Safety Data Sheet

According to Annex II to REACH - Regulation (EU) 2020/878

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

1.1. Product identifier

Product name — **RHODIUM SULFATE - 2%**

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

Intended use — Galvanic surface treatment of metals.
Application in electrolytic processes. Exclusively industrial.

Uses advised against — Uses other than those stated.

1.3. Details of the supplier of the safety data sheet

Name — TCA Spa
Full address — Zona Ind. Castelluccio, 11
District and Country — 52010 Capolona (AR) - ITALY
Tel. +39 0575 3911
Fax +39 0575 451337
e-mail address of the competent person
responsible for the Safety Data Sheet — tcaspa@pec.tcaspa.com
Serena Tavanti

1.4. Emergency telephone number

For urgent inquiries refer to — Malta 112

SECTION 2. Hazards identification

2.1. Classification of the substance or mixture

The product is classified as hazardous pursuant to the provisions set forth in (EC) Regulation 1272/2008 (CLP) (and subsequent amendments and supplements). The product thus requires a safety datasheet that complies with the provisions of (EU) Regulation 2020/878.
Any additional information concerning the risks for health and/or the environment are given in sections 11 and 12 of this sheet.

Hazard classification and indication:

Substance or mixture corrosive to metals, category 1	H290	May be corrosive to metals.
Germ cell mutagenicity, category 2	H341	Suspected of causing genetic defects.
Skin corrosion, category 1	H314	Causes severe skin burns and eye damage.
Serious eye damage, category 1	H318	Causes serious eye damage.
Hazardous to the aquatic environment, chronic toxicity, category 2	H411	Toxic to aquatic life with long lasting effects.

2.2. Label elements

Hazard labelling pursuant to EC Regulation 1272/2008 (CLP) and subsequent amendments and supplements.

Hazard pictograms:

Signal words: **DANGER**

Hazard statements:

H290	May be corrosive to metals.
H341	Suspected of causing genetic defects.
H314	Causes severe skin burns and eye damage.
H411	Toxic to aquatic life with long lasting effects.
EUH071	Corrosive to the respiratory tract.

Precautionary statements:

P201	Obtain special instructions before use.
P260	Do not breathe fume / mist / vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing / eye protection / face protection.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER / doctor.
P391	Collect spillage.

Contains: SULPHURIC ACID 32%
DIRHODIUM TRISULPHATE

2.3. Other hazards

On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.
The product does not contain substances with endocrine disrupting properties in concentration ≥ 0.1%.

SECTION 3. Composition/information on ingredients

3.2. Mixtures

Contains:

Identification	Conc. %	Classification (EC) 1272/2008 (CLP)
SULPHURIC ACID		
INDEX 016-020-00-8 EC 231-639-5 CAS 7664-93-9 REACH Reg. 01-2119458838-20-0087	30 ≤ x ≤ 32	Skin Corr. 1A H314, Eye Dam. 1 H318, Classification note according to Annex VI to the CLP Regulation: B *Specific Concentrtion Limits (SCL)* *Skin Corr. 1A; H314: C ≥ 15 % Skin Irrit. 2; H315: 5 % ≤ C < 15 % Eye Irrit. 2; H319: 5 % ≤ C < 15 %*
DIRHODIUM TRISULPHATE		
INDEX - EC 234-014-5 CAS 10489-46-0	4,5 ≤ x < 5	Met. Corr. 1 H290, Muta. 2 H341, Skin Corr. 1B H314, Eye Dam. 1 H318, Aquatic Acute 1 H400 M=1, Aquatic Chronic 1 H410 M=1, EUH071

The full wording of hazard (H) phrases is given in section 16 of the sheet.

SECTION 4. First aid measures

4.1. Description of first aid measures

In case of doubt or in the presence of symptoms contact a doctor and show him this document.
In case of more severe symptoms, ask for immediate medical aid.
EYES: Remove, if present, contact lenses if the situation allows you to do so easily. Wash immediately with plenty of water for at least 15 minutes, opening the eyelids fully. Get medical advice/attention.
SKIN: Take off immediately all contaminated clothing. Wash immediately and thoroughly with running water (and soap if possible). Get medical advice/attention. Avoid further contact with contaminated clothing.
INGESTION: Do not induce vomiting unless explicitly authorised by a doctor. Rinse your mouth with running water. Do not give anything by mouth to an unconscious person. Get medical advice/attention.
INHALATION: Remove victim to fresh air, away from the accident scene. In the event of respiratory symptoms (coughing, wheezing, breathing difficulty, asthma) keep the victim in a comfortable position for breathing. If necessary administer oxygen. If the subject stops breathing, administer artificial respiration. Get medical advice/attention.

Rescuer protection
It is good practice for rescuers lending support to a person who has been exposed to a chemical substance or to a mixture to wear personal protective equipment. The nature of such protection depends on the hazard level of the substance or mixture, on the type of exposure and on the extent of the contamination. In the absence of other more specific indications, use of disposable gloves in the event of possible contact with body fluids is recommended. For the type of PPE suitable for the characteristics of the substance or mixture, see section 8.

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

Specific information on symptoms and effects caused by the product are unknown.
DELAYED EFFECTS: Based on the information currently available, there are no known cases of delayed effects following exposure to this product.

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

If symptoms occur, whether acute or delayed, consult a doctor.
Means to have available in the workplace for specific and immediate treatment
Running water for skin and eye wash.

SECTION 5. Firefighting measures

5.1. Extinguishing media

SUITABLE EXTINGUISHING EQUIPMENT
The extinguishing equipment should be of the conventional kind: carbon dioxide, foam, powder and water spray.
UNSUITABLE EXTINGUISHING EQUIPMENT
None in particular.

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE
Do not breathe combustion products.
Metal oxides, sulphuric acid, Sulphur oxides.

5.3. Advice for firefighters

GENERAL INFORMATION
Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health. Always wear full fire prevention gear. Collect extinguishing water to prevent it from draining into the sewer system. Dispose of contaminated water used for extinction and the remains of the fire according to applicable regulations.
SPECIAL PROTECTIVE EQUIPMENT FOR FIRE-FIGHTERS
Normal fire fighting clothing i.e. fire kit (BS EN 469), gloves (BS EN 659) and boots (HO specification A29 and A30) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137).

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel
No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Do not touch or walk through spilled material. Wear appropriate respirator when ventilation is inadequate.
Wear suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing. Do not breathe mist/vapour/aerosol. Avoid leakage of the product into the environment.
Non-emergency personnel must follow the appropriate internal procedures in case of accidental release.

6.1.2 For emergency responders
Block the leakage if there is no hazard. Evacuate unprotected and untrained personnel from hazard area. Wear suitable protective equipment. (see Section 8 of this Safety data sheet)
Follow the appropriate internal procedures in case of accidental release.
Keep fumes and vapours under control. Isolate hazard area and deny entry. Ventilate closed spaces before entering. Send away individuals who are not suitably equipped. Eliminate all sources of ignition (cigarettes, flames, sparks, etc.) from the leakage site.

