

SAFETY DATA SHEET

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH) & 1272/2008 (CLP)

Revision 4 – March 2021
(replaces Revision 3, May 2020)**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Product form	:	Mixture
Trade name	:	Nitram®
IUPAC name	:	Nitric acid ammonium salt
EC no	:	229-347-8
CAS No	:	6484-52-2
UK REACH registration No	:	UK-01-0942230983-2-0001
EU REACH registration No	:	01-2119490981-27-0020
Other means of identification:		
Unique Formula Identifier (UFI):	:	1W20-J050-800U-J1GR
Formula	:	NH ₄ .NO ₃
Synonyms	:	Ammonium(I) nitrate (1:1) / Nitric acid ammonium salt / Nitric acid, ammonium salt / Nitric acid ammonium salt (1:1) / Ammonium nitrates / Ammoniumnitrate

1.2. Relevant identified uses of the substance or mixture and uses advised against**1.2.1. Relevant identified uses**

Main use category : Fertiliser

Title	Use descriptors
Professional use (ES Ref.: 2)	SU1, SU2a, SU10, SU19, SU23, PC11, PC12, PC37, PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC15, PROC19, ERC8b, ERC8e
Manufacture of substances (ES Ref.: 1)	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15, ERC1

Full text of use descriptors: see section 16

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheetCF Fertilisers UK Limited
Ince
CH2 4LB Chester - United KingdomT: +44 (0) 151 357 2777
F: +44 (0) 151 357 1755
E: info@cffertilisers.co.uk

Only Representative for EU REACH:

ERM GmbH
Siemensstrasse 9
63263 Neu-Isenburg
GermanyE: REACH-OR.de@erm.com**1.4. Emergency telephone number**Emergency number : **UK**
+44 (0) 151 357 4029 (solids.sds@cffertilisers.co.uk)
24 hoursIn an emergency following exposure to a chemical, the public should telephone **111** which is a free-to-call single non-emergency number medical helpline operating in England, in Scotland and in Wales.

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(replaces Revision 3, May 2020)**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Oxidising Solids, Category 3 H272

Serious eye damage/eye irritation, Category 2 H319

Full text of H statements : see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements**Labelling according to Regulation (EC) No. 1272/2008 [CLP]**

Hazard pictograms (CLP) :



GHS03

GHS07

Signal word (CLP) :

Warning

Hazard statements (CLP) :

H272 - May intensify fire; oxidiser
H319 - Causes serious eye irritation

Precautionary statements (CLP) :

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P220 - Keep away from clothing and other combustible materials

P264 - Wash hands and face thoroughly after handling

P280 - Wear protective gloves/protective clothing/eye protection/face protection

P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P337 + P313: If eye irritation persists: Get medical advice/attention

P370 + P378: In case of fire: Use water to extinguish

P501: Dispose of contents/container to a licenced waste contractor.

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients**3.1. Substance**

Not applicable – product is a mixture

3.2. Mixture

Hazardous ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Ammonium Nitrate	>98.8	6484-52-2	229-347-8	01-2119490981-27-0020	GHS03, Ox. Sol. 3; H272, GHS07, Eye Irrit. 2; H319.
Magnesium Nitrate	<1.2	10377-60-3	233-826-7	01-2119491164-38-0004	GHS07, Eye Irrit. 2; H319.

Full text of H-statements: see section 16

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(replaces Revision 3, May 2020)**SECTION 4: First aid measures****4.1. Description of first aid measures**

- First-aid measures after inhalation : Unlikely route of exposure. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a poison center or a doctor.
- First-aid measures after skin contact : Wash off immediately with soap and plenty of water. In all cases of doubt, or when symptoms persist, seek medical advice.
- First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Remove contact lenses, if present and easy to do. Continue rinsing. If symptoms persist call a doctor.
- First-aid measures after ingestion : Do NOT induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). In all cases of doubt, or when symptoms persist, seek medical advice.

