SAFETY DATA SHEET
HYDRAZINE HYDRATE 7.5%W/W

Commission Regulation (EU) No 2015/830 of 28 May 2015.

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

1.1. Product identifier

Product name HYDRAZINE HYDRATE 7.5%W/W

Product number HH7.5, 3D

REACH registration number 01-2119492624-31-xxxx (FOR HYDRAZINE)

REACH registration notes REACH registration and pre-registration only covers products which OQEMA have imported into Europe or sourced within Europe. If the product is sold directly outside Europe this is not covered under the pre-registration or registration. It is the responsibility of the subsequent importer into Europe to ensure their volume of product is covered under the REACH regulations. This product is REACH compliant either through pre-registration or registration subject to volume threshold deadline. However please note we may have dual sources for some products. As a result the product you have purchased may not be covered by the registration number listed above. Please contact the email address in section 1.3 for specific information on your purchase.

CAS number 10217-52-4

EC number 206-114-9

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

Identified uses Hydrazine. Use as corrosion inhibitor in steam generating and heating systems. (Industrial) Use as intermediate in closed systems. Use as monomer in closed systems. (Industrial) Hydrazine. Use as laboratory chemical. (Industrial) Use as monomer in closed industrial systems under controlled conditions. Use as reducing agent in closed industrial systems under controlled conditions. Hydrazine. Use as reducing agent to remove nitrosyl kations contained in sulphuric acid. (Industrial) Hydrazine. Distribution, formulation and (re)packing of substances
and mixtures (Industrial) Hydrazine. Use as reducing agent for metal-based chemicals in closed industrial systems under controlled conditions (Industrial) Hydrazine. Use as stabilising reagent in aromatic amines to be further used in synthesis of dyestuffs. (Industrial)

1.3. Details of the supplier of the safety data sheet

Supplier

Technical Department
OQEMA LTD
Winstons House
Carterton
Oxford
OX18 3EZ
+44 (0)1993 843081
+44 (0)1993 841261
regulatory.affairs@oqema.co.uk

1.4. Emergency telephone number

Emergency telephone EMERGENCY INFORMATION OUT OF OFFICE HOURS CONTACT CARECHEM 24: +44 (0)1270 502891

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SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (EC 1272/2008)

Physical hazards Not Classified

Health hazards Acute Tox. 4 - H302 Acute Tox. 4 - H312 Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Skin Sens. 1 - H317 Carc. 1B - H350

Environmental hazards Aquatic Acute 1 - H400 Aquatic Chronic 1 - H410

2.2. Label elements

EC number 206-114-9

Pictogram

Signal word Danger

Hazard statements
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.
H302+H312+H332 Harmful if swallowed, in contact with skin or if inhaled.

Precautionary statements
P273 Avoid release to the environment.
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.
P391 Collect spillage.

Contains HYDRAZINE

Supplementary precautionary statements
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing vapour/ spray.
P264 Wash contaminated skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P302+P352 IF ON SKIN: Wash with plenty of water.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P308+P313 IF exposed or concerned: Get medical advice/ attention.
P312 Call a POISON CENTER/ doctor if you feel unwell.
P321 Specific treatment (see medical advice on this label).
P330 Rinse mouth.
P332+P313 If skin irritation occurs: Get medical advice/ attention.
P333+P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337+P313 If eye irritation persists: Get medical advice/ attention.
P362+P364 Take off contaminated clothing and wash it before reuse.
P405 Store locked up.
P501 Dispose of contents/ container in accordance with national regulations.

2.3. Other hazards

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SECTION 3: Composition/information on ingredients

3.2. Mixtures

HYDRAZINE		**ca 4.8% w/w**
CAS number: 302-01-2	EC number: 206-114-9	
M factor (Acute) = 10	M factor (Chronic) = 10	

Classification
Flam. Liq. 3 - H226
Acute Tox. 3 - H301
Acute Tox. 3 - H311
Acute Tox. 2 - H330
Skin Corr. 1B - H314
Skin Sens. 1 - H317
Carc. 1B - H350
Aquatic Acute 1 - H400
Aquatic Chronic 1 - H410

The full text for all hazard statements is displayed in Section 16.

Composition comments THIS PRODUCT IS A SUBSTANCE OF VERY HIGH CONCERN (SVHC) ACCORDING TO REACH LEGISLATION M FACTOR: 10

Ingredient notes Hydrazine Hydrate is also known as CAS 7803-57-8

SECTION 4: First aid measures

4.1. Description of first aid measures

General information Use emergency shower Get medical attention immediately.

Inhalation Move affected person to fresh air at once. If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Get medical attention.

Ingestion Never give anything by mouth to an unconscious person. Do not induce vomiting. Rinse mouth thoroughly with water. Give plenty of water to drink. Get medical attention. Show this Safety Data Sheet to the medical personnel.

Skin contact Immediately remove contaminated clothing. Rinse immediately with plenty of water. Get medical attention immediately.

Eye contact Remove any contact lenses and open eyelids wide apart. Continue to rinse for at least 15 minutes and get medical attention.

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

General information NO DATA AVAILABLE

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

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Water spray. Foam. Powder.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture

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Specific hazards May explode when heated or when exposed to flames or sparks. Thermal decomposition or combustion products may include the following substances: Very toxic or corrosive gases or vapours. May form explosive or toxic mixtures with air. May explode when heated or when exposed to flames or sparks. Vapours are heavier than air and may spread near ground and travel a considerable distance to a source of ignition and flash back. Vapour explosion and poison hazard indoors, outdoors and in sewers.

5.3. Advice for firefighters

Protective actions during firefighting Use water spray to reduce vapours. Do not scatter spilled material with more water than needed to fight the fire. Move containers from fire area if it can be done without risk. Evacuate area Cool containers exposed to heat with water spray and remove them from the fire area if it can be done without risk.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid inhalation of vapours and contact with skin and eyes. No smoking, sparks, flames or other sources of ignition near spillage. Wear protective clothing as described in Section 8 of this safety data sheet.