6.2. Environmental precautions

The product must not penetrate into the sewer system or come into contact with surface water or ground water.

6.3. Methods and material for containment and cleaning up

Collect the leaked product into a suitable container. Evaluate the compatibility of the container to be used, by checking section 10. Absorb the remainder with inert absorbent material.
Make sure the leakage site is well aired. Contaminated material should be disposed of in compliance with the provisions set forth in point 13.

6.4. Reference to other sections

Any information on personal protection and disposal is given in sections 8 and 13.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Ensure that there is an adequate earthing system for the equipment and personnel. Avoid contact with eyes and skin. Do not breathe powders, vapours or mists. Do not eat, drink or smoke during use. Wash hands after use. Avoid leakage of the product into the environment.

7.2. Conditions for safe storage, including any incompatibilities

Store only in the original container. Store in a ventilated and dry place, far away from sources of ignition. Keep containers well sealed. Keep the product in clearly labelled containers. Avoid overheating. Avoid violent blows. Keep containers away from any incompatible materials, see section 10 for details.

7.3. Specific end use(s)

No use other than as indicated in section 1.2 of this safety data sheet.

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Regulatory references:

IRL	Éire	2020 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations (2001-2015) and the Safety, Health and Welfare at Work (Carcinogens) Regulations (2001-2019)
MLT	Malta	PROTECTION OF THE HEALTH AND SAFETY OF WORKERS FROM THE RISKS RELATED TO CHEMICAL AGENTS AT WORK REGULATIONS (S.L.424.24). PROTECTION OF WORKERS FROM THE RISKS RELATED TO EXPOSURE TO CARCINOGENS OR MUTAGENS AT WORK REGULATIONS (S.L.424.22)
EU	OEL EU	Directive (EU) 2022/431; Directive (EU) 2019/1831; Directive (EU) 2019/130; Directive (EU) 2019/983; Directive (EU) 2017/2398; Directive (EU) 2017/164; Directive 2009/161/EU; Directive 2006/15/EC; Directive 2004/37/EC; Directive 2000/39/EC; Directive 98/24/EC; Directive 91/322/EEC.
	TLV-ACGIH	ACGIH 2024

SULPHURIC ACID

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
OEL	EU	0,05 *				THORA
OELV	IRL	0,05*				
TLV	MLT	0,05				
TLV-ACGIH		0,2				

Predicted no-effect concentration - PNEC	
Normal value in fresh water	
Normal value in marine water	
Normal value for fresh water sediment	
Normal value for marine water sediment	
Normal value of STP microorganisms	
Normal value for the terrestrial compartment	NPI
Normal value for the atmosphere	NPI

Health - Derived no-effect level - DNEL / DMEL

	Effects on consumers				Effects on workers			
Route of exposure	Acute local	Acute systemic	Chronic local	Chronic systemic	Acute local	Acute systemic	Chronic local	Chronic systemic
Inhalation					0,1 mg/m3		0,05 mg/m3	

DIRHODIUM TRISULPHATE Threshold Limit Value						
Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
TLV-ACGIH		0,1				Rhodium Metal and Insoluble compounds

Legend:
(C) = CEILING ; INHAL = Inhalable Fraction ; RESP = Respirable Fraction ; THORA = Thoracic Fraction.
VND = hazard identified but no DNEL/PNEC available ; NEA = no exposure expected ; NPI = no hazard identified ; LOW = low hazard ; MED = medium hazard ; HIGH = high hazard.

**The mist is defined as the thoracic fraction.*
When selecting an appropriate exposure monitoring method, account should be taken of potential limitations and interferences that may arise in the presence of other sulphur compounds. (Dir. 2009/161/EU).

Recommended monitoring procedures:
This product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.
Reference should be made to monitoring standards, such as the following:

- European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy)
- European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

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8.2. Exposure controls

General working hygiene practices involves procedures (such as showering and changing clothes at the end of the work shift) to avoid any contamination of third parties and appropriate cleaning practices (such as regular cleaning, with appropriate cleaning devices), not eating and smoking at the workplace.
Personal protective equipment (PPE) must be CE marked, showing that it complies with applicable standards.
Only use PPE provided for the risk assessment for the specific use of the product. Choose the most suitable PPE after assessing the actual conditions of use of the product.
When choosing PPE, ask your technical equipment supplier for advice.
Make sure that the workplace is well aired through effective local aspiration, based on the specific use of the product.
Provide an emergency shower with face and eye wash station. Exposure levels must be kept as low as possible to avoid significant build-up in the organism. Manage PPE so as to guarantee maximum protection (e.g. reduction in replacement times).

General PPE procedures:
Provide adequate personnel training for use.
Carry out an inspection of PPE to verify the integrity. Do not use damaged or deteriorated PPE.
Carry out the PPE inspection procedures laid down in the user manual.
Do not use PPE after its expiry date or outside the indications given in the technical data sheet/user manual.
Do not reuse single-use PPE.
PPE that is no longer usable must be disposed according to local applicable regulations.
If PPE is used in an explosive or potentially explosive atmosphere, check the compatibility for the usage.

HAND PROTECTION
Protect hands with category III work gloves.
The following should be considered when choosing work glove material (see standard EN 374): compatibility, degradation, permeability time.
The work gloves' resistance to chemical agents should be checked before use, as it can be unpredictable. The gloves' wear time depends on the duration and type of use.

SKIN PROTECTION
Wear category III professional long-sleeved overalls and safety footwear (see Regulation 2016/425 and standard EN ISO 20344). Wash body with soap and water after removing protective clothing.

EYE PROTECTION
Wear a hood visor or protective visor combined with airtight goggles (see standard EN ISO 16321).

RESPIRATORY PROTECTION
Respiratory protection devices must be used if the technical measures adopted are not suitable for restricting the worker's exposure to the threshold values considered. Use a mask with a type B filter whose class (1, 2 or 3) must be chosen according to the limit of use concentration. (see standard EN 14387).
If the substance considered is odourless or its olfactory threshold is higher than the corresponding TLV-TWA and in the case of an emergency, wear open-circuit compressed air breathing apparatus (in compliance with standard EN 137) or external air-intake breathing apparatus (in compliance with standard EN 138). For a correct choice of respiratory protection device, see standard EN 529.

ENVIRONMENTAL EXPOSURE CONTROLS
The emissions generated by manufacturing processes, including those generated by ventilation equipment, should be checked to ensure compliance with environmental standards.
Product residues must not be indiscriminately disposed of with waste water or by dumping in waterways.