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

- Symptoms/injuries : Methemoglobinemia.

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

Treat symptomatically.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Flood with plenty of water. Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Dry chemical is not recommended. Foam.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : Oxidizer. Could ignite combustibles (wood, paper, oil, clothing, etc.).
- Explosion hazard : Risk of explosion if heated under confinement. May intensify fire; oxidizer.
- Hazardous decomposition products in case of fire : Nitrogen oxides. Toxic fumes may be released. Ammonia. Amines.

5.3. Advice for firefighters

- Firefighting instructions : Fight fire with normal precautions from a reasonable distance. May cause or intensify fire; oxidizer.
- Protective equipment for firefighters : Wear suitable protective clothing, gloves and eye/face protection. In case of fire: Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures****6.1.1. For non-emergency personnel**

- Protective equipment : Wear suitable protective clothing, gloves and eye or face protection. Dust production: dust mask with filter type P2.
- Emergency procedures : Immediately contact emergency personnel. Evacuate area. Avoid generation of dust. Avoid contact with skin and eyes.
- Measures in case of dust release : Dust production: dust mask with filter type P2. Mechanically ventilate the spillage area.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. In case of fire: Wear self-contained breathing apparatus. Dust production: dust mask with filter type P2.
- Emergency procedures : Avoid generation of dust. Avoid contact with skin and eyes. Evacuate area.

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

- For containment : Take up mechanically (sweeping, shovelling) and collect in suitable container for disposal.
- Methods for cleaning up : Do not absorb in sawdust, paper, cloth or other combustible absorbents. Keep the recovered product for subsequent recycling.

6.4. Reference to other sections

Concerning personal protective equipment to use, see section 8.

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(replaces Revision 3, May 2020)**SECTION 7: Handling and storage****7.1. Precautions for safe handling**

- Additional hazards when processed : May intensify fire; oxidiser.
- Precautions for safe handling : Keep away from combustible materials. - No smoking. Avoid generation of dust. Avoid breathing dust. Keep away from heat and direct sunlight.
- Hygiene measures : Wash contaminated clothing prior to re-use. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling. Use good personal hygiene practices. Contaminated work clothing should not be allowed out of the workplace.

7.2. Conditions for safe storage, including any incompatibilities

- Storage conditions : Store in a well-ventilated place. Keep container tightly closed. Protect from sunlight.
- Incompatible materials : Reducing agents. Acids. Strong alkalis. combustible materials. Powdered metals. chromates, e.g. potassium chromate, potassium or sodium dichromate. Zinc. Copper.
- Heat and ignition sources : Keep away from open flames, hot surfaces and sources of ignition.
- Packaging materials : polypropylene. PE (polyethylene). Avoid : Copper. Zinc.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****Ammonium Nitrate (6484-52-2)**

Czech Republic	Expoziční limity (PEL) (mg/m ³)	10.0 mg/m ³ (dust)
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Ammonium Nitrate (6484-52-2)

DNEL/DMEL (Workers)	
Long-term - systemic effects, dermal	5.12 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	36 mg/m ³
DNEL/DMEL (General population)	
Long-term - systemic effects, oral	2.56 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	8.9 mg/m ³
Long-term - systemic effects, dermal	2.56 mg/kg bodyweight/day
PNEC (Water)	
PNEC aqua (freshwater)	0.45 mg/l
PNEC aqua (marine water)	0.045 mg/l
PNEC aqua (intermittent, freshwater)	4.5 mg/l
PNEC (STP)	
PNEC sewage treatment plant	18 mg/l

8.2. Exposure controls

- Appropriate engineering controls : Provide adequate ventilation to minimize dust concentrations.
- Personal protective equipment : Safety glasses. Gloves. Dust formation: dust mask.
- Materials for protective clothing : Wear suitable protective clothing. EN 14605
- Hand protection : In the event of contact with molten product : Insulated gloves. Wear suitable gloves tested to EN374. EN 407
- Eye protection : Chemical goggles or face shield with safety glasses. DIN EN 166
- Respiratory protection : Dust production: dust mask with filter type P2. Filtering Half-face mask (DIN EN 149). particle filter device (DIN EN 143). EN 405



