ConnectingChemistry

BRENNTAG

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

Aluminium Sulphate Solid/Ground

Version 5.1 Print Date 2020/04/02

Revision date / valid from 2020/04/02 **MSDS code: MALS100**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name	:	Aluminium Sulphate Solid/Ground
Substance name	:	Aluminium sulphate
CAS-No.	:	10043-01-3
EC-No.	:	233-135-0
EU REACH-Reg. No.	:	01-2119531538-36-xxxx

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

Use of the Substance/Mixture	:	At this time we do not yet have information on identified uses. They will be included in this safety data sheet when available.
Uses advised against	:	At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company	:	Brenntag UK Limited Alpha House, Lawnswood Business Park GB LS16 6QY Leeds
Telephone	:	+44 (0) 113 3879 200
Telefax	:	+44 (0) 113 3879 280
E-mail address	:	msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number	:	Emergency only telephone number (open 24 hours): +44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	**Hazard category**	**Target Organs**	**Hazard statements**
Serious eye damage/eye irritation	Category 1	---	H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health	:	See section 11 for toxicological information.
Physical and chemical hazards	:	See section 9/10 for physicochemical information.
Potential environmental effects	:	See section 12 for environmental information.

2.2. Label elements

Labelling according to Regulation (EC) No 1272/2008

Hazard symbols :



Signal word	:	Danger	
Hazard statements	:	H318	Causes serious eye damage.
Precautionary statements			
General	:	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.
		P310	Immediately call a POISON CENTER/doctor.

Additional Labelling:

EUH210 Safety data sheet available on request.

Hazardous components which must be listed on the label:

- Aluminium sulphate

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.1. Substances

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
Aluminium sulphate CAS-No. : 10043-01-3 EC-No. : 233-135-0 EU REACH-Reg. No. : 01-2119531538-36-xxxx	< 100	Eye Dam.1	H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General advice : Take off all contaminated clothing immediately.

If inhaled : Remove to fresh air. If symptoms call a physician. If breathing is irregular or stopped, administer artificial respiration. If unconscious place in recovery position.

In case of skin contact : Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.

In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 5 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.

If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.

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

Symptoms : See Section 11 for more detailed information on health effects and symptoms.

Effects : See Section 11 for more detailed information on health effects and symptoms.

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

Treatment : Treat symptomatically.
No further information available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable extinguishing media	:	High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting	:	Incomplete combustion may form toxic pyrolysis products.

5.3. Advice for firefighters

Special protective equipment for firefighters	:	In the event of fire, wear self-contained breathing apparatus.Wear personal protective equipment.
Further advice	:	Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Use personal protective equipment. Avoid contact with skin and eyes. Do not breathe vapours or spray mist. For personal protection see section 8.

6.2. Environmental precautions

Environmental precautions	:	Do not flush into surface water or sanitary sewer system.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up	:	Use mechanical handling equipment. Keep in suitable, closed containers for disposal.
	:	Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.
Further information	:	Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

For personal protection see section 8.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling	:	Keep container tightly closed. Avoid formation of aerosol. Do not breathe vapours or spray mist. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.
Hygiene measures	:	Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately. Provide adequate ventilation. Avoid contact with the skin and the eyes.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers	:	Keep only in the original container.
Advice on protection against fire and explosion	:	Normal measures for preventive fire protection.
Further information on storage conditions	:	Keep tightly closed in a dry and cool place. Keep away from heat.
Advice on common storage	:	Keep away from food, drink and animal feedingstuffs.

7.3. Specific end use(s)

Specific use(s)	:	No information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Other Occupational Exposure Limit Values		
(Additional) Information	:	Contains no substances with occupational exposure limit values.

Component:	Aluminium sulphate	CAS-No. 10043-01-3
Other Occupational Exposure Limit Values		

UK. EH40 Workplace Exposure Limits (WELs), as amended, Time Weighted Average (TWA):
2 mg/m3

ELV (IE), Time Weighted Average (TWA):
2 mg/m3

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice	:	Required, if exposure limit is exceeded (e.g. OEL).

Hand protection

Advice	:	The glove material has to be impermeable and resistant to the product / the substance / the preparation. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact). Protective gloves should be replaced at first signs of wear.

Eye protection

Advice	:	Tightly fitting safety goggles

Skin and body protection

Advice	:	Wear personal protective equipment.