SECTION 9. Physical and chemical properties

9.1. Information on basic physical and chemical properties

Properties	Value
Appearance	Liquid
Colour	Brown
Odour	Pungent
Melting point / freezing point	-1/-2 °C
Initial boiling point	> 100 °C
Flammability	Non-flammable according to CLP criteria
Lower explosive limit	not available
Upper explosive limit	not available
Flash point	not available
Auto-ignition temperature	not available
Decomposition temperature	340 °C (value for the Sulphuric acid)
pH	-0,1
Kinematic viscosity	not available
Solubility	soluble in water
Partition coefficient: n-octanol/water	not available
Vapour pressure	not available
Density and/or relative density	not available
Relative vapour density	3,4 (value for the Sulphuric acid)
Particle characteristics	not applicable on the basis of physical state

9.2. Other information

9.2.1. Information with regard to physical hazard classes
Information not available

9.2.2. Other safety characteristics
Information not available

SECTION 10. Stability and reactivity

10.1. Reactivity

SULPHURIC ACID
It attacks and corrodes numerous metals with hydrogen development; the corrosivity of sulphuric acid against metals depends on its concentration and temperature.

10.2. Chemical stability

The product is stable in normal conditions of use and storage.
SULPHURIC ACID
At 340 °C it decomposes into sulphur trioxide and water.

10.3. Possibility of hazardous reactions

No hazardous reactions are foreseeable in normal conditions of use and storage.

SULPHURIC ACID
Reacts violently with, for example: carbides, perchlorates, permanganates, fulminated, nitrates, picrates, acrylonitrile, propargyl alcohol and alkalis. These reactions can be explosive.
The dilution of the substance in water is strongly exothermic and fast. If you pour water on concentrated acid the reaction is violent and accompanied by splashes of liquid.

10.4. Conditions to avoid

None in particular. However the usual precautions used for chemical products should be respected.

10.5. Incompatible materials

SULPHURIC ACID

Flammable, reducing, basic, organic substances, metals and water.

DIRHODIUM TRISULPHATE
Corrosive effect on steel and aluminum.

10.6. Hazardous decomposition products

Metal oxides, sulphuric acid, sulphur oxides.

SECTION 11. Toxicological information

In the absence of experimental data for the product itself, health hazards are evaluated according to the properties of the substances it contains, using the criteria specified in the applicable regulation for classification.
It is therefore necessary to take into account the concentration of the individual hazardous substances indicated in section 3, to evaluate the toxicological effects of exposure to the product.

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Metabolism, toxicokinetics, mechanism of action and other information
SULPHURIC ACID
References: Clearance Of Sulfuric Acid-Introduced 35S From The Respiratory Tracts Of Rats, Guinea Pigs And Dogs Following Inhalation Or Instillation (Fundamental & Applied Toxicology 3 (4) 293-297 (1983))
Reliability (Klimisch score): 2
Species: rat (F344), dog (Beagle), guinea pig (Hartley)
Routes of exposure: inhalation and instillation
Results: Sulphate is rapidly absorbed by the lungs following exposure by inhalation of sulfuric acid.

Information on likely routes of exposure
SULPHURIC ACID
The main potential routes of exposure are inhalation, skin contact and ingestion

Delayed and immediate effects as well as chronic effects from short and long-term exposure
Information not available

Interactive effects
Information not available

ACUTE TOXICITY
Corrosive to the respiratory tract.

ATE (Inhalation) of the mixture:	Not classified
ATE (Oral) of the mixture:	Not classified
ATE (Dermal) of the mixture:	Not classified

SULPHURIC ACID
Reference: Range-finding toxicity data: List VII (Am Ind Hyg Assoc J. 1969 Sep-Oct; 30 (5): 470-6 (1969))
Reliability (Klimisch score): 2
Species: rat (Wistar)
Routes of exposure: oral
Results LD50: 2140 mg / kg

Reference: The toxicity of H2SO4 aerosols to CD-1 mice and Fischer-344 rats. (Annual Report of the Inhalation Toxicology Research Institute (p435-439) (1979))
Reliability (Klimisch score): 2
Species: rat (Fischer 344; male / female)
Routes of exposure: inhalation (aerosol)
Results CL50: 375 mg/m³

Acute skin toxicity: data not available.

Corrosion of the respiratory tract
The concentrated substance, at significant doses, has caustic power.

DIRHODIUM TRISULPHATE
Based on the weight of evidence of available data determined by expert judgment, the substance is not classified for the acute toxicity hazard class.

SKIN CORROSION / IRRITATION
Corrosive for the skin
Classification according to the experimental pH value

SULPHURIC ACID
In humans, direct skin contact with a concentrated solution of SULPHURIC ACID (pH < 2) The more prolonged the contact time and the higher the concentration, the more severe the caustic lesions.
Specific concentration limits (Annex VI Reg. 1272/2008)
Skin Corr. 1A; H314: C ≥ 15 %
Skin Irrit. 2; H315: 5 % ≤ C < 15 %

DIRHODIUM TRISULPHATE
Method:OECD 435, ex vivo
Reliability (Klimisch score):1
Species: artificial membrane
Results: corrosive, Cat. 1 B

SERIOUS EYE DAMAGE / IRRITATION
Causes serious eye damage
Classification according to the experimental pH value

SULPHURIC ACID
Based on the evidence-based data available, determined by expert judgement , the substance is classified as H314 (causes severe skin burns and serious eye damage).
Specific concentration limits (Annex VI Reg. 1272/2008)
Eye Irrit. 2; H319: 5 % ≤ C < 15 %

DIRHODIUM TRISULPHATE
Based on the evidence of available data determined by expert judgement, the substance causes serious eye damage.

RESPIRATORY OR SKIN SENSITISATION
Does not meet the classification criteria for this hazard class

Respiratory sensitization
SULPHURIC ACID
No data avaliable

Skin sensitization
SULPHURIC ACID
No data avaliable

DIRHODIUM TRISULPHATE
Rhodium (III) sulphate shows a slight potential for skin sensitization in two limited occupational studies (de la Cuadra and Grau-Massanes, 1991; Gomez de la Fuente et al., 2003).
Based on the probative value of the available data determined by expert judgment, the substance is not classified for the class of respiratory or skin sensitization.

GERM CELL MUTAGENICITY
Suspected of causing genetic defects

SULPHURIC ACID .
Reference: Sublethal pH decrease may cause genetic damage to eukaryotic cells: a study on sea urchins and Salmonella typhimurium (Teratog. Carcinog. Mutagen. 6 (4): 275-287 (1986))

Reliability (Klimisch score): 2
In vitro test
Species: TA97, TA98, TA100, TA102, TA1535
Results: negative
In vivo test: data not available.

DIRHODIUM TRISULPHATE
Method: OECD 487, IN VITRO
Reliability (Klimisch score):1
Species: lymphocytes
Results: positive
Based on the available data, the substance is classified as mutagenic (Cat. 2).