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Physical state	: Solid
Colour	: White.
Odour and Odour threshold	: Odourless. No data available on odour threshold.
	:
pH	: >4.5 – 7.0
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: 169 °C @1013hPa
Freezing point	: No data available
Boiling point	: > 210 °C. Pure ammonium nitrate begins to decompose at approximately 210°C
Flash point	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: >= 210 °C
Flammability (solid, liquid, gas)	: Non-flammable.
Vapour pressure	: Negligible.
Relative vapour density at 20 °C	: No data available
Relative density	: 1.72 g/cm ³ @ 20°C
Solubility	: Water: > 100 g/l
Partition coefficient (Log Pow)	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive.
Lower and upper explosion limit	: Not explosive.
Oxidising properties	: May cause or intensify fire; oxidizer.
Particle characteristics	d50 min – 2.1mm, d50 max – 2.7mm, product <1.0mm - <5%

9.2. Other information

9.2.1 Information with Regard to Physical Hazard Classes	May cause or intensify fire – product is an oxidizer.
9.2.2 Other Safety Characteristics.	None to report.

SECTION 10: Stability and reactivity**10.1. Reactivity**

Stable under normal conditions of use.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May cause or intensify fire; oxidiser. Oxidizer. Could ignite combustibles (wood, paper, oil, clothing, etc.).

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

10.5. Incompatible materials

Reducing agents. Acids. alkalis. Combustible materials. Metals in powder form. chromates, e.g. potassium chromate, potassium or sodium dichromate. Zinc. Copper. Copper alloys. Chlorates.

10.6. Hazardous decomposition products

Nitrogen oxides. Ammonia. Amines.

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(replaces Revision 3, May 2020)**SECTION 11: Toxicological information****11.1. Information on toxicological effects**

Acute toxicity : Not classified

Ammonium Nitrate (6484-52-2)

LD50 oral rat > 5000 mg/kg

LD50 dermal rat 2980 mg/kg

Magnesium nitrate (10377-60-3)

LD50 oral rat 5440 mg/kg

Skin corrosion/irritation : Not classified

pH: acidic

Serious eye damage/irritation : Causes serious eye irritation.

pH: acidic

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Ammonium Nitrate (6484-52-2)

NOAEL (oral, rat) > 1500 mg/kg bodyweight

Specific target organ toxicity (repeated exposure) : Not classified

Ammonium Nitrate (6484-52-2)

NOAEL (oral, rat, 90 days) > 256 mg/kg bodyweight/day

Aspiration hazard : Not classified

11.2. Other information

11.2.1 Endocrine disrupting properties The product does not have endocrine disrupting properties

11.2.2 Information on other hazards None to report.

SECTION 12: Ecological information**12.1. Toxicity****Ammonium Nitrate (6484-52-2)**

LC50 fish 1 447 mg/l 48h

LC50 other aquatic organisms 1 490 mg/l

EC50 72h algae (1) 1700 mg/l

12.2. Persistence and degradability**Ammonium Nitrate (6484-52-2)**

Persistence and degradability The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential**Ammonium Nitrate (6484-52-2)**

Bioaccumulative potential No bioaccumulation.

12.4. Mobility in soil**Ammonium Nitrate (6484-52-2)**

Mobility in soil Soluble in water

12.5. Results of PBT and vPvB assessment

No additional information available

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The product does not have endocrine disrupting properties

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations**13.1. Waste treatment methods****.Product:** Waste generation should be avoided/minimised. Disposal of the product should be in line with local regulatory requirements, and by a licenced waste contractor. Do not dispose of waste to sewers or drains.

EWC code for waste product: 06 10 02* - wastes containing dangerous substances.