Environmental exposure controls

General advice	:	Do not flush into surface water or sanitary sewer system.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form	:	powder granules
Colour	:	white
Odour	:	not significant
Odour Threshold	:	no data available
pH	:	no data available
Melting point/range	:	120 - 140 °C
Boiling point/boiling range	:	770 °C yes

Flash point	:	no data available
Evaporation rate	:	no data available
Flammability (solid, gas)	:	no data available
Upper explosion limit	:	no data available
Lower explosion limit	:	no data available
Vapour pressure	:	no data available
Relative vapour density	:	no data available
Density	:	1.61 g/cm3
Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	no data available
Auto-ignition temperature	:	no data available
Thermal decomposition	:	no data available
Viscosity, dynamic	:	no data available
Explosivity	:	no data available
Oxidizing properties	:	no data available

9.2. Other information

No further information available.

SECTION 10: Stability and reactivity

10.1. Reactivity

Advice : No information available.

10.2. Chemical stability

Advice : Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : No information available.

10.4. Conditions to avoid

Conditions to avoid : Avoid dust formation.

10.5. Incompatible materials

Materials to avoid : alkalis

10.6. Hazardous decomposition products

Hazardous decomposition products : Sulphur oxides, Heating may cause toxic fumes

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Data for the product		
Acute toxicity		
Oral		
LD50	:	> 2000 mg/kg (Rat)
Dermal		
LD50 Dermal	:	> 2000 mg/kg (Rat)
Irritation		
Eyes		
Result	:	Risk of serious damage to eyes. Dust in the eyes may cause mechanical irritation.
Sensitisation		
Result	:	No sensitizing effect known.

Component:	**Aluminium sulphate**	**CAS-No. 10043-01-3**
Acute toxicity		
Oral		
LD50 Oral	:	> 2000 mg/kg (Rat, male and female) (OECD Test Guideline 401)
Dermal		
LD50 Dermal	:	> 5000 mg/kg (Rabbit, male and female) (OECD Test Guideline 402)
Irritation		
Eyes		
Result	:	Irreversible damage. (Rabbit) (OECD - Guideline 405)
Sensitisation		

Result	:	not sensitizing (Maximisation Test; Dermal; Guinea pig) (OECD Test Guideline 406)Read-across (Analogy)

SECTION 12: Ecological information

12.1. Toxicity

Data for the product		
Acute toxicity		
Fish		
LC50	:	>= 1,000 mg/l (Danio rerio; 96 h) (Toxicity to fish)
NOEC		>= 1,000 mg/l (Danio rerio; 96 h)
Toxicity to daphnia and other aquatic invertebrates		
EC50	:	>= 160 mg/l (Daphnia (water flea); 48 h) (Immobilization)

Component:	Aluminium sulphate	CAS-No. 10043-01-3
Acute toxicity		
Fish		
LC50	:	> 562 mg/l (Danio rerio (zebra fish); 96 h) (semi-static test; OECD Test Guideline 203)
NOEC		> 562 mg/l (Danio rerio (zebra fish); 96 h) (semi-static test; OECD Test Guideline 203)
LC50		> 0.247 mg/l (Danio rerio (zebra fish); 96 h; Test substance: Aluminium) (semi-static test; OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates		
EC50	:	> 90 mg/l (Daphnia magna (Water flea); 48 h) (semi-static test; OECD Test Guideline 202)
NOEC		> 90 mg/l (Daphnia magna (Water flea); 48 h) (semi-static test; OECD Test Guideline 202)
EC50		> 0.176 mg/l (Daphnia magna (Water flea); 48 h; Test substance: Aluminium) (semi-static test; OECD Test Guideline 202)

12.2. Persistence and degradability

Data for the product
Persistence and degradability
Biodegradability

Result : Not readily biodegradable.

12.3. Bioaccumulative potential

12.4. Mobility in soil

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

Data for the product
Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.

Contaminated packaging : Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.

European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information

Not dangerous goods for ADR, RID, IMDG and IATA.

14.1. UN number

Not applicable.

14.2. UN proper shipping name

Not applicable.

14.3. Transport hazard class(es)

Not applicable.

14.4. Packaging group

Not applicable.

14.5. Environmental hazards

Not applicable.