CARCINOGENICITY
Does not meet the classification criteria for this hazard class

SULPHURIC ACID
Based on the evidence of available data, the substance is not classified for the hazard class CLP of carcinogenecity

DIRHODIUM TRISULPHATE
Based on the evidence of available data, the substance is not classified for the hazard class CLP of carcinogenecity

REPRODUCTIVE TOXICITY
Does not meet the classification criteria for this hazard class

DIRHODIUM TRISULPHATE
Based on the available data, the substance is not classified in this hazard class.

Adverse effects on sexual function and fertility
SULPHURIC ACID
No data avaliable

Adverse effects on development of the offspring
SULPHURIC ACID
Method: equivalent or similar to OECD 414
Reliability (Klimisch score): 2
Species: white rabbit (New Zealand); mouse
Routes of exposure: inhalation (aerosol)
Results: NOAEC (maternal - mouse): 5.7 mg / mÂ³; NOAEC (development - mouse): 19.3 mg / mÂ³; NOAEC (maternal - rabbit): 5.7 mg / mÂ³; NOAEC (development - rabbit): 19.3 mg / mÂ³.

STOT - SINGLE EXPOSURE
Does not meet the classification criteria for this hazard class

SULPHURIC ACID
Exposure to the aerosols of sulphuric acid is responsible for irritation of the respiratory tract with an intensity that depends on the atmospheric concentration of acid, the characteristics of the aerosol, the duration of exposure and the sensitivity of the exposed animal.

DIRHODIUM TRISULPHATE
Based on the available data, the substance has no specific target organ toxicity effects for single exposure and is not classified under the relevant CLP hazard class.

STOT - REPEATED EXPOSURE
Does not meet the classification criteria for this hazard class

SULPHURIC ACID
Based on the available data, the substance has no specific target organ toxicity effects due to repeated exposure and is not classified under the relevant CLP hazard class.
Method: OECD 412
Reliability (Klimisch score): 1
Species: rat (Wistar; females)
Routes of exposure: inhalation (aerosol)
LOAEC results: 0.3 mg / mÂ³.

DIRHODIUM TRISULPHATE
Based on the evidence of available data, determined by the judgement of experts, the substance is not classified for the hazard class CLP of STOT-RE

ASPIRATION HAZARD
Does not meet the classification criteria for this hazard class

SULPHURIC ACID
There no available data for the hazard class CLP of aspiration hazard.

DIRHODIUM TRISULPHATE
There no available data for the hazard class CLP of aspiration hazard.

11.2. Information on other hazards

Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with human health effects under evaluation.

SECTION 12. Ecological information

This product is dangerous for the environment and is toxic for aquatic organisms. In the long term, it has negative effects on the aquatic environment.

12.1. Toxicity

SULPHURIC ACID	
LC50 - for Fish	> 16 mg/l/96h 16-28 (pH 3.25 to 3.5) Lepomis macrochirus (J. Fish Bid. (1984) 25, 133-137.)
EC50 - for Crustacea	> 100 mg/l/48h Daphnia magna (OECD TG 202)
EC50 - for Algae / Aquatic Plants	> 100 mg/l/72h Desmodesmus subspicatus (OECD TG 201)

Long term effects
Fish (Salvelinus fontinalis) NOEC: 0,31 mg/l (pH 5,2) (effect on embryo survival), NOEC: 0,15 mg/l (pH 5,5) (effect on hatching time); NOEC: 0,13 mg/l (pH 5,56 mg/l) (effect on weight of young fish);
Fish (Jordanella floridae) NOEC: 0,025 mg/l (calculated from the LOEC);
Crustaceans (Tanytarsus dissimilis) NOEC-35 days: 0,15 mg/l (pH 5,5) (effect on reproduction) (HSDB,2015)

DIRHODIUM TRISULPHATE	
LC50 - for Fish	220 mg/l/96h Leuciscus idus melanotus OECD Guideline 203
EC50 - for Crustacea	0,29 mg/l/48h Daphnia magna OECD Guideline 202
EC50 - for Algae / Aquatic Plants	0,522 mg/l/72h Raphidocelis subcapitata OECD Guideline 201
EC10 for Algae / Aquatic Plants	< 0,3 mg/l/72h Raphidocelis subcapitata OECD Guideline 201

12.2. Persistence and degradability

SULPHURIC ACID
It dissociates rapidly in water with sulphate ions and hydrated protons and is totally miscible in water (at pH 3.92 for example dissociation is 99%) (OECD SIDS 2001).

DIRHODIUM TRISULPHATE

Degradability: information not available inorganic substance

12.3. Bioaccumulative potential

SULPHURIC ACID
It does not bioaccumulate in tissues as it is completely dissociated in water (OECD SIDS 2001).

12.4. Mobility in soil

SULPHURIC ACID
High mobility in soil (OECD SIDS 2001)

12.5. Results of PBT and vPvB assessment

On the basis of available data, the product does not contain any PBT or vPvB in percentage ≥ than 0,1%.

12.6. Endocrine disrupting properties

Based on the available data, the product does not contain substances listed in the main European lists of potential or suspected endocrine disruptors with environmental effects under evaluation.

12.7. Other adverse effects

Information not available

SECTION 13. Disposal considerations

13.1. Waste treatment methods

Reuse, when possible. Product residues should be considered special hazardous waste. The hazard level of waste containing this product should be evaluated according to applicable regulations. (Directive 2008/98/EC and subsequent amendments and adjustments and related national transpositions).
Disposal must be performed through an authorised waste management firm, in compliance with national and local regulations.
The legal responsibility for disposal is the producer / holder of the waste.
To this mixture different EWC codes could be applied (European Waste Code) based on the specific circumstances that generated the waste, possible alterations and / or possible contamination.

The product as such, contained in the original packaging, or decanted in an appropriate container for the purpose of disposal, or no longer usable (for example following an accidental spill), must be classified with a EWC code that is compatible with the description of the use indicated in section 1.2.

The suitable final destination of the waste must be evaluated by the manufacturer on the basis of the chemical-physical characteristics of the waste, the compatibility with the authorized facility to which it will be given for recovery, and the definitive treatment or disposal according to the procedures established by current regulations .
Disposal through wastewater discharge is not permitted.

For hazardous substances registered according to Regulation EC 1907/2006 (REACH), for which a chemical safety report has been drawn up, refer to the specific information contained in the exposure scenarios attached to this SDS.