Packaging: Waste generation should be avoided/minimised. Waste packaging should be recycled, and incineration//landfill only be considered where recycling is not available. Empty the bag by shaking to minimise retained product. Disposal of the product should be in line with local regulatory requirements, and by a licenced waste contractor.**SECTION 14: Transport information**

In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number

UN-No. (All modes) : 2067

14.2. UN proper shipping name

Proper Shipping Name (All modes) : AMMONIUM NITRATE BASED FERTILIZER

14.3. Transport hazard class(es)**All modes**

Transport hazard class(es) : 5.1

Danger labels : 5.1

**14.4. Packing group**

Packing group : III

14.5. Environmental hazards

Dangerous for the environment : No

Marine pollutant : No

Other information : No supplementary information available

14.6. Special precautions for user**- Overland transport**

Classification code (ADR) : O2

Special provisions (ADR) : 186, 306, 307

Limited quantities (ADR) : 5kg

Excepted quantities (ADR) : E1

Transport category (ADR) : 3

Hazard identification number (Kemler No.) : 50

Orange plates :



Tunnel restriction code (ADR) : E

EAC code : 1Z

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- Transport by sea

Special provisions (IMDG)	: 186, 306, 307, 900, 967
Limited quantities (IMDG)	: 5 kg
Excepted quantities (IMDG)	: E1
EmS-No. (Fire)	: F-H
EmS-No. (Spillage)	: S-Q
Stowage category (IMDG)	: C
Properties and observations (IMDG)	: Crystals, granules or prills. Wholly or partly soluble in water. Supporters of combustion. A major fire aboard a ship carrying these substances may involve a risk of explosion in the event of contamination (e.g. by fuel oil) or strong confinement. An adjacent detonation may also involve a risk of explosion. If heated strongly, decompose, giving off toxic gases and gases which support combustion. Transport of AMMONIUM NITRATE liable to self-heating sufficient to initiate decomposition is prohibited.
MFAG-No	: 140

- Air transport

PCA Excepted quantities (IATA)	: E1
PCA Limited quantities (IATA)	: Y546
PCA packing instructions (IATA)	: 559
CAO packing instructions (IATA)	: 563
Special provisions (IATA)	: A64, A79, A89

- Inland waterway transport

Classification code (ADN)	: O2
Special provisions (ADN)	: 186, 306, 307
Limited quantities (ADN)	: 5 kg
Excepted quantities (ADN)	: E1

- Rail transport

Classification code (RID)	: O2
Special provisions (RID)	: 186, 306, 307
Limited quantities (RID)	: 5kg
Excepted quantities (RID)	: E1

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****15.1.1. EU-Regulations**

No REACH Annex XVII restrictions

Ammonium Nitrate is not on the REACH Candidate List

Ammonium Nitrate is not on the REACH Annex XIV List

15.1.2. National regulations

Listed on the AICS (Australian Inventory of Chemical Substances)

Listed on the Canadian DSL (Domestic Substances List)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory

Listed on the Korean ECL (Existing Chemicals List)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Listed on INSQ (Mexican national Inventory of Chemical Substances)

Listed on CICR (Turkish Inventory and Control of Chemicals)

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VwVwS Annex reference : Water hazard class (WGK) 1, low hazard to waters (Classification according to VwVwS, Annex 1 or 2; ID No. 212)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

15.2. Chemical safety assessment

For this substance a chemical safety assessment has been carried out see attached exposure scenario

SECTION 16: Other information

Abbreviations and acronyms:

	CAS - Chemical Abstracts Service
	CLP - Classification, Labelling and Packaging
	EC - European Community
	GHS - Globally Harmonised System
	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
	TLV- Threshold Limit Value
	STEL- Short-Term Exposure Limit
	vPvB - Very Persistent and Very Bioaccumulative
DNEL	Derived-No Effect Level
PBT	Persistent Bioaccumulative Toxic
EC50	Median effective concentration
LOAEL	Lowest Observed Adverse Effect Level

Other information : The information presented in this Safety Data Sheet is based on current knowledge and is believed to be complete and accurate. It describes the product for the purposes of health, safety and environment requirements only and shall, therefore, be used only as a guide. The data refers to a specific product and may not be valid for combined uses with other products. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. The Supplier of this SDS shall not be responsible for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. It is the user's responsibility to take mentioned precaution measures and ensure that this information is complete and sufficient for the use of this product.