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information

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

15.2. Chemical safety assessment

no data available

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H318 Causes serious eye damage.

Abbreviations and Acronyms

BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration

LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references and sources for data	:	Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
Methods used for product classification	:	The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	:	The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	:	The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship. The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

Aluminium Sulphate Solid/Ground

No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance (fine powder, high dustiness)	3	8, 9	NA	1, 2, 3, 4, 8b, 15	1	NA	ES8390
2	Manufacture of substance (granules, low dustiness)	3	8, 9	NA	1, 2, 3, 4, 8b, 15	1	NA	ES8392
3	Use as an intermediate (solid) (high dustiness)	3	6b, 8, 9, 14	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 4, 5, 6a	NA	ES8509
4	Use as an intermediate (solid) (low dustiness)	3	6b, 8, 9, 14	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 4, 5, 6a	NA	ES8511
5	Formulation & (re)packing (solid) (high dustiness)	3	10	NA	1, 2, 3, 4, 8a, 8b, 9, 14, 15, 19	2	NA	ES8405
6	Formulation & (re)packing (solid) (low dustiness)	3	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15, 19	2	NA	ES8407
7	Use in spraying formulations (solid) (high dustiness)	3	5, 6b, 7	NA	1, 2, 3, 5, 7, 8a, 8b, 9, 19	3, 4, 5, 6a, 6b	NA	ES8536
8	Use in spraying formulations (solid) (low dustiness)	3	5, 6b, 7	NA	1, 2, 3, 5, 7, 8a, 8b, 9, 19	3, 4, 5, 6a, 6b	NA	ES8537
9	Use in non - spraying formulations (solid) (high dustiness)	3	1, 5, 6b, 7, 13, 19	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 13, 14, 15, 19	2, 3, 4, 5, 6a, 6b	NA	ES8583
10	Use in non - spraying formulations (solid) (low dustiness)	3	1, 5, 6b, 7, 13, 19	NA	1, 2, 3, 4, 5, 6, 8a, 8b, 9, 10, 13, 14, 15, 19	2, 3, 4, 5, 6a, 6b	NA	ES8587
11	Use in spraying formulations (solid) (high dustiness)	22	5, 6b, 7	NA	1, 2, 3, 5, 8a, 8b, 9, 11, 19	8a, 8b, 8c, 8f	NA	ES8541
12	Use in spraying formulations (solid) (low dustiness)	22	5, 6b, 7	NA	1, 2, 3, 5, 8a, 8b, 9, 11, 19	8a, 8b, 8c, 8f	NA	ES11013
13	Use in non - spraying formulations (solid) (high dustiness)	3	1, 5, 6b, 7, 13, 19	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 13, 14, 15, 19	2, 3, 4, 5, 6a, 6b	NA	ES8583
14	Use in non - spraying formulations (solid) (low dustiness)	3	1, 5, 6b, 7, 13, 19	NA	1, 2, 3, 4, 5, 6, 8a, 8b, 9, 10, 13, 14, 15, 19	2, 3, 4, 5, 6a, 6b	NA	ES8587
15	Use in laboratories (solid) (high dustiness)	3	NA	NA	15	4	NA	ES8620
16	Use in laboratories (solid) (low dustiness)	3	NA	NA	15	4	NA	ES8624
17	Use in laboratories (solid) (high dustiness)	22	9	NA	15	8a	NA	ES8622
18	Use in laboratories (solid) (low dustiness)	22	9	NA	15	8a	NA	ES10638

19	Use as water treatment chemicals (solid) (high dustiness)	3	2, 5, 6b, 10, 23	NA	2, 3, 4, 5, 8a, 8b, 9, 19	2, 4, 6b	NA	ES10702
20	Use as water treatment chemicals (solid) (low dustiness)	3	2, 5, 6b, 10, 23	NA	2, 3, 4, 5, 8a, 8b, 9, 19	2, 4, 6b	NA	ES8616
21	Use as water treatment chemicals (solid) (high dustiness)	22	2, 5, 6b, 10, 23	NA	2, 3, 4, 5, 8a, 8b, 9, 19	8a, 8b, 8d	NA	ES10704
22	Use as water treatment chemicals (solid) (low dustiness)	22	2, 5, 6b, 10, 23	NA	2, 3, 4, 5, 8a, 8b, 9, 19	8a, 8b, 8d	NA	ES11009
23	Use as a process chemical (solid) (high dustiness)	3	6b, 8, 9, 14	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 4, 5, 6a	NA	ES8500
24	Use as a process chemical (solid) (low dustiness)	3	6b, 8, 9, 14	NA	1, 2, 3, 4, 8a, 8b, 9, 15	1, 2, 4, 5, 6a	NA	ES8502