6.2. Environmental precautions

Environmental precautions Avoid or minimise the creation of any environmental contamination. Do not discharge into drains or watercourses or onto the ground. Spillages or uncontrolled discharges into watercourses must be reported immediately to the Environmental Agency or other appropriate regulatory body.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up Ventilate well, stop flow of gas or liquid if possible. Remove ignition sources. Do not allow chemical to enter confined spaces such as sewers due to explosion risk. Sewers designed to preclude formation of explosive concentrations of vapour may be permitted. Stop leak if possible without risk. DO NOT touch spilled material! Small Spillages: Absorb with paper towels as found in a specialist spill kit Place in suitable containers for disposal, labelled appropriately. Hold for waste disposal For waste disposal, see Section 13. Large Spillages: Dilute Hydrazine Hydrate with water so the concentration of Hydrazine is less than 5% w/w. Neutalise using either <5% calcium hypochlorite or <5% sodium hypochlorite by a ratio of 1:1 Collect and place in suitable waste disposal containers and seal securely. Dispose of via licensed hazardous waste contractor

6.4. Reference to other sections

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet. See Section 11 for additional information on health hazards. Collect and dispose of spillage as indicated in Section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Usage precautions Keep away from heat, sparks and open flame. Avoid spilling. Avoid contact with skin and eyes. Provide adequate ventilation. Avoid inhalation of vapours. Use approved respirator if air contamination is above an acceptable level. Avoid contact with the following materials: Acids. Moisture. Wear suitable protective equipment for prolonged exposure and/or high concentrations of vapours, spray or mist. Please refer to section 8 for protective equipment. Use explosion proof electric equipment. Do not eat, drink or smoke when using the product. Avoid contact with skin and eyes.

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7.2. Conditions for safe storage, including any incompatibilities

Storage precautions Keep away from oxidising materials, heat and flames. Store in tightly-closed, original container in a dry, cool and well-ventilated place. Protect from light.

7.3. Specific end use(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.2.

SECTION 8: Exposure Controls/personal protection

8.1. Control parameters

Occupational exposure limits

HYDRAZINE

Hydrazine, monohydrate
Long-term exposure limit (8-hour TWA): WEL 0.02 ppm 0.03 mg/m³
Hydrazine, monohydrate
Short-term exposure limit (15-minute): WEL 0.1 ppm 0.13 mg/m³
hydrazine
Long-term exposure limit (8-hour TWA): WEL 0.02 ppm 0.03 mg/m³
hydrazine
Short-term exposure limit (15-minute): WEL 0.1 ppm 0.13 mg/m³
WEL = Workplace Exposure Limit

Ingredient comments WEL = Workplace Exposure Limits

DNEL For Hydrazine
Industry - Inhalation; Short term systemic effects: 0.1332 mg/m³
Industry - Inhalation; Long term systemic effects: 0.01 ppm
Industry - Dermal; Long term systemic effects: 6.4 bw/day, µg/kg
Industry - Inhalation; Long term local effects: 0.013 mg/m³
Industry - Inhalation; Short term local effects: 0.1332 mg/m³

PNEC - water; 0.0006 mg/l
for Hydrazine
- Marine water; 0.00006 mg/l
- STP; 0.055 mg/l

8.2. Exposure controls

Protective equipment

Appropriate engineering controls Provide adequate general and local exhaust ventilation.

Eye/face protection Safety glasses with side shields conforming to EN166 The following protection should be worn: Chemical splash goggles. The following protection should be worn: Full face visor or shield.

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Hand protection	Wear protective gloves made of the following material: Neoprene. Nitrile rubber. Butyl rubber. The most suitable glove should be chosen in consultation with the glove supplier/manufacturer, who can provide information about the breakthrough time of the glove material. Obtain the appropriate professional advice taking into account of the conditions under which the glove is used. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticpated use of the user. It must not be construed as offering an approval for any specific use scenario. The gloves must satisfy the specifications of EU directive 89/686/EEC and the standard EN 374 derived from it.
Other skin and body protection	Provide eyewash station and safety shower. Wear appropriate clothing to prevent any possibility of skin contact. Wear chemical protective suit.
Hygiene measures	Wash at the end of each work shift and before eating, smoking and using the toilet. Wash promptly if skin becomes contaminated. Promptly remove any clothing that becomes wet or contaminated.
Respiratory protection	Wear self-contained breathing apparatus. Wear a respirator fitted with the following cartridge: Gas filter, type K.

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance	Liquid.
Colour	Colourless.
Odour	Ammonia. Penetrating.
Odour threshold	No specific test data are available.
pH	pH (diluted solution): 10.6-10.7 1%
Melting point	-31 to -62°C
Initial boiling point and range	110-120°C @ 760 mm Hg
Flash point	73-91°C OC (Open cup).
Evaporation rate	Not available.
Evaporation factor	No specific test data are available.
Flammability (solid, gas)	No specific test data are available.
Upper/lower flammability or explosive limits	Upper flammable/explosive limit: 100 Lower flammable/explosive limit: 4.70
Other flammability	No specific test data are available.
Vapour pressure	15-20 mbar @ °C
Vapour density	Not available.
Relative density	1.0002kg/m3 @ 20*C°C
Bulk density	No specific test data are available.
Solubility(ies)	Completely soluble in water. Soluble in the following materials: Ethanol.
Partition coefficient	: (HYDRAZINE) log Kow = -0.16 OECD guideline 107
Auto-ignition temperature	HYDRAZINE: 290 deg C°C
Viscosity	Not available.

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Explosive properties	Not explosive (A14 method)
Oxidising properties	Not relevant.

9.2. Other information

Other information	Not available.
Volatility	100

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	Stable under normal conditions

10.2. Chemical stability

Stability	Stable at normal ambient temperatures and when used as recommended.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	Not available.

10.4. Conditions to avoid

Conditions to avoid	Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid	Oxidising agents. Nitrites, nitrate and heavy metal salts. Metal oxides. Metals

10.6. Hazardous decomposition products

Hazardous decomposition products	Oxides of the following substances: Nitrogen. Hydrogen.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological effects	All data in this section referes to testing for Hydrazine (CAS302-01-2)
Other health effects	IARC Int. Agency for Cancer Research. Carcinogen Category 2.