Full text of H- and EUH-statements:

Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Ox. Sol. 3	Oxidising Solids, Category 3
H272	May intensify fire; oxidiser
H319	Causes serious eye irritation
ERC1	Manufacture of substances
ERC8b	Wide dispersive indoor use of reactive substances in open systems
ERC8e	Wide dispersive outdoor use of reactive substances in open systems
PC11	Explosives
PC12	Fertilizers

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PC37	Water treatment chemicals
PROC1	Use in closed process, no likelihood of exposure
PROC11	Non industrial spraying
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation
PROC15	Use as laboratory reagent
PROC19	Hand-mixing with intimate contact and only PPE available
PROC2	Use in closed, continuous process with occasional controlled exposure
PROC3	Use in closed batch process (synthesis or formulation)
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)
SU1	Agriculture, forestry, fishery
SU10	Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
SU19	Building and construction work
SU23	Electricity, steam, gas water supply and sewage treatment
SU2a	Mining, (including offshore industries)

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

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(replaces Revision 3, May 2020)**Annex to the Safety Data Sheet****Product exposure scenario(s)**

ES Type	ES title
Worker	Manufacture of substances
Worker	Professional use

1. Exposure scenario 1**Manufacture of substances**ES Ref.: 1
ES Type: Worker

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC14, PROC15 ERC1
Processes, tasks, activities covered	Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)
Assessment method	Used ECETOC TRA model

2. Operational conditions and risk management measures**2.1.1 Contributing scenario controlling worker exposure (PROC1)**

PROC1	Use in closed process, no likelihood of exposure	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed process	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	

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Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed, continuous process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process (synthesis or formulation). With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.4 Contributing scenario controlling worker exposure (PROC4)

PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Semi-closed process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	

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Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.5 Contributing scenario controlling worker exposure (PROC8a)

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities
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Product characteristics

Concentration of substance in product	100 %
Dustiness	Solid, low dustiness

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands (960 cm ²)

Risk management measures

Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.6 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
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Product characteristics

Concentration of substance in product	100 %
Dustiness	Solid, low dustiness

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands (960 cm ²)

Risk management measures

Technical conditions and measures at process level (source) to prevent release	Semi-closed process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.7 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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Product characteristics

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Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Semi-closed process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.8 Contributing scenario controlling worker exposure (PROC14)

PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.9 Contributing scenario controlling worker exposure (PROC15)

PROC15	Use as laboratory reagent	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		

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Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

3. Exposure estimation and reference to its source**3.1. Health**

Long-term - systemic effects						
DNEL	Inhalation.: 37.6 mg/m ³ Dermal: 21.3 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m ³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.003	0.000	0.000	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.01	0.000	0.137	0.006	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.1	0.003	0.069	0.003	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4	0.5	0.013	0.686	0.032	0.045	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a	0.5	0.013	1.371	0.064	0.077	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.1	0.003	1.371	0.064	0.067	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.1	0.003	0.686	0.032	0.035	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC14	0.1	0.003	0.343	0.016	0.019	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC15	0.1	0.003	0.034	0.002	0.005	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

3.2. Environment**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES****4.1. Health**

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated
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4.2. Environment

Guidance - Environment	Not required
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(replaces Revision 3, May 2020)**Additional good practice advice beyond the REACH CSA**

Additional good practice advice	Good standard of personal hygiene. Containment as appropriate
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Revision 4 – March 2021
(replaces Revision 3, May 2020)**1. Exposure scenario 2****Professional use**ES Ref.: 2
ES Type: Worker