1. Short title of Exposure Scenario 1: Manufacture of substance (fine powder, high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC1: Manufacture of substances	
2.1 Contributing scenario controlling environmental exposure for: ERC1		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Dedicated facility Mixing operations (open systems) Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	

Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8b, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Use drum pumps.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 2: Manufacture of substance (granules, low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1
No exposure assessment presented for the environment

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8b, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8b, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b,	Concentration of substance in product: 5%	Worker - inhalative, long-term - local	0.06mg/m³	0.03

PROC15	- 25%, 8 hours/day			

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 3: Use as an intermediate (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)	
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC5, ERC6a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Non-dedicated facility Material transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation.

	Equipment cleaning and maintenance Bulk transfers	Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (closed systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and maintenance	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4	Concentration of	Worker - inhalative, long-	1.50mg/m³	0.83

	substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	term - local		
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC15	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 4: Use as an intermediate (solid) (low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC5, ERC6a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source
Environment
Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC8a	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 5: Formulation & (re)packing (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC2: Formulation of preparations	
2.1 Contributing scenario controlling environmental exposure for: ERC2		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC5)
	General exposures (open	Limit the substance content in the product to 25 %.

	systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Laboratory activities small scale	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. or Avoid carrying out operation for more than 1 hour. (Efficiency: 90 %)(PROC14)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours.(PROC14)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC19)
	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours.(PROC19)	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Non-dedicated facility	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %.

	Material transfers Equipment cleaning and maintenance Bulk transfers	Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC14)
	General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC5	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.80mg/m³	0.67
PROC8b	Concentration of	Worker - inhalative, long-	1.50mg/m³	0.83

	substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	term - local		
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC14	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC14	Concentration of substance in product: 1% - 5%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC14	Concentration of substance in product : < 1%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1mg/m³	0.56
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1mg/m³	0.56
PROC19	Concentration of substance in product : < 1%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.50mg/m³	0.83

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear spills immediately.
Clear transfer lines prior to de-coupling.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 6: Formulation & (re)packing (solid) (low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2
No exposure assessment presented for the environment

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source
Environment
Qualitative approach used to conclude safe use.
Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9, PROC14, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC8a, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear spills immediately.
Clear transfer lines prior to de-coupling.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 7: Use in spraying formulations (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC5)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points

	maintenance Bulk transfers	and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and maintenance	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures Spraying	Limit the substance content in the product to 25 %. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. (Efficiency: 80 %)(PROC11)
	General exposures Spraying	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.(PROC11)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC19)
	General exposures Mixing operations (open systems) Manual	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours.(PROC19)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)

Bulk transfers	
General exposures Spraying	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC11)
General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC5	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC7	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency), With respiratory protection	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC7	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC7	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC7	Concentration of substance in product : < 1%, 8 hours/day, With	Worker - inhalative, long-term - local	1.00mg/m³	0.56

	Local Exhaust Ventilation, (90% efficiency)			
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC19	Concentration of substance in product : < 1%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.50mg/m³	0.83

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 8: Use in spraying formulations (solid) (low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source
Environment
Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC8b, PROC9	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC8a, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17
PROC7	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 9: Use in non - spraying formulations (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU1: Agriculture, forestry, fishery SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (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: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion	General exposures (open systems)	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or

from source towards the worker	Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC6)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC6)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Avoid carrying out operation for more than 4 hours.(PROC6)
	General exposures (closed systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	Automated metal rolling/forming Dedicated facility Drum and small package	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points

	filling Equipment cleaning and maintenance	and other openings. (Efficiency: 80 %)(PROC9)
	General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC10)
	General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours.(PROC10)
	General exposures (open systems) Dipping, immersion and pouring	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.(PROC13)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. or Avoid carrying out operation for more than 1 hour. (Efficiency: 90 %)(PROC14)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours.(PROC14)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC19)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours.(PROC19)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC6)
	General exposures (open systems)	If above technical/organisational control measures are not feasible, then adopt following PPE:

Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)
General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC10)
General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC14)
General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC5, PROC6, PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC6, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC6, PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC6, PROC19	Concentration of substance in product : < 1%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1	Worker - inhalative, long-term - local	1.20mg/m³	0.67

	hour, With Local Exhaust Ventilation, 80% efficiency			
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC10	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC10	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC10, PROC14	Concentration of substance in product: 1% - 5%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC10, PROC14	Concentration of substance in product : < 1%, 8 hours/day	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC13, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.20mg/m³	0.67

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 10: Use in non - spraying formulations (solid) (low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU1: Agriculture, forestry, fishery SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC6: Calendering operations PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (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: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to	Ensure operatives are trained to minimise exposures.	

prevent /limit releases, dispersion and exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9, PROC13, PROC14, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC8a, PROC10, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17
PROC6, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 11: Use in spraying formulations (solid) (high dustiness)		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8c, ERC8f		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process Process sampling Open systems	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. (Efficiency: 80 %)(PROC2)
	General exposures Use in contained batch processes With sample collection Equipment cleaning and maintenance	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. (Efficiency: 80 %)(PROC3)
	General exposures (open systems) Mixing operations (open	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or

	systems) Material transfers Batch process Cleaning	extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 1 hour.(PROC5)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings.(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8b)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC8b)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 1 hour.(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)

	maintenance	
	General exposures Spraying	Limit the substance content in the product to 25 %. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. (Efficiency: 80 %)(PROC11)
	General exposures Spraying	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20. (Efficiency: 80 %)(PROC11)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC5)
	General exposures Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8b)
	General exposures Spraying	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC11)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC5	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC5	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC5	Concentration of substance in product: 1% - 5%, during <15 mins	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8b	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8b	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC8b	Concentration of substance in product: 1% - 5%, < 15 min/day	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC8b	Concentration of	Worker - inhalative, long-	1.00mg/m³	0.56

	substance in product : < 1%, during 15 mins - 1 hour	term - local		
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC11	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency, With respiratory protection	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC11	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.60mg/m³	0.89
PROC19	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC19	Concentration of substance in product: 1% - 5%, during <15 mins	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC19	Concentration of substance in product : < 1%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 12: Use in spraying formulations (solid) (low dustiness)	
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC11: Non industrial spraying PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8c, ERC8f		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC11	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC8a, PROC8b, PROC9, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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.
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Health
Environment

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 13: Use in non - spraying formulations (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU1: Agriculture, forestry, fishery SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (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: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion	General exposures (open systems)	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or

from source towards the worker	Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC6)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC6)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Avoid carrying out operation for more than 4 hours.(PROC6)
	General exposures (closed systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	Automated metal rolling/forming Dedicated facility Drum and small package	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points

	filling Equipment cleaning and maintenance	and other openings. (Efficiency: 80 %)(PROC9)
	General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC10)
	General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours.(PROC10)
	General exposures (open systems) Dipping, immersion and pouring	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings. Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.(PROC13)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. or Avoid carrying out operation for more than 1 hour. (Efficiency: 90 %)(PROC14)
	General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours.(PROC14)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC19)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours.(PROC19)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC6)
	General exposures (open systems)	If above technical/organisational control measures are not feasible, then adopt following PPE:

Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)
General exposures (open systems) Rolling, Brushing Equipment cleaning and maintenance	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC10)
General exposures (open systems) Production or preparation or articles by tabletting, compression, extrusion or pelletisation	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC14)
General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC5, PROC6, PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC6, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC6, PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC6, PROC19	Concentration of substance in product : < 1%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1	Worker - inhalative, long-term - local	1.20mg/m³	0.67

	hour, With Local Exhaust Ventilation, 80% efficiency			
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC10	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC10	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC10, PROC14	Concentration of substance in product: 1% - 5%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC10, PROC14	Concentration of substance in product : < 1%, 8 hours/day	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC13, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC14	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.20mg/m³	0.67