CONTAMINATED PACKAGING
Contaminated packaging must be sent, properly labeled, to recovery or disposal in compliance with national waste management regulations and must be classified with the following EWC code:

15 01 10*: packaging containing residues of or contaminated by dangerous substances

EMPTY PACKAGING
To assign a Chapter 15 Subchapter 01 (1501) code to the waste, it is necessary to determine whether the packaging/container is nominally empty. Citing what is contained in the European Commission Communication relating to the "Technical guidelines on waste classification" C/2018/1447 of 8th April 2018, and confirmed in the Sentence of the European Court of Justice n. 487/2019 and 489/2019, it is suggested to interpret the notion of "nominally empty" in the sense that the contents of the product have been effectively removed. Removal can be done via drainage or scraping. The fact that there is a minimal residue of the original content in packaging waste does not exclude the possibility of classifying this waste as 'nominally empty' and does not prohibit its assignment to subchapter 15 01 packaging waste.
A package can be considered completely emptied if in the event of a further emptying attempt, for example, due to its overturning, no more drops or solid residues are released.

Waste resulting from the use of the substance or mixture must be classified and managed by the following legal references to be considered in their updated version:

- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives;
- COMMISSION DECISION of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- Council Regulation (EU) 2017/997 of 8 June 2017 amending Annex III to Directive 2008/98/EC of the European Parliament and of the Council as regards the hazardous property HP 14 ‘Ecotoxic’.

SECTION 14. Transport information

14.1. UN number or ID number

ADR / RID, IMDG, IATA: UN 3264

14.2. UN proper shipping name

ADR / RID: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Sulphuric acid, Dirhodium trisulphate)

IMDG: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Sulphuric acid, Dirhodium trisulphate)
IATA: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (Sulphuric acid, Dirhodium trisulphate)

14.3. Transport hazard class(es)

ADR / RID:	Class: 8	Label: 8
IMDG:	Class: 8	Label: 8
IATA:	Class: 8	Label: 8

14.4. Packing group

ADR / RID, IMDG, IATA: II

14.5. Environmental hazards

ADR / RID:	Environmentally Hazardous
IMDG:	Marine Pollutant
IATA:	NO

For Air transport, environmentally hazardous mark is only mandatory for UN 3077 and UN 3082.

14.6. Special precautions for user

ADR / RID:	HIN - Kemler: 80	Limited Quantities: 1 lt	Tunnel restriction code: (E)
	Special provision: 274		
IMDG:	EMS: F-A, S-B	Limited Quantities: 1 lt	
IATA:	Cargo:	Maximum quantity: 30 L	Packaging instructions: 855
	Passengers:	Maximum quantity: 1 L	Packaging instructions: 851
	Special provision:	A3, A803	

14.7. Maritime transport in bulk according to IMO instruments

Information not relevant

SECTION 15. Regulatory information

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

Seveso Category - Directive 2012/18/EU
E2

Restrictions relating to the product or contained substances pursuant to Annex XVII to EC Regulation 1907/2006
Product
3. Liquid substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008:
(a) hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F;
(b) hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10;
(c) hazard class 4.1;
(d) hazard class 5.1.

Contained substance
Point 75

Regulation (EU) 2019/1148 - on the marketing and use of explosives precursors
Regulated explosives precursor
The acquisition, introduction, possession or use of that regulated explosives precursor by members of the general public is subject to reporting obligations as set out in Article 9.
All suspicious transactions and significant disappearances and thefts must be reported to the relevant national contact point.

Substances in Candidate List (Art. 59 REACH)
On the basis of available data, the product does not contain any SVHC in percentage ≥ than 0,1%.

Substances subject to authorisation (Annex XIV REACH)
None

Substances subject to exportation reporting pursuant to Regulation (EU) 649/2012:
None

Substances subject to the Rotterdam Convention:
None

Substances subject to the Stockholm Convention:
None

Healthcare controls
Workers exposed to this chemical agent must not undergo health checks, provided that available risk-assessment data prove that the risks related to the workers' health and safety are modest and that the 98/24/EC directive is respected.

15.2. Chemical safety assessment

A chemical safety assessment has been performed for the following contained substances: SULPHURIC ACID.

SECTION 16. Other information

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]

Classification according to Regulation (EC) Nr. 1272/2008		Classification procedure
Substance or mixture corrosive to metals, category 1	H290	On basis of test data
Germ cell mutagenicity, category 2	H341	Calculation method
Skin corrosion, category 1	H314	On basis of test data
Serious eye damage, category 1	H318	On basis of test data
Hazardous to the aquatic environment, chronic toxicity, category 2	H411	Calculation method

Text of hazard (H) indications mentioned in section 2-3 of the sheet:

Met. Corr. 1	Substance or mixture corrosive to metals, category 1
Muta. 2	Germ cell mutagenicity, category 2
Skin Corr. 1A	Skin corrosion, category 1A
Skin Corr. 1B	Skin corrosion, category 1B
Skin Corr. 1C	Skin corrosion, category 1C
Skin Corr. 1	Skin corrosion, category 1
Eye Dam. 1	Serious eye damage, category 1
Eye Irrit. 2	Eye irritation, category 2
Skin Irrit. 2	Skin irritation, category 2
Aquatic Acute 1	Hazardous to the aquatic environment, acute toxicity, category 1
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic toxicity, category 1
Aquatic Chronic 2	Hazardous to the aquatic environment, chronic toxicity, category 2
H290	May be corrosive to metals.
H341	Suspected of causing genetic defects.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.

H319	Causes serious eye irritation.
H315	Causes skin irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H411	Toxic to aquatic life with long lasting effects.
EUH071	Corrosive to the respiratory tract.
Note B	*Some substances (acids, bases, etc.) are placed on the market in aqueous solutions at various concentrations and, therefore, these solutions require different classification and labelling since the hazards vary at different concentrations.* *In Part 3 entries with Note B have a general designation of the following type: 'nitric acid … %'.* *In this case the supplier must state the percentage concentration of the solution on the label. Unless otherwise stated, it is assumed that the percentage concentration is calculated on a weight/weight basis.*

LEGEND:
- ADR: European Agreement concerning the carriage of Dangerous goods by Road
- ATE: Acute Toxicity Estimate
- CAS: Chemical Abstract Service Number
- CE50: Effective concentration (required to induce a 50% effect)
- CE: Identifier in ESIS (European archive of existing substances)
- CLP: Regulation (EC) 1272/2008
- DNEL: Derived No Effect Level
- EmS: Emergency Schedule
- GHS: Globally Harmonized System of classification and labeling of chemicals
- IATA DGR: International Air Transport Association Dangerous Goods Regulation
- IC50: Immobilization Concentration 50%
- IMDG: International Maritime Code for dangerous goods
- IMO: International Maritime Organization
- INDEX: Identifier in Annex VI of CLP
- LC50: Lethal Concentration 50%
- LD50: Lethal dose 50%
- OEL: Occupational Exposure Level
- PBT: Persistent, bioaccumulative and toxic
- PEC: Predicted environmental Concentration
- PEL: Predicted exposure level
- PMT: Persistent, mobile and toxic
- PNEC: Predicted no effect concentration
- REACH: Regulation (EC) 1907/2006
- RID: Regulation concerning the international transport of dangerous goods by train
- TLV: Threshold Limit Value
- TLV CEILING: Concentration that should not be exceeded during any time of occupational exposure.
- TWA: Time-weighted average exposure limit
- TWA STEL: Short-term exposure limit
- VOC: Volatile organic Compounds
- vPvB: Very persistent and very bioaccumulative
- vPvM: Very persistent and very mobile
- WGK: Water hazard classes (German).

