet													
3. Exposure estimation and reference to its source													
3.1 Environment exposure estimation and reference to its source													
<p>The table below gives the summary of the environment exposure estimation made in the Chemical Safety Report, referring to HERA (2005a) and to Specific Environmental Release Categories (SPERC) (AISE, 2010).</p> <table border="1"> <thead> <tr> <th>Compartments</th> <th>Measured release (kg/d)</th> <th>Explanation / source of measured data</th> </tr> </thead> <tbody> <tr> <td>Aquatic</td> <td>Negligible</td> <td>HERA (2005a); see section 9.5.2.3.2</td> </tr> <tr> <td>Air (direct)</td> <td>Negligible</td> <td>Specific Environmental Release Categories (SPERC) (AISE, 2010)</td> </tr> <tr> <td>Soil (direct only)</td> <td>Negligible</td> <td>Specific Environmental Release Categories (SPERC) (AISE, 2010)</td> </tr> </tbody> </table>		Compartments	Measured release (kg/d)	Explanation / source of measured data	Aquatic	Negligible	HERA (2005a); see section 9.5.2.3.2	Air (direct)	Negligible	Specific Environmental Release Categories (SPERC) (AISE, 2010)	Soil (direct only)	Negligible	Specific Environmental Release Categories (SPERC) (AISE, 2010)
Compartments	Measured release (kg/d)	Explanation / source of measured data											
Aquatic	Negligible	HERA (2005a); see section 9.5.2.3.2											
Air (direct)	Negligible	Specific Environmental Release Categories (SPERC) (AISE, 2010)											
Soil (direct only)	Negligible	Specific Environmental Release Categories (SPERC) (AISE, 2010)											
3.2 Consumers exposure estimation and reference to its source													
<p>Exposures have been calculated with the software tool REACT (Reach Exposure Assessment Consumer Tool) Long-term dermal exposure to consumers:</p> <table border="1"> <thead> <tr> <th>Product category</th> <th>Ingredient fraction by weight</th> <th>Estimated uptake value (mg/kg bw per day)</th> </tr> </thead> <tbody> <tr> <td>Laundry regular (AISE C1, PC35), Powder</td> <td>0.3</td> <td>1.56E-02</td> </tr> <tr> <td>Laundry regular (AISE C1, PC35), Liquid</td> <td>0.3</td> <td>2.29E-02</td> </tr> </tbody> </table>		Product category	Ingredient fraction by weight	Estimated uptake value (mg/kg bw per day)	Laundry regular (AISE C1, PC35), Powder	0.3	1.56E-02	Laundry regular (AISE C1, PC35), Liquid	0.3	2.29E-02			
Product category	Ingredient fraction by weight	Estimated uptake value (mg/kg bw per day)											
Laundry regular (AISE C1, PC35), Powder	0.3	1.56E-02											
Laundry regular (AISE C1, PC35), Liquid	0.3	2.29E-02											

Laundry compact (AISE C2, PC35), Powder	0.3	1.60E-02
Laundry compact (AISE C2, PC35), Liquid/Gel	0.3	2.29E-02
Laundry additives (AISE C4, PC35), Liquid Bleach	0.3	2.21E-02
Hand Dishwashing (AISE C5, PC35)	0.3	3.12E-04
Surface cleaners (AISE C7, PC35), Gel	0.3	4.29E-02

The negligible inhalation has been confirmed for the laundry washing scenario reported by HERA (2005a).

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

4.1 Environment.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.

4.2 Health.

Predicted exposures are not expected to exceed the DNEL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.