Acute toxicity - oral

ATE oral (mg/kg)	500.0

Acute toxicity - dermal

ATE dermal (mg/kg)	1,100.0

Acute toxicity - inhalation

ATE inhalation (gases ppm)	14,583.33
ATE inhalation (vapours mg/l)	62.5
ATE inhalation (dusts/mists mg/l)	10.42

Serious eye damage/irritation

Serious eye damage/irritation	Hydrazine: causes serious eye damage. In animals - vapour at high concentrations and direct contact with liquid; risk of serious damage to eyes. severely irritating or even corrosive to eyes.

Skin sensitisation

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Skin sensitisation	Sensitising. Eczema-like dermatitis possible, Possible cross sensitization with hydrazine derivatives

Carcinogenicity

Carcinogenicity	NOAEL (1.3mg/m3) 0.3mg/m3 , , Rat LOAEL (0.3 mg/m3) 1.3mg/m3 , , Possible cancer hazard Exposure to vapours. Nasal tumours only observed at high concentrations in association with permanent irritating lesions of the epithelium in the upper respiratory tract induced by the exposure. Absence of casual relationship between the incidence of cancer and exposure to product in epidemiological studies. Slight carcinogenic effects in animals.

Reproductive toxicity

Reproductive toxicity - fertility	According to available experimental data; ansence of toxic effects on fertility
Reproductive toxicity - development	Absence of congenital malformations and embryotoxic effects in rodents at non-toxic doeses for the mothers

Specific target organ toxicity - single exposure

Target organs	Respiratory system, lungs

Specific target organ toxicity - repeated exposure

STOT - repeated exposure	LOAEL 0.066mg/m3 , Inhalation, Rat NOAEL = 1.92mg/kg (rat, subacute)
Target organs	Liver Kidneys Central nervous system

Aspiration hazard

Aspiration hazard	Not available.

Inhalation	Toxic by inhalation.
Ingestion	Toxic if swallowed.
Skin contact	Toxic in contact with skin.
Eye contact	Risk of serious damage to eyes.
Acute and chronic health hazards	Repeated exposure may cause chronic eye irritation. Repeated exposure may cause chronic upper respiratory irritation. Burning pain and severe corrosive skin damage. Acute eczematous dermatitis, contact type erythema, oedema, papules, vesicles, bullae, crusts, desquamation. Swallowing concentrated chemical may cause severe internal injury. Liver and/or kidney damage. Methemoglobin formation.
Route of entry	Inhalation Ingestion. Skin and/or eye contact
Target organs	Blood Central nervous system Eyes Kidneys Liver Respiratory system, lungs Skin
Medical symptoms	Severe irritation, burning and tearing. Rhinitis (inflammation of the nasal mucous membranes). Upper respiratory irritation. General respiratory distress, unproductive cough. Severe skin irritation. Nausea, vomiting. Irritability, hyperactivity, convulsions. Behavioural changes. Unconsciousness, possibly death.
Medical considerations	Skin disorders and allergies. Liver and/or kidney damage. Convulsions. Central nervous system depression.

SECTION 12: Ecological Information

12.1. Toxicity

Toxicity	All data in this section refers to testing for Hydrazine (CAS302-01-2) LETHAL concentration to Rainbow Trout is reported to be 146 mg/l after 1 hour of exposure.

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Acute toxicity - fish	LC50, 96 hours: 0.61 mg/l, toxic to fish klimisch rating 2 1977 Lebistes reticulatus
Acute toxicity - aquatic invertebrates	EC_{50}, 48 hours: 0.16 mg/l, Daphnia magna very toxic to daphnia
Acute toxicity - aquatic plants	, 72 hours: 0.017 mg/l, IC50, Pseudokirchneriella subcapitata. Method OECD Test guideline 201. NOEC = 0.006mg/l
Acute toxicity - microorganisms	EC5, 16HRS, (PSUEDOMONAS PUTIDA); 0.019mg/l
Chronic toxicity - aquatic invertebrates	NOEC, 21 days: 0.01 mg/l, Daphnia magna OECD Guideline 211, reproduction inhibition, Test substance: Active ingredient NOEC, : 0.123 mg/l, Immobilization

12.2. Persistence and degradability

Persistence and degradability	The product is readily biodegradable.
Phototransformation	Water - Half-life : 6.3 hours for Hydrazine (CAS302-01-2)
Biodegradation	Water - Degradation (%) 100: 1 days Zahn-Wellens test OECD Guideline 302B for Hydrazine (CAS302-01-2)

12.3. Bioaccumulative potential

Bioaccumulative potential	The product is not bioaccumulating.
Partition coefficient	: (HYDRAZINE) log Kow = -0.16 OECD guideline 107

12.4. Mobility in soil

Mobility	The product is non-volatile.
Henry's law constant	960 Pa m3/mol @ °C for Hydrazine (CAS302-01-2)

12.5. Results of PBT and vPvB assessment

Results of PBT and vPvB assessment	This substance is not classified as PBT or vPvB according to current EU criteria.

12.6. Other adverse effects

Other adverse effects	Not available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal methods	Dilute Hydrazine hydrate with water until the concentration of Hydrazine is less than 5% w/w/ neutalise with either sodium hyperchlorite <5% w/w or calcium hyperchlorite < 5% w/w Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority. Dispose of waste via a licensed waste disposal contractor.