GENERAL BIBLIOGRAPHY
1. Regulation (EC) 1907/2006 (REACH) of the European Parliament
2. Regulation (EC) 1272/2008 (CLP) of the European Parliament
3. Regulation (EU) 2020/878 (II Annex of REACH Regulation)
4. Regulation (EC) 790/2009 (I Atp. CLP) of the European Parliament
5. Regulation (EU) 286/2011 (II Atp. CLP) of the European Parliament
6. Regulation (EU) 618/2012 (III Atp. CLP) of the European Parliament
7. Regulation (EU) 487/2013 (IV Atp. CLP) of the European Parliament
8. Regulation (EU) 944/2013 (V Atp. CLP) of the European Parliament
9. Regulation (EU) 605/2014 (VI Atp. CLP) of the European Parliament
10. Regulation (EU) 2015/1221 (VII Atp. CLP) of the European Parliament
11. Regulation (EU) 2016/918 (VIII Atp. CLP) of the European Parliament
12. Regulation (EU) 2016/1179 (IX Atp. CLP)
13. Regulation (EU) 2017/776 (X Atp. CLP)
14. Regulation (EU) 2018/669 (XI Atp. CLP)
15. Regulation (EU) 2019/521 (XII Atp. CLP)
16. Delegated Regulation (UE) 2018/1480 (XIII Atp. CLP)
17. Regulation (EU) 2019/1148
18. Delegated Regulation (UE) 2020/217 (XIV Atp. CLP)
19. Delegated Regulation (UE) 2020/1182 (XV Atp. CLP)
20. Delegated Regulation (UE) 2021/643 (XVI Atp. CLP)
21. Delegated Regulation (UE) 2021/849 (XVII Atp. CLP)
22. Delegated Regulation (UE) 2022/692 (XVIII Atp. CLP)
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24. Delegated Regulation (UE) 2023/1434 (XIX Atp. CLP)
25. Delegated Regulation (UE) 2023/1435 (XX Atp. CLP)

26. Delegated Regulation (UE) 2024/197 (XXI Atp. CLP)
- The Merck Index. - 10th Edition
- Handling Chemical Safety
- INRS - Fiche Toxicologique (toxicological sheet)
- Patty - Industrial Hygiene and Toxicology
- N.I. Sax - Dangerous properties of Industrial Materials-7, 1989 Edition
- IFA GESTIS website
- ECHA website
- Database of SDS models for chemicals - Ministry of Health and ISS (Istituto Superiore di Sanità) - Italy

Note for the recipient of the Safety Data Sheet (SDS):

The recipient of this SDS shall make sure of reading and understanding the information included by all people who handle, store, use, or otherwise come into contact in any way with the substance or mixture to which this SDS is referred to. In particular, the recipient shall provide adequate training to the personnel for the use of hazardous substances and/or mixtures. The recipient shall verify the suitability and completeness of the provided information according to the specific use of the substance or mixture.

However, the substance or mixture referred to by this SDS shall not be used for uses other than those specified in Section 1. The Supplier don't assume responsibility for improper uses. Since the use of the product does not fall under the direct control of the Supplier, the user shall, under his own responsibility, fulfill national and EU regulations concerning health and safety.

The information included in this SDS are provided in good faith and are based on the current state of scientific and technical knowledge, at the revision date indicated, available to the Supplier indicated in Section 1 of this SDS. It shall not be meant that the SDS is a guarantee of any specific property of the substance or mixture. The information concern only to the substance or mixture specifically designated in Section 1 and it could not be valid for the substance or mixture used in combination with other materials or in any process not specified in the text.

This version of the SDS substitutes all the previous versions.

Changes to previous review:
The following sections were modified:
01 / 02 / 03 / 04 / 05 / 06 / 07 / 08 / 09 / 10 / 11 / 12 / 13 / 14 / 15 / 16.

ATTACHED EXPOSURE SCENARIO

Substance name	Registrazione Number	Exposure scenario
SULPHURIC ACID	01-2119458838-20-0087	ES6 - Industrial end-use - Use of sulphuric acid in surface treatments, purification and etching and electrolytic processes

6. Industrial end-use - Use of sulphuric acid in surface treatments, purification and etching and electrolytic processes

Section 1 Title of the Exposure Scenario	
Abbreviated title: Use of sulphuric acid in surface treatments, purification and etching and electrolytic processes	
Systematic title based on the use of descriptors	
Sector of use (SU)	2a, 14, 15, 16
Product Categories (PC)	14, 15
Process Categories (PROC)	1, 2, 3, 8a, 8b, 9, 13, 15, 28
Environmental Release Categories (ERC)	6b
Processes, assignments, activities covered	
Sulphuric acid is widely used in surface treatments, purification and incision, and electrolytic processes. Common applications include: Use in pickling steel (also galvanized): electrogalvanzing of iron and steel products; Use in abrasive, descaling and cleaning surfaces before electrolysis; Use in polished immersion techniques of brass; Use in aluminum treatments; Use in the engraving industry (e.g. glass engraving) Use in metal refining Industrial sites that use sulphuric acid in surface treatments, purification and engraving, and electrolytic processes will vary in size. In large-scale chemical synthesis plants, processing equipment, vessels and reactors will generally be housed outdoors and operated by a small number of operators working in a separate closed control room. At these larger sites, processes typically operate uninterruptedly, for long periods without interruption, up to 330 days a year. Operators work a standard shift and a normal working week, with production continuing on weekends. Small-scale operations may also be possible.	
Section 2: CS1-Environmental exposure: Use of sulphuric acid in surface treatments, purification and etching and electrolytic processes(ERC 6b)	
Exposure assessment and risk characterisation are not necessary as no environmental hazard has been identified.	
Section 3 Exposure for Workers	
Evaluation method	
ART 1.5	
Worker CS 2: Use of sulphuric acid in closed, continuous processes, without likelihood of exposure (Hot processes, indoors and outdoors) (PROC 1)	
Product features	
Concentration of the substance in the product (% w/w)	≤98%
Physical state	Liquid including paste/slurry/suspension
Vapour pressure (Pa)	<130 (volatile)
Viscosity	Liquid with low viscosity (similar to water)
Operating conditions	
Duration of the activity	≤ 8 h /day
(ART) duration of the activity	< 480 min
(ART) duration of non-exposure	> 0 min
Technical and organisational conditions and specific measures for risk management	
Proximity to the primary source of emission	The primary source of emission is not located in the worker's breathing zone
Activity class	Activities with open liquid surfaces or open tanks/activities with agitated surfaces
Situation	Open area 0.1-0.3 m^2.
Room ventilation	Basic (up to 3 ACH)