Use descriptors	SU1, SU2a, SU10, SU19, SU23 PROC1, PROC2, PROC3, PROC5, PROC8a, PROC8b, PROC9, PROC11, PROC15, PROC19 PC11, PC12, PC37 ERC8b, ERC8e
Processes, tasks, activities covered	Manufacture of substance or use as an intermediate, process chemical or extracting agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container)
Assessment method	Used ECETOC TRA model

2. Operational conditions and risk management measures**2.1.1 Contributing scenario controlling worker exposure (PROC1)**

PROC1	Use in closed process, no likelihood of exposure	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use only in closed systems permitted	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.2 Contributing scenario controlling worker exposure (PROC2)

PROC2	Use in closed, continuous process with occasional controlled exposure	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed, continuous process with occasional controlled exposure	

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Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.3 Contributing scenario controlling worker exposure (PROC3)

PROC3	Use in closed batch process (synthesis or formulation)	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process (synthesis or formulation). With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.4 Contributing scenario controlling worker exposure (PROC5)

PROC5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

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Revision 4 – March 2021
(replaces Revision 3, May 2020)**2.1.5 Contributing scenario controlling worker exposure (PROC8a)**

PROC8a	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands (960 cm ²)
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.6 Contributing scenario controlling worker exposure (PROC8b)

PROC8b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands (960 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Semi-closed process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.7 Contributing scenario controlling worker exposure (PROC9)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	

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Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands face (480 cm ²)
Risk management measures		
Technical conditions and measures at process level (source) to prevent release	Semi-closed process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.8 Contributing scenario controlling worker exposure (PROC11)

PROC11	Non industrial spraying	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands and upper wrists (1500 cm ²)
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

2.1.9 Contributing scenario controlling worker exposure (PROC15)

PROC15	Use as laboratory reagent	
Product characteristics		
Concentration of substance in product	100 %	
Dustiness	Solid, low dustiness	
Operational conditions		
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	One hand face (240 cm ²)
Risk management measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)

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Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	
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2.1.10 Contributing scenario controlling worker exposure (PROC19)

PROC19	Hand-mixing with intimate contact and only PPE available
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Product characteristics

Concentration of substance in product	100 %
Dustiness	Solid, low dustiness

Operational conditions

Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently)	
Other given operational conditions affecting workers exposure	Indoor	
Other given operational conditions affecting workers exposure	Exposed skin surface assumed:	Two hands and forearms (1980 cm ²)

Risk management measures

Technical conditions and measures to control dispersion from source towards the worker	General ventilation	
Organisational measures to prevent /limit releases, dispersion and exposure	Occupational exposure controls	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear suitable gloves tested to EN374	(efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Chemical goggles or safety glasses	

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation.: 37.6 mg/m ³ Dermal: 21.3 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure mg/m ³	RCR	Dermal exposure mg/kg bodyweight/day	RCR	Sum RCR	Assessment method
PROC1	0.01	0.000	0.003	0.000	0.000	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2	0.01	0.000	0.137	0.006	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3	0.1	0.003	0.069	0.003	0.006	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5	1	0.027	1.371	0.064	0.091	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a	0.5	0.013	1.371	0.064	0.077	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b	0.5	0.013	1.371	0.064	0.077	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9	0.5	0.013	0.686	0.032	0.045	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC11	1	0.027	4.284	0.201	0.228	Inhalation.: Used ECETOC TRA model

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						Dermal: Used ECETOC TRA model
PROC15	0.1	0.003	0.034	0.002	0.005	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC19	0.1	0.003	2.829	0.133	0.136	Inhalation.: Used ECETOC TRA model Dermal: Used ECETOC TRA model

3.2. Environment**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES****4.1. Health**

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated
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4.2. Environment

Guidance - Environment	Not required
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Additional good practice advice beyond the REACH CSA

Additional good practice advice	Good standard of personal hygiene. Containment as appropriate
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