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 14: Use in non - spraying formulations (solid) (low dustiness)	
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU1: Agriculture, forestry, fishery SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU7: Printing and reproduction of recorded media SU13: Manufacture of other non-metallic mineral products, e.g. plasters, cement SU19: Building and construction work
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC6: Calendering operations PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (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: Roller application or brushing PROC13: Treatment of articles by dipping and pouring PROC14: Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC15: Use as laboratory reagent PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC2: Formulation of preparations ERC3: Formulation in materials ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC3, ERC4, ERC5, ERC6a, ERC6b		
No exposure assessment presented for the environment		

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to	Ensure operatives are trained to minimise exposures.	

prevent /limit releases, dispersion and exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9, PROC13, PROC14, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC8a, PROC10, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17
PROC6, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 15: Use in laboratories (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 16: Use in laboratories (solid) (low dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles	
2.1 Contributing scenario controlling environmental exposure for: ERC4		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day

Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 17: Use in laboratories (solid) (high dustiness)		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Sectors of end-use	SU9: Manufacture of fine chemicals	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 18: Use in laboratories (solid) (low dustiness)		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Sectors of end-use	SU9: Manufacture of fine chemicals	
Process categories	PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area

Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 19: Use as water treatment chemicals (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU2: Mining, (including offshore industries) SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU23: Electricity, steam, gas water supply and sewage treatment	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 25 %.
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC5)

	Cleaning	
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and maintenance	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 1 hour.(PROC19)
	General exposures Mixing operations (open systems) Manual	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours.(PROC19)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)
	General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC5, PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1.00
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC19	Concentration of substance in product : < 1%, during 1 - 4 hours	Worker - inhalative, long-term - local	1.50mg/m³	0.83

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk

Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 20: Use as water treatment chemicals (solid) (low dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU2: Mining, (including offshore industries) SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU23: Electricity, steam, gas water supply and sewage treatment	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC6b: Industrial use of reactive processing aids	
2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6b		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
3. Exposure estimation and reference to its source		
Environment		
Qualitative approach used to conclude safe use.		

Workers

PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC5, PROC8a, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 21: Use as water treatment chemicals (solid) (high dustiness)		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Sectors of end-use	SU2: Mining, (including offshore industries) SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU23: Electricity, steam, gas water supply and sewage treatment	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures Continuous process Process sampling Open systems	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC2)
	General exposures Use in contained batch processes With sample collection Equipment cleaning and maintenance	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC3)
	General exposures (open systems) Batch process Open systems	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation.

	Drum/batch transfers With sample collection Equipment cleaning and maintenance	Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC4)
	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC4)
	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 1 hour.(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC5)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 1 hour.(PROC5)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute.

	Equipment cleaning and maintenance Bulk transfers	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8b)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC8b)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Avoid carrying out operation for more than 1 hour. Limit the substance content in the product to 1 %.(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and maintenance	Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures Mixing operations (open systems) Manual	Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 15 minutes.(PROC19)
	General exposures Mixing operations (open systems) Manual	or Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 1 hour.(PROC19)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	If above technical/organisational control measures are not feasible, then adopt following PPE: Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC4)
	General exposures (open systems) Mixing operations (open systems) Material transfers Batch process Cleaning	If above technical/organisational control measures are not feasible, then adopt following PPE: Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC5)
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and	If above technical/organisational control measures are not feasible, then adopt following PPE: Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)

	maintenance Bulk transfers	
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8b)
	General exposures Mixing operations (open systems) Manual	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC19)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4, PROC5, PROC8a, PROC8b, PROC19	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC4, PROC5, PROC8b, PROC19	Concentration of substance in product: 1% - 5%, during <15 mins	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC4, PROC5, PROC8b, PROC19	Concentration of substance in product : < 1%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80

PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day, With respiratory protection	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC19	Concentration of substance in product: 1% - 5%, during 15 mins - 1 hour	Worker - inhalative, long-term - local	1.00mg/m³	0.56

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 22: Use as water treatment chemicals (solid) (low dustiness)		
Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)	
Sectors of end-use	SU2: Mining, (including offshore industries) SU5: Manufacture of textiles, leather, fur SU6b: Manufacture of pulp, paper and paper products SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU23: Electricity, steam, gas water supply and sewage treatment	
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC19: Hand-mixing with intimate contact and only PPE available	
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems	
2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
3. Exposure estimation and reference to its source		
Environment		
Qualitative approach used to conclude safe use.		
Workers		

PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC19: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC4, PROC8a, PROC8b, PROC9, PROC19	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17
PROC5	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Stay upwind/ keep distance from source.
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 23: Use as a process chemical (solid) (high dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)	
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC5, ERC6a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, high dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	General exposures (open systems) Batch process Open systems Drum/batch transfers With sample collection Equipment cleaning and maintenance	Limit the substance content in the product to 25 %. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC4)
	General exposures (open systems) Non-dedicated facility Material transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. Ensure material transfers are under containment or extract ventilation.