Personal enclosure	Partial insulation without ventilation (inhalation effectiveness: 70%) Workers are separated from the emission source, e.g. workers are in a separate control room	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	
Segregation systems	No system (the source is not isolated from the workspace)	
Process enclosure	Process fully enclosed The process is completely closed (airtight) and the integrity of the seal is monitored. Containment is not interrupted for sampling or routine cleaning.	
Dispersion – General ventilation	3 ACH	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Operating temperature	≤ 40°C	
Work area	Indoor	
Room size	1000 m^3	
Process temperature	Hot processes (50-150°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	1.1E-3 mg/m^3	Exposure/DMEL: = 0.022
Inhalation acute local effects	8.8E-3 mg/m^3	Exposure/DMEL: = 0.088
Worker CS 3: Use of sulphuric acid in closed, continuous processes with occasional controlled exposure (Hot processes) (PROC 2)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	<130 (volatile)	
Viscosity	Liquid with low viscosity (similar to water)	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	The primary source of emission is not located in the worker's breathing zone	
Activity class	Activities with open liquid surfaces or open tanks/activities with agitated surfaces	
Situation	Open area 0.1-0.3 m^2.	
Room ventilation	Basic (up to 3 ACH)	
Personal enclosure	no personal enclosure	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	

Segregation systems	No system	
Process enclosure	Process not fully completely enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion - Distance of the worker from the emission source (external):	> 4 m	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Operating temperature	≤ 40°C	
Work area	Outdoor (close to buildings)	
Process temperature	Hot processes 50-150°C	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	3.1E-4 mg/m^3	Exposure/DMEL: < 0,01
Inhalation acute local effects	2.5 E-3 mg/m^3	Exposure/DMEL: = 0.025
Worker CS 4: Use of sulphuric acid in closed, batch processes, with occasional controlled exposure (Hot processes) (PROC 3)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	<130 (volatile)	
Viscosity	Liquid with low viscosity (similar to water)	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	The primary source of emission is not located in the worker's breathing zone	
Activity class	Activities with open liquid surfaces or open tanks/activities with agitated surfaces	
Situation	Open area 0.1-0.3 m^2.	
Room ventilation	Basic (up to 3 ACH)	
Personal enclosure	no personal enclosure	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	
Segregation systems	No system	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion - Distance of the worker from the emission source (external):	> 4 m	
Conditions and measures relating to personal protection, hygiene and health assessment		

Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Operating temperature	≤ 40°C	
Work area	Outdoor (close to buildings)	
Process temperature	Hot processes 50-150°C	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	3.1E-4 mg/m^3	Exposure/DMEL: = 0,01
Inhalation acute local effects	2.5 E-3 mg/m^3	Exposure/DMEL: = 0.025
Worker CS 5: Transfer of sulphuric acid from road tankers/cars or other vessels to bulk storage facility and charging (dedicated facilities) (PROC 8b)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	< 6 (low volatility substance, exposure to fog is estimated)	
Viscosity	Liquid with medium viscosity (similar to oil)	
Weight of the fraction	100%	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	Primary emission source not located in the breathing zone of the worker (Far field source)	
Activity class	Transfer of liquid products / Falling liquids	
Situation	Transfer of liquid product with flow > 1000 l/minute.	
Room ventilation	Basic (up to 3 ACH)	
Personal enclosure	no personal enclosure	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Type of loading	Submerged loading, where the liquid dispenser remains below the fluid level reducing the amount of aerosol formation	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	
Segregation systems	No system	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion - Distance of the worker from the emission source (external):	≤ 4 m	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	

Other conditions affecting the worker's exposure		
Place of use	Outdoor	
Operating temperature	≤ 40°C	
Work area	Outdoor (close to buildings)	
Process temperature	Room temperature (15-25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	1.9E-6mg/m^3	Exposure/DMEL: < 0,01
Inhalation acute local effects	1.5E-5 mg/m^3	Exposure/DMEL: < 0,01
Worker CS 6: Transfer of sulphuric acid into large containers (dedicated facilities; e.g. transferring pickling fluid) (PROC 8b)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	< 6 (low volatility substance, exposure to fog is estimated)	
Viscosity	Liquid with medium viscosity (similar to oil)	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	Primary emission source not located in the breathing zone of the worker (Far field source)	
Activity class	Transfer of liquid products / Falling liquids	
Situation	Transfer of liquid product with flow of 100 - 1000 l/minute e.g. Filling drums.	
Room ventilation	Basic (up to 3 ACH)	
Personal enclosure	no personal enclosure	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Type of loading	Submerged loading, where the liquid dispenser remains below the fluid level reducing the amount of aerosol formation	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	
Segregation systems	No system	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion – General ventilation	3 ACH	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Room size	1000 m^3	
Operating temperature	≤ 40°C	
Work area	Indoor	

Process temperature	Room temperature (15-25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	3.7E-5 mg/m^3	Exposure/DMEL: < 0,01
Inhalation acute local effects	3E-4 mg/m^3	Exposure/DMEL: < 0,01
Worker CS 7: Transfer of sulphuric acid into large containers (non-dedicated facilities; e.g. transferring pickling fluid) (PROC 8a)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	< 6 (low volatility substance, exposure to fog is estimated)	
Viscosity	Liquid with medium viscosity (similar to oil)	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	Primary emission source not located in the breathing zone of the worker (Far field source)	
Activity class	Transfer of liquid products / Falling liquids	
Situation	Transfer of liquid product with flow of 100 - 1000 l/minute e.g. Filling drums.	
Room ventilation	Basic (up to 3 ACH)	
Personal enclosure	no personal enclosure	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Type of loading	Submerged loading, where the liquid dispenser remains below the fluid level reducing the amount of aerosol formation	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Localized secondary control system	No system	
Segregation systems	No system	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion – General ventilation	3 ACH	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Room size	1000 m^3	
Operating temperature	≤ 40°C	
Work area	Indoor	
Process temperature	Room temperature (15-25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification

Inhalation, long-term local effects	3.4E-4 mg/m^3	Exposure/DMEL: < 0,01
Inhalation acute local effects	3E-3 mg/m^3	Exposure/DMEL: < 0,03
Worker CS 8: Transfer of sulphuric acid into small containers (e.g. sampling for analysis) (PROC 9)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	< 6 (low volatility substance, exposure to fog is estimated)	
Viscosity	Liquid with medium viscosity (similar to oil)	
Operating conditions		
Duration of the activity	≤ 1 h /day	
(ART) duration of the activity	< 60 min	
(ART) duration of non-exposure	> 420 min	
Technical and organisational conditions and specific measures for risk management		
Level of containment of the process	Handling that reduces contact between product and adjacent air *Transfer of liquid through a small opening*	
Proximity to the primary source of emission	Primary emission source located in the breathing zone of the worker (Near field source)	
Activity class	Transfer of liquid products / Falling liquids	
Situation	Transfer of liquid product with flow of 0.1 - 1 l/minute e.g. Filling bottles	
Room ventilation	Basic (up to 3 ACH)	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Type of loading	Splash loading, where the liquid dispenser remains at the top of the reservoir and the liquid splashes freely	
Localized primary control system	No High Level Extraction/Containment [Inhalation Efficacy: 99.9%]	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion – General ventilation	Only good natural ventilation	
Secondary emission source	No secondary emission sources present in the workroom in addition to the source in the breathing zone of the worker	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Room size	Any size	
Operating temperature	≤ 40°C	
Work area	Indoor	
Process temperature	Room temperature (15-25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	2.3E-3 mg/m^3	Exposure/DMEL: 0.046
Inhalation acute local effects	0.018 mg/m^3	Exposure/DMEL: 0.1803
Worker CS 9: Dipping of materials in sulphuric acid (e.g. pickling processes) (PROC 13)		
Product features		

Concentration of the substance in the product (% w/w)	≤10%	
Physical state	Liquid including paste/slurry/suspension	
Product type	Liquid	
Vapour pressure (Pa)	< 130 (low volatility substance, exposure to fog is estimated)	
Operating conditions		
Duration of the activity	≤ 8 h /day	
(ART) duration of the activity	< 240 min	
(ART) duration of non-exposure	> 240 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	Primary emission source not located in the breathing zone of the worker (Far field source)	
Activity class	Activities with open liquid surfaces or open reservoirs / Activities with relatively undisturbed surfaces (no aerosol formation) *e.g. Dipping/immersing objects; tank dipping*	
Situation	Open surface > 3 m2	
Room ventilation	Basic (up to 3 ACH)	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Localized primary control system	Local exhaust ventilation (LEV) / Capturing hoods / Fixed capturing hood [Effectiveness Inhalation: 90%]	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion – General ventilation	Only good natural ventilation	
Secondary emission source	No secondary emission sources present in the workroom in addition to the source in the breathing zone of the worker	
Segregation	No segragation	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Respiratory protection	Yes (APF >= 20)	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Room size	Large workrooms only	
Operating temperature	≤ 40°C	
Work area	Indoor	
Process temperature	Hot processes (50 - 150 ºC)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	7.5E-3 mg/m^3	Exposure/DMEL: 0.15
Inhalation acute local effects	0.06 mg/m^3	Exposure/DMEL: 0.6
Worker CS 10: Laboratory analysis (PROC 15)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Viscosity	Liquids with medium viscosity (like oil)	

Vapour pressure (Pa)	< 6 *The substance is considered to be low volatile and exposure to vapour is estimated*	
Operating conditions		
Duration of the activity	≤ 1 h /day	
(ART) duration of the activity	< 60 min	
(ART) duration of non-exposure	> 420 min	
Technical and organisational conditions and specific measures for risk management		
Activity class	Transfer of liquid products / Falling liquids	
Primary emission source proximity	Primary emission source located in the breathing zone of the worker (Near field source)	
Situation	Transfer of liquid product with flow of < 0.1 l/minute *e.g. Transfer of small amounts in a laboratory*	
Room ventilation	Basic (up to 3 ACH)	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Type of loading	Splash loading, where the liquid dispenser remains at the top of the reservoir and the liquid splashes freely	
Localized primary control system	Local exhaust ventilation (LEV) / Enclosing hoods / Fume cupboard [Effectiveness Inhalation: 99%]	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion – General ventilation	3 ACH	
Secondary emission source	No secondary emission sources present in the workroom in addition to the source in the breathing zone of the worker	
Conditions and measures relating to personal protection, hygiene and health assessment		
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Room size	300 m^2	
Operating temperature	≤ 40°C	
Work area	Indoor	
Process temperature	Room temperature (15 – 25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	4E-4 mg/m^3	Exposure/DMEL: < 0.01
Inhalation acute local effects	3.3E-3 mg/m^3	Exposure/DMEL: 0.033
Worker CS 11: Maintenance, repair and cleaning operations (including shut-down operations) (PROC 28)		
Product features		
Concentration of the substance in the product (% w/w)	≤98%	
Physical state	Liquid including paste/slurry/suspension	
Vapour pressure (Pa)	< 6 (low volatility substance, exposure to fog is estimated)	
Viscosity	Liquid with medium viscosity (similar to oil)	
Operating conditions		
Duration of the activity	≤ 8 h /day	

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(ART) duration of the activity	< 480 min	
(ART) duration of non-exposure	> 0 min	
Technical and organisational conditions and specific measures for risk management		
Proximity to the primary source of emission	The primary source of emission is located in the breathing zone of the worker (Near field source)	
Activity class	Handling of contaminated objects	
Situation	Activities with treated/contaminated objects (surface 1-3 m^2)	
Room ventilation	Basic (up to 3 ACH)	
Occupational Health and Safety Management System	Advanced	
Local exhaust ventilation	No	
Level of contamination	Contaminated surface < 10%	
Localized primary control system	No system	
Process enclosure	Process not fully enclosed	
Housekeeping Practices	Demonstrable and effective cleaning practices in place	
Dispersion. General ventilation	3 ACH	
Secondary emission source	No secondary emission source present in the working environment other than the source in the worker's breathing zone	
Conditions and measures relating to personal protection, hygiene and health assessment		
Respiratory protection	No	
Chemical Protective clothing	YES, acid-resistant coverall and safety boots to prevent skin contact	
Face/Eye protection	YES, helmet with full face shield/chemical glasses to avoid eye contact	
Dermal protection	YES, chemically resistant acid-resistant gloves with activity-specific training) and (other) appropriate skin protection [Skin efficacy: 95%]	
Other conditions affecting the worker's exposure		
Place of use	Indoor	
Operating temperature	≤ 40°C	
Work area	Indoor	
Room size	Any size	
Process temperature	Room temperature (15-25°C)	
Exposure and risk characterisation (RCR)		
Route of exposure and type of effects	Exposure	Risk Quantification
Inhalation, long-term local effects	1E-4 mg/m^3	Exposure/DMEL: <0,01
Inhalation acute local effects	8E-4 mg/m^3	Exposure/DMEL: < 0,01
Section 4 Guide to verifying compliance with the exposure scenario		
4.1 Health		
Exposures are expected not to exceed acute and chronic inhalation DNELs for local effects when the Risk Management Measures/Operating Conditions set out in Section 3 are applied. Where different Risk Management Measures/Operating Conditions are adopted, users are required to ensure that risks are managed at at least an equivalent level.		