SECTION 14: Transport information

14.1. UN number

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UN No. (ADR/RID)	3293
UN No. (IMDG)	3293
UN No. (ICAO)	3293

14.2. UN proper shipping name

Proper shipping name (ADR/RID)	HYDRAZINE AQUEOUS SOLUTION with not more than 37% hydrazine, by mass
Proper shipping name (IMDG)	HYDRAZINE AQUEOUS SOLUTION with not more than 37% hydrazine, by mass
Proper shipping name (ICAO)	HYDRAZINE AQUEOUS SOLUTION with not more than 37% hydrazine, by mass
Proper shipping name (ADN)	HYDRAZINE AQUEOUS SOLUTION with not more than 37% hydrazine, by mass

14.3. Transport hazard class(es)

ENVIRONMENTALLY HAZARDOUS SYMBOL

ADR/RID class	6.1
ADR/RID label	ENVIRONMENTALLY HAZARDOUS SYMBOL
IMDG class	6.1
ICAO class/division	6.1

Transport labels

14.4. Packing group

ADR/RID packing group	III
IMDG packing group	III
ICAO packing group	III

14.5. Environmental hazards

Environmentally hazardous substance/marine pollutant

14.6. Special precautions for user

Emergency Action Code	2X
Tunnel restriction code	(E)

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

SECTION 15: Regulatory information

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

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EU legislation Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (as amended).
Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (as amended).

15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information

Abbreviations and acronyms used in the safety data sheet

ECHA: European Chemicals Agency
ATE: Acute Toxicity Estimate
ADR:European Agreement concerning the International Carriage of Dangerous Goods by Road
C&L: Classification and Labelling
CLP: Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
CAS# / CAS NO. CAS-numero (eräs kemikaalien tunnistenumero)
CSR: Chemical Safety Report
DNEL: Derived No Effect Level
DPD: Dangerous Preparations Directive 1999/45/EC
DSD: Dangerous Substances Directive 67/548/EEC
EC NO.: EINECS and ELINCS Number (see also EINECS and ELINCS)
EINECS: European Inventory of Existing Commercial Substances
eSDS / ext-SDS: Extended Safety Data Sheet (SDS with ES attached)
GES: Generic Exposure Scenario
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods
kow: octanol-water partition coefficient
LC50: Lethal Concentration to 50 % of a test population
LD50: Lethal Dose to 50% of a test population (Median Lethal Dose)
SDS: Safety Data Sheet
OEL: Occupational Exposure Limit
OECD: Organization for Economic Co-operation and Development
PBT: Persistent, Bioaccumulative and Toxic substance
PEC: Predicted Effect Concentration
PNEC: Predicted No Effect Concentration(s)
PPE: Personal Protection Equipment
QSAR: Qualitative Structure Activity Relationship
REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RMM: Risk Management Measure
STOT: Specific Target Organ Toxicity
STOT (RE): Repeated Exposure
STOT (SE): Single Exposure
vPvB: Very Persistent and Very Bioaccumulative

Key literature references and sources for data Material Safety Data Sheet, Misc. manufacturers.

Revision comments 8, 16.

Revision date 07/02/2018

Revision 005

HYDRAZINE HYDRATE 7.5%W/W

Supersedes date 01/09/2014

SDS number 10103

Hazard statements in full

H226 Flammable liquid and vapour.
H301 Toxic if swallowed.
H302 Harmful if swallowed.
H311 Toxic in contact with skin.
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H331 Toxic if inhaled.
H332 Harmful if inhaled.
H350 May cause cancer.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.

Annex to the extended Safety Data Sheet (eSDS)

Identification of the substance or mixture

Product name: Hydrazine

Exposure scenarios in black text are generic exposure scenarios from all our suppliers of hydrazine

Exposure scenarios in blue text are supplier specific. Please contact Lansdowne to verify your individual purchase is covered.

Exposure Scenario 1

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as intermediate in closed systems. Use as monomer in closed systems. (Industrial)
List of use descriptors	**Identified use name:** Hydrazine. Intermediate / Monomer (closed systems) (Industrial) **Process Category:** PROC01, PROC03, PROC08b, PROC09 **Substance supplied to that use in form of:** As such **Sector of end use:** SU03, SU08, SU09, SU10 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC06a, ERC06c **Market sector by type of chemical product:** PC19, PC32
Name of contributing environmental scenario and corresponding ERC	**-ERC06a, ERC06c**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC01, PROC03, PROC08b, PROC09**

Additional information：PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC06a, ERC06c	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10 If receiving surface water flow is (m^3/d): 18 000 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	The substance shall be rigorously contained by technical means during handling and use.
Technical conditions and measures at process level (source) to prevent release	waste water (kg/d): ≤ 0.02. (referring to pure hydrazine) Deviating from the STP size and water body size daily emissions have to be adjusted. Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	The waste water has to be directed to a dedicated sewage treatment plant or treated by other suitable techniques. Waste air should be scrubbed or filtered. (efficiency %): > 95 Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Size of sewage treatment plant (m^3/d): 2 000 (efficiency %): > 45 Sewage sludge has not to be disposed on agricultural soil.
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.

Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : PROC01, PROC03, PROC08b, PROC09	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Not applicable.
Frequency and duration of use	Exposure frequency(d/a) : 230 Exposure duration per day: PROC01, PROC03: 8 h (full shift). PROC08b, PROC09: ≤ 1 h Sampling: ≤ 0.25
Human factors not influenced by risk management	Respiratory volume (m^3/d): 10 (light activity)
Other given operational conditions affecting environmental exposure	Indoor setting Outdoor setting
Technical conditions and measures at process level (source) to prevent release	Product is handled under closed conditions.
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation required.(efficiency %): > 90% Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur.
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures.

	Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. Wear safety goggles as described in section 8. Sampling: If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95 During (Dis)connection steps: Wear respiratory protection as described in section 8. (efficiency %): 95 (Dis)Connection of non-closed (?) dosing units: Wear coverall according to section 8.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC06a, ERC06c	
Exposure assessment (environment):	Manual calculated.
Exposure estimation	The calculated individual exposure figures are below the PNECs (RCR ratios < 1).
Exposure estimation and reference to its source - Workers: -PROC01, PROC03, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 2

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as corrosion inhibitor in steam generating and heating systems. (Industrial/ Professional)
List of use descriptors	**Identified use name:** Hydrazine. Use as corrosion inhibitor in steam generating and heating systems (Industrial/Professional) **Process Category:** PROC01, PROC08b, PROC09 **Substance supplied to that use in form of:** As such **Sector of end use:** SU03, SU22, SU23 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC07, ERC09a **Market sector by type of chemical product:** PC37
Name of contributing environmental scenario and corresponding ERC	**- ERC07, ERC09a** **-**
List of names of contributing worker scenarios and corresponding PROCs	**- PROC01, PROC08b, PROC09**

Additional information： PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : - ERC07, ERC09a	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10 If receiving surface water flow is (m^3/d): 18 000 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Direct emission of blow-off water into fresh/ marine water. Concentration in the blow off-water (mg/L): ≤ 5.47*10^{-3} (pure hydrazine) Deviating from the dilution factors, daily emissions have to be adjusted. Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical conditions and measures at process level (source) to prevent release	The substance shall be rigorously contained by technical means during handling and use.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste air should be scrubbed or filtered. (efficiency %): > 95 Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Not required
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : -ERC07, ERC09a	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10 If receiving surface water flow is (m^3/d): 18 000 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	waste water(kg/d): ≤ 0.02 (referring to pure hydrazine) Deviating from the STP size and water body size daily emissions have to be adjusted. Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical conditions and measures at process level (source) to prevent release	The substance shall be rigorously contained by technical means during handling and use.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	The waste water has to be directed to a dedicated sewage treatment plant or treated by other suitable techniques. Waste air should be scrubbed or filtered. (efficiency %): > 95 Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to external recovery of waste	No special measures required.
Contributing exposure scenario controlling environmental exposure for : PROC01, PROC08b, PROC09	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	
Amounts used	Not applicable.
Frequency and duration of	Exposure frequency(d/a) : 230

use	Exposure duration per day: PROC01: 8 h PROC08b, PROC09: ≤ 1 h Sampling: ≤ 0.25
Human factors not influenced by risk management	Respiratory volume (m^3/d): 10 (light activity)
Other given operational conditions affecting environmental exposure	Indoor setting Outdoor setting
Technical conditions and measures at process level (source) to prevent release	Process fully enclosed.
Technical conditions and measures to control dispersion from source towards the worker	Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur.
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. (efficiency %): 90 Wear safety goggles as described in section 8. Sampling:

	If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95 During (Dis)connection steps: Wear respiratory protection as described in section 8. (efficiency %): 95

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC06a, ERC06c	
Exposure assessment (environment):	Manual calculated.
Exposure estimation	The calculated individual exposure figures are below the PNECs (RCR ratios < 1).
Exposure estimation and reference to its source - Environment: -ERC07, ERC09a	
Exposure assessment (environment):	Manual calculated.
Exposure estimation	The calculated individual exposure figures are below the PNECs (RCR ratios < 1).
Exposure estimation and reference to its source - Workers: -PROC01, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or

	suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 3

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as reducing agent to remove nitrosyl kations contained in sulphuric acid. (Industrial)
List of use descriptors	**Identified use name:** Hydrazine. Use as reducing agent to remove nitrosyl kations contained in sulphuric acid (Industrial) **Process Category:** PROC01, PROC08b, PROC09 **Substance supplied to that use in form of:** As such **Sector of end use:** SU03, SU08, SU09 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC06b **Market sector by type of chemical product:** PC
Name of contributing environmental scenario and corresponding ERC	**-ERC06b**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC01, PROC08b, PROC09**

Additional information : PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC06a, ERC06c	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	40 % (25.6 % hydrazine pure)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent

	discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300
Other given operational conditions affecting environmental exposure	Percentage release to waste water: 0 Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical conditions and measures at process level (source) to prevent release	The generation of waste should be avoided or minimised wherever possible.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste air should be scrubbed or filtered. (efficiency %): > 95 Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Not applicable as there is no release to wastewater.
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : PROC01, PROC08b, PROC09	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	40 % (25.6 % hydrazine pure)
Amounts used	Not applicable.
Frequency and duration of use	Exposure frequency(d/a) : 230 Exposure duration per day: PROC01: 8 h PROC08b, PROC09: ≤ 1 h Sampling: ≤ 0.25
Human factors not influenced by risk management	Respiratory volume (m^3/d): 10 (light activity)
Other given operational conditions affecting environmental exposure	Indoor setting Outdoor setting
Technical conditions and measures at process level (source) to prevent release	Process fully enclosed. Product is handled under closed conditions.

Technical conditions and measures to control dispersion from source towards the worker	Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. Wear safety goggles as described in section 8. Sampling: If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95 % During (Dis)connection steps: Wear respiratory protection as described in section 8.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC06b

Exposure assessment (environment):	Qualitative Assessment
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.).
Exposure estimation and reference to its source - Workers: -PROC01, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 4

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as stabilising reagent in aromatic amines to be further used in synthesis of dyestuffs. (Industrial)

List of use descriptors	**Identified use name:** Hydrazine. Use as stabilising reagent in aromatic amines to be further used in synthesis of dyestuffs (Industrial) **Process Category:** PROC01, PROC08b, PROC09 **Substance supplied to that use in form of:** As such **Sector of end use:** SU03, SU08, SU09 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC06b **Market sector by type of chemical product:** PC0,
Name of contributing environmental scenario and corresponding ERC	**-ERC06b**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC01, PROC08b, PROC09**

Additional information : PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC06a, ERC06c	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300
Other given operational conditions affecting environmental exposure	Percentage release to waste water: 0 Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical conditions and measures at process level (source) to prevent release	The generation of waste should be avoided or minimised wherever possible.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	Waste air should be scrubbed or filtered. (efficiency %): > 95 Floor should be impervious and resistant to liquid.

Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Not applicable as there is no release to wastewater.
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : PROC01, PROC08b, PROC09	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Not applicable.
Frequency and duration of use	Exposure frequency(d/a) : 230 Exposure duration per day: PROC01: 8 h PROC08b, PROC09: ≤ 1 h Sampling: ≤ 0.25
Human factors not influenced by risk management	Respiratory volume (m^3/d): 10 (light activity)
Other given operational conditions affecting environmental exposure	Indoor setting Outdoor setting
Technical conditions and measures at process level (source) to prevent release	Product is handled under closed conditions.
Technical conditions and measures to control dispersion from source towards the worker	Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.

	Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. Wear safety goggles as described in section 8. Sampling: If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95 % During (Dis)connection steps: Wear respiratory protection as described in section 8.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC06b	
Exposure assessment (environment):	Qualitative Assessment
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.).
Exposure estimation and reference to its source - Workers: -PROC01, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 5

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as laboratory chemical. (Industrial/Professional)
List of use descriptors	**Identified use name:** Hydrazine. Use as laboratory chemical (Industrial/Professional) **Process Category:** PROC15 **Substance supplied to that use in form of:** As such **Sector of end use:** SU03, SU22 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC06a, ERC06b **Market sector by type of chemical product:** PC21
Name of contributing environmental scenario and corresponding ERC	**-ERC06a, ERC06b**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC15**

Additional information： PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC06a, ERC06b	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	≤ 0.5 L/d
Frequency and duration of use	Not applicable.
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10 If receiving surface water flow is (m^3/d): 18 000 Local marine water dilution factor: 100
Other given operational conditions affecting environmental exposure	Avoid release to the environment. In case of incidental aqueous waste, the water has to pre-treated to reduce hydrazine concentrations prior to emission. Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	The waste water has to be directed to a dedicated sewage treatment plant or treated by other suitable techniques. Waste air should be scrubbed or filtered.(efficiency %): > 95 Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Size of sewage treatment plant (m^3/d): 2 000 (efficiency %): 45
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : -PROC15

Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	0.5 L/d
Frequency and duration of use	Exposure duration per day: 8 h Exposure frequency (d/a) : 230
Human factors not influenced by risk management	Respiratory volume (m^3/d): 10 (light activity)
Other given operational conditions affecting environmental exposure	Indoor setting
Technical conditions and measures to control dispersion from source towards the worker	Sample via a closed loop or other system to avoid exposure. Handle in a fume cupboard or under extract ventilation.
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. (efficiency %): 90 Wear safety goggles as described in section 8.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC06b	
Exposure assessment (environment):	Qualitative Assessment
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained.

	Based on these measures, no risk for workers is concluded.).
Exposure estimation and reference to its source - Workers: -PROC01, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 6

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Distribution, formulation and (re)packing of substances and mixtures (Industrial)
List of use descriptors	**Identified use name:** Hydrazine .Distribution, formulation and (re)packing of substances and mixtures (Industrial) **Process Category:** PROC01, PROC03, PROC08b, PROC09 **Substance supplied to that use in form of:** In a mixture

	Sector of end use: SU03 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC02
Name of contributing environmental scenario and corresponding ERC	**-ERC02**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC01, PROC03, PROC08b, PROC09**

Additional information：PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC06a, ERC06b	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300.
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10. If receiving surface water flow is (m^3/d): 18.000. Local marine water dilution factor: 100.
Other given operational conditions affecting environmental exposure	The substance shall be rigorously contained by technical means during handling and use.
Technical conditions and measures at process level (source) to prevent release	Maximum load to waste water (kg/d): ≤ 0.02. (referring to pure hydrazine) Deviating from the STP size and water body size daily emissions have to be adjusted. Based on the applied operational conditions, emission in the air and soil compartment are negligible.
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	The waste water has to be directed to a dedicated sewage treatment plant or treated by other suitable techniques.

	Waste air has to be cleaned by a waste gas scrubber or or a combustion unit or treated by other suitable techniques. (efficiency %): > 95 %. Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Size of sewage treatment plant (m^3/d): 2 000 (efficiency %): ≥45
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : -PROC01, PROC03, PROC08b, PROC09	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Not applicable.
Frequency and duration of use	Exposure frequency (d/a) : 230. Exposure duration (h/d): PROC01, PROC03 : 8 h (full shift). PROC08b, PROC09: ≤1. Sampling : ≤ 0.25.
Other given operational conditions affecting environmental exposure	Indoor setting / Outdoor setting
Technical conditions and measures at process level (source) to prevent release	The substance shall be contained by technical means during handling and use.
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation required. (efficiency %): 90. Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling.

	Provide extract ventilation to points where emissions occur.
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. Wear safety goggles as described in section 8. Sampling : If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95. During (Dis)connection steps: Wear respiratory protection as described in section 8. (efficiency %): 95. (Dis)Connection of non-closed (?) dosing units: Wear coverall according to section 8.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC02	
Exposure assessment (environment):	Calculation method
Exposure estimation	The calculated individual exposure figures are below the PNECs

	(RCR ratios < 1).
Exposure estimation and reference to its source - Workers: -PROC01, PROC03, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 7

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as reducing agent for metal-based chemicals in closed industrial systems under controlled conditions (Industrial)
List of use descriptors	**Identified use name:** Hydrazine .Use as reducing agent for metalbased chemicals in closed industrial systems under controlled conditions (Industrial) **Process Category:** PROC01, PROC03, PROC08b

	Substance supplied to that use in form of: In a mixture **Sector of end use:** SU03 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC04, ERC06b **Market sector by type of chemical product:** PC0
Name of contributing environmental scenario and corresponding ERC	**-ERC04, ERC06b**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC01, PROC03, PROC08b**

Additional information：PROCs and ERCs for communication purpose only. Risk assessment based on Expert judgement.

Section 2 - Exposure controls

Contributing exposure scenario controlling environmental exposure for : -ERC04, ERC06b	
Product Characteristics	Liquid. Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%)
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Annual site tonnage (t/a): Not applicable. Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Emissions are limited by the daily waste water independent of the tonnage applied.
Frequency and duration of use	Continuous release (d/a) : 300.
Environmental factors not influenced by risk management	Local freshwater dilution factor: 10. If receiving surface water flow is (m^3/d): 18.000. Local marine water dilution factor: 100.
Other given operational conditions affecting environmental exposure	The substance shall be rigorously contained by technical means during handling and use.
Technical conditions and measures at process level (source) to prevent release	Maximum load to waste water (kg/d): ≤ 0.02. (referring to pure hydrazine) Deviating from the STP size and water body size daily emissions have to be adjusted. Based on the applied operational conditions, emission in the air and soil compartment are negligible.

Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	The waste water has to be directed to a dedicated sewage treatment plant or treated by other suitable techniques. Waste air has to be cleaned by a waste gas scrubber or or a combustion unit or treated by other suitable techniques. (efficiency %): > 95 %. Floor should be impervious and resistant to liquid.
Organisational measures to prevent/limit release from site	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised.
Conditions and measures related to municipal sewage treatment plant	Size of sewage treatment plant (m^3/d): 2.000. (Removal rate %): ≥ 45. Sewage sludge has not to be disposed on agricultural soil.
Conditions and measures related to external treatment of waste for disposal	General information on waste disposal see section 13.
Conditions and measures related to external recovery of waste	No special measures required.

Contributing exposure scenario controlling environmental exposure for : -PROC01, PROC03, PROC08b,	
Product Characteristics	Vapour pressure: 19.2 hPa (25 ° C) (hydrazine hydrate 100%) liquid
Concentration of substance in mixture or article	≤ 64% (referring to pure hydrazine)
Amounts used	Not applicable.
Frequency and duration of use	Exposure frequency (d/a) : 230. Exposure duration (h/d): PROC01, PROC03 : 8 h (full shift). PROC08b : ≤1. Sampling : ≤ 0.25.
Other given operational conditions affecting environmental exposure	Indoor setting / Outdoor setting
Technical conditions and measures at process level (source) to prevent release	The substance shall be contained by technical means during handling and use.
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation required. Ventilation rate (h^{-1}): 3-5. Ensure samples are obtained under containment or extract ventilation.

	Sample via a closed loop or other system to avoid exposure. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions) Use vapour recovery system. Clear transfer lines prior to de-coupling. Provide extract ventilation to points where emissions occur.
Organisational measures to prevent/limit releases, dispersion and exposure	Only properly trained and authorised personnel shall handle the substance. Substance-handling procedures shall be well documented and supervised. Ensure intensive management supervision controls. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Clear up spills immediately. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Organize regular exposure monitoring to check that exposure levels of operators stay beyond the exposure limits (exposure limits: see Section 8)
Conditions and measures related to personal protection, hygiene and health evaluation	
Personal protection	Wear protective clothing as described in section 8. Wear gloves as described in section 8. Wear safety goggles as described in section 8. Sampling : If the efficiency of the local exhaust ventilation cannot be ensured or the installation of a LEV is not possible, wear respiratory protective equipment (efficiency %): 95. During (Dis)connection steps: Wear respiratory protection as described in section 8. (efficiency %): 95.

Section 3 - Exposure estimation and reference to its source

Exposure estimation and reference to its source - Environment: -ERC02	
Exposure assessment (environment):	Calculation method
Exposure estimation	The calculated individual exposure figures are below the PNECs (RCR ratios < 1).
Exposure estimation and reference to its source - Workers: -PROC01, PROC03, PROC08b, PROC09	
Exposure assessment (human):	Qualitative Assessment.
Exposure estimation	Applying the stipulated Risk Management Measures and operational conditions, hydrazine will be highly contained. Based on these measures, no risk for workers is concluded.

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

Environment	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.
Health	Under the above listed conditions the process is deemed safe. Other conditions should only be considered when measurements or suitable calculations show that the RCR is < 1.

Additional good practice advice beyond the REACH CSA

Environment	Not applicable.
Health	Not applicable.

Exposure Scenario 8

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as monomer in closed industrial systems under controlled conditions (Industrial)

List of use descriptors	**Identified use name:** Hydrazine .Use as monomer in closed industrial systems under controlled conditions (Industrial) **Process Category:** PROC01, PROC8b, PROC 3 **Substance supplied to that use in form of:** In a mixture **Sector of end use:** SU03, SU08, SU09 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC6a **Product Category:** PC32
Name of contributing environmental scenario and corresponding ERC	**ERC6a**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC 1; PROC8b; PROC 3**

Section 2 – Conditions of use – Exposure estimation and reference to its source

Control of environmental exposure:	
Characteristics	Liquid, vapour pressure 0.5-10 kPa. Low potential to bioaccumulate, Non-hydrophobic
Operational conditions:	Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Risk from exposure via the aquatic environment is driven by the effluent disvharge to marine water. Sludge Treatment: Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. Ensure that water emissions don't exceed the PNEC in a water treatment plant and/or in surface water. This may require a specific treatment of waste waters.
General risk management measures applicable to all activities	Water: Typical onsite wastewater treatment technology provides removal efficacy of %: 45% Soil: Bund storage facilities to prevent soil and water pollution in the event of spillage. Waste treatment: Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. Gas treatment: Gas scrubber or destroy the product by incineration (in accordance with local and national regulations). Dispose of in accordance with European Directives on waste and hazardous waste.

Contributing Scenario	Industrial use resulting in manufacture of another substance (use of intermediates)
Annual amount per site	150 tonnes/year

Emission or release factor: Air	Gas treatment, degradation by radicals – Negligible
Maximum concentration / release value	Marine water: 0.06µg/l Fresh water: 0.06µg/l
Emission or release factor: Soil	0
Risk Characterisation ration:	Water <1 Soil <0,1
Remarks	In addition to direct release in soil, soil risk characterisation ration is influenced by the deposition of air emission and sludge application (if permitted to soil).

Section 3 – Risk characterisation ratio:

Compartment	All (environment)
Exposure Assessment Method	EUSES
Risk Characterisation ration:	Water <1 Soil <0,1
Remarks	In addition to direct release in soil, soil risk characterisation ration is influenced by the deposition of air emission and sludge application (if permitted to soil).

Control of worker exposure	
Characteristic	Liquid, vapour pressure 0.5-10kPa
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Concentration of the substance in mixture/article	Covers the percentage of the substance in the product up to 100% (unless stated differently)
General risk management measures applicable to all activities	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed system, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prioir to breaking containment. Clean/flush equioment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalents arrangements are in place to manage risks.

	Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Automate activity where possible. Only allow access to authorised person. Ensure that eyewash stations and safety showers are closed to the workstation location. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Protective suit.

Specific Conditions:

Contributing Scenario	General exposures (closed systems)
PROC	PROC 1
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Sample via enclosed loop or other system to avoid exposure.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.
Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Contributing Scenario	Used in contained batch processes
PROC	3
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Sample via enclosed loop or other system to avoid exposure.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.
Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Contributing Scenario	Drum/batch transfers
PROC	PROC 8b
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Return IBCs or tanks to supplier for re-use. Avoid carrying out operation for more than 1 hour. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions). Provide exact ventilation to material transfer points and other openings. Clear transfer lines prior to decoupling.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.
Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

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. If scaling reveals a condition of unsafe use (i.e. RCR's >1), additional RMM's or a site-specific chemical safety assessment is required.

For a given contributing scenario, several risk management measures can be proposed. It is your responsibility to select the configuration that best suits your activity.

PROC: Process category

SU: Sectors of end use

PC: Peoduct category

ERC: Environmental release category

RCR: Risk characterisation ratio:

DNEL: Derived no effect level

PNEC Predicted no effect concentration.

Exposure Scenario 9

Section 1 – Title

Short title of the exposure scenario	Hydrazine. Use as reducing agent in closed industrial systems under controlled conditions (Industrial)
List of use descriptors	**Identified use name:** Hydrazine .Use as monomer in closed industrial systems under controlled conditions (Industrial) **Process Category:** PROC01, PROC8b, PROC 2 **Substance supplied to that use in form of:** In a mixture **Sector of end use:** SU03, SU08, SU09 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC6b **Product Category:** PC20
Name of contributing environmental scenario and corresponding ERC	**ERC6a**
List of names of contributing worker scenarios and corresponding PROCs	**-PROC 1; PROC8b; PROC 3**

Section 2 – Conditions of use – Exposure estimation and reference to its source

Control of environmental exposure:	
Characteristics	Liquid, vapour pressure 0.5-10 kPa. Low potential to bioaccumulate, Non-hydrophobic
Operational conditions:	Risk from exposure via the aquatic environment is driven by effluent discharge to freshwater. Risk from exposure via the aquatic environment is driven by the effluent discharge to marine water. Sludge Treatment: Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. Ensure that water emissions don't exceed the PNEC in a water treatment plant and/or in surface water. This may require a specific treatment of waste waters.
General risk management measures applicable to all activities	Water: Typical onsite wastewater treatment technology provides removal efficacy of %: 45% Soil: Bund storage facilities to prevent soil and water pollution in the event of spillage. Waste treatment: Do not apply industrial sludge to natural soils. Sludge should be incinerated, contained or reclaimed. Gas treatment: Gas scrubber or destroy the product by incineration (in accordance with local and national regulations). Dispose of in accordance with European Directives on waste and hazardous waste.

Contributing Scenario	Industrial use of reactive processing aids.
Annual amount per site	400 tonnes/year
Emission or release factor: Air	Gas treatment, degradation by radicals – Negligible
Maximum concentration / release value	Marine water: 0.06µg/l Fresh water: 0.06µg/l
Emission or release factor: Soil	0
Risk Characterisation ration:	Water <1 Soil <0,1
Remarks	In addition to direct release in soil, soil risk characterisation ration is influenced by the deposition of air emission and sludge application (if permitted to soil).

Section 3 – Risk characterisation ratio:

Compartment	All (environment)
Exposure Assessment Method	EUSES
Risk Characterisation ration:	Water <1 Soil <0,1
Remarks	In addition to direct release in soil, soil risk characterisation ration is influenced by the deposition of air emission and sludge application (if permitted to soil).

Control of worker exposure	
Characteristic	Liquid, vapour pressure 0.5-10kPa
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently).
Concentration of the substance in mixture/article	Covers the percentage of the substance in the product up to 100% (unless stated differently)
General risk management measures applicable to all activities	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed system, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is

	identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalents arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. Automate activity where possible. Only allow access to authorised person. Ensure that eyewash stations and safety showers are closed to the workstation location. Wear chemically resistant gloves (tested to EN374) in combination with intensive management supervision controls. Use suitable eye protection. Protective suit.

Specific Conditions:

Contributing Scenario	General exposures (closed systems)
PROC	PROC 1
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Sample via enclosed loop or other system to avoid exposure.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.
Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Contributing Scenario	Use in contained systems
PROC	2
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Handle substance within a closed system. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Sample via enclosed loop or other system to avoid exposure.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.

Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Contributing Scenario	Drum/batch transfers
PROC	PROC 8b
Operational conditions	Outdoor, indoor
Concentration of the substance in mixture/article	
Risk Management Measures	Return IBCs or tanks to supplier for re-use. Avoid carrying out operation for more than 1 hour. Use of closed transfers of liquids from storage to production equipment (e.g. metered piped or pumped additions). Provide exact ventilation to material transfer points and other openings. Clear transfer lines prior to decoupling.
Conditions and measures related to personal hygiene and health evaluation	If the risk assessment of an exposing activity indicates the anticipated exposure levels are above the Exposure Limits, use a properly fitted, air purifying or air fed respirator complying with an approved standard.
Risk characterisation ratio: (Long term)	Inhalation: <1 Dermal: <1

Section 4 - Guidance to Downstream User to evaluate if he works inside the boundaries set by the ES

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. If scaling reveals a condition of unsafe use (i.e. RCR's >1), additional RMM's or a site-specific chemical safety assessment is required.

For a given contributing scenario, several risk management measures can be proposed. It is your responsibility to select the configuration that best suits your activity.

PROC: Process category

SU: Sectors of end use

PC: Peoduct category

ERC: Environmental release category

RCR: Risk characterisation ratio:

DNEL: Derived no effect level

PNEC Predicted no effect concentration.