	Equipment cleaning and maintenance Bulk transfers	Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (closed systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	or Limit the substance content in the product to 5 %. Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC8a)
	General exposures (open systems) Dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	Limit the substance content in the product to 25 %. Use bulk or semi-bulk handling systems. Discharge sacks via suitable vented charge chute. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 90 %)(PROC8b)
	General exposures Dedicated facility Drum and small package filling Equipment cleaning and maintenance	Avoid carrying out operation for more than 4 hours. Ensure material transfers are under containment or extract ventilation. Provide extract ventilation to material transfer points and other openings. (Efficiency: 80 %)(PROC9)
	General exposures Laboratory activities small scale	Carry out in a vented booth or extracted enclosure. (Efficiency: 80 %)(PROC15)
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
	General exposures (open systems) Non-dedicated facility Material transfers Equipment cleaning and maintenance Bulk transfers	If above technical/organisational control measures are not feasible, then adopt following PPE: Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. Wear a respirator conforming to EN140 with Type A/P2 filter or better.(PROC8a)

3. Exposure estimation and reference to its source

Environment

Qualitative approach used to conclude safe use.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC2, PROC3	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.60mg/m³	0.33
PROC4	Concentration of	Worker - inhalative, long-	1.50mg/m³	0.83

	substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, 80% efficiency	term - local		
PROC8a	Concentration of substance in product: 5% - 25%, during 15 mins - 1 hour, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8a	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With respiratory protection	Worker - inhalative, long-term - local	1.80mg/m³	1
PROC8a	Concentration of substance in product: 1% - 5%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.20mg/m³	0.67
PROC8b	Concentration of substance in product: 5% - 25%, 8 hours/day, With Local Exhaust Ventilation, (90% efficiency)	Worker - inhalative, long-term - local	1.50mg/m³	0.83
PROC9	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	1.44mg/m³	0.80
PROC15	Concentration of substance in product: 5% - 25%, during 1 - 4 hours, With Local Exhaust Ventilation, 80% efficiency	Worker - inhalative, long-term - local	0.60mg/m³	0.33

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.

1. Short title of Exposure Scenario 24: Use as a process chemical (solid) (low dustiness)		
Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites	
Sectors of end-use	SU6b: Manufacture of pulp, paper and paper products SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU9: Manufacture of fine chemicals SU14: Manufacture of basic metals, including alloys	
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent	
Environmental Release Categories	ERC1: Manufacture of substances ERC2: Formulation of preparations ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)	
2.1 Contributing scenario controlling environmental exposure for: ERC1, ERC2, ERC4, ERC5, ERC6a		
No exposure assessment presented for the environment		
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers the content of Aluminium in the product up to 25%
	Physical Form (at time of use)	Solid, low dustiness
Amount used	Varies between milliliters (sampling) and cubic meters (material transfers).	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Avoid direct skin contact with product. Wear suitable gloves tested to EN374.	
3. Exposure estimation and reference to its source		
Environment		
Qualitative approach used to conclude safe use.		

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15: ECETOC TRA model v2

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.01mg/m³	0.005
PROC3, PROC4, PROC8b, PROC9, PROC15	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.06mg/m³	0.03
PROC8a	Concentration of substance in product: 5% - 25%, 8 hours/day	Worker - inhalative, long-term - local	0.30mg/m³	0.17

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

Guidance is based on assumed operating conditions which may not be applicable to all sites. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Additional good practice advice beyond the REACH Chemical Safety Assessment

Handle substance within a closed system.
Clear transfer lines prior to de-coupling.
Clear spills immediately.
Drain or remove substance from equipment prior to break-in or maintenance.
Use drum pumps.
Change gloves, if duration of activity exceeds breakthrough time
Wear a disposable mask only once
Clean non-disposable mask after each use and store in a clean box in a clean area
Wear respiratory protection less than 2 hours/day
Assumes a good basic standard of occupational hygiene is implemented.