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 — **PALLADIUM TETRAMINE - 1%**

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.
Serious eye damage, category 1	H318	Causes serious eye damage.
Skin irritation, category 2	H315	Causes skin irritation.
Skin sensitization, category 1A	H317	May cause an allergic skin reaction.
Hazardous to the aquatic environment, acute toxicity, category 1	H400	Very toxic to aquatic life.
Hazardous to the aquatic environment, chronic toxicity, category 1	H410	Very 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.
H318	Causes serious eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statements:

P261	Avoid breathing fume / mist / vapours.
P273	Avoid release to the environment.
P280	Wear protective gloves / eye protection / face protection.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER / doctor.
P362+P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.

Contains: AMMONIA 4,5 %
TETRAAMMINEPALLADIUM(2+) DICHLORIDE

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)
AMMONIA		
INDEX 007-001-01-2 EC 215-647-6 CAS 1336-21-6	4 ≤ x < 5	Skin Corr. 1B H314, Eye Dam. 1 H318, STOT SE 3 H335, Aquatic Acute 1 H400 M=1, Classification note according to Annex VI to the CLP Regulation: B *Specific Concentration Limits (SCL)* STOT SE 3 H335: ≥ 5%
TETRAAMMINEPALLADIUM(2+) DICHLORIDE		
INDEX - EC 237-489-7 CAS 13815-17-3	2 ≤ x < 3	Met. Corr. 1 H290, Acute Tox. 4 H302, Eye Irrit. 2 H319, Skin Sens. 1A H317, Aquatic Acute 1 H400 M=100, Aquatic Chronic 1 H410 M=10 LD50 Oral: 933 mg/kg

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. 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

Skin contact may provoke the following symptoms: Allergic reactions, skin irritation.
Ingestion may provoke the following symptoms: Stomach/intestinal disorders
In case of eye contact: Excessive lachrymation, Causes serious eye damage.

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
High volume water jet

5.2. Special hazards arising from the substance or mixture

HAZARDS CAUSED BY EXPOSURE IN THE EVENT OF FIRE
Do not breathe combustion products. Ammonia, Metal oxides, Nitrogen oxides (NOx), Chlorine compounds.

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:

DEU	Deutschland	Forschungsgemeinschaft MAK- und BAT-Werte-Liste 2022 Ständige Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe Mitteilung 58
ESP	España	Límites de exposición profesional para agentes químicos en España 2023
FRA	France	Valeurs limites d'exposition professionnelle aux agents chimiques en FranceDécret n° 2021-1849 du 28 décembre 2021
FIN	Suomi	HTP-VÄRDEN 2020. Koncentrationer som befunnits skadliga. SOCIAL - OCH HÄLSOVÅRDSMINISTERIETS PUBLIKATIONER 2020:25
HUN	Magyarország	Az innovációért és technológiáért felelős miniszter 5/2020. (II. 6.) ITM rendelete a kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
ITA	Italia	Decreto Legislativo 9 Aprile 2008, n.81
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)
POL	Polska	Rozporządzenie ministra rozwoju, pracy i technologii z dnia 18 lutego 2021 r. Zmieniające rozporządzenie w sprawie najwyższych dopuszczalnych stężeń i natężeń czynników szkodliwych dla zdrowia w środowisku pracy
ROU	România	Hotărârea nr. 53/2021 pentru modificarea hotărârii guvernului nr. 1.218/2006, precum și pentru modificarea și completarea hotărârii guvernului nr. 1.093/2006
SWE	Sverige	Hygieniska gränsvärden, Arbetsmiljöverkets föreskrifter och allmänna råd om hygieniska gränsvärden (AFS 2018:1)
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

AMMONIA

Threshold Limit Value

Type	Country	TWA/8h		STEL/15min		Remarks / Observations
		mg/m3	ppm	mg/m3	ppm	
AGW	DEU	14	20	36	50	
MAK	DEU	14	20	36	50	
VLA	ESP	14	20	36	50	
VLEP	FRA	7	10	14	20	
HTP	FIN	14	20	36	50	
AK	HUN	14		36		Ammonia gas
OELV	IRL	14	20	36	50	
NDS/NDSCh	POL	14		28		
TLV	ROU	14	20	36	50	
NGV/KGV	SWE	14	20	36	50	
OEL	EU	14	20	36	50	
TLV-ACGIH			25		35	

Legend:
(C) = CEILING ; INHAL = Inhalable Fraction ; RESP = Respirable Fraction ; THORA = Thoracic Fraction.

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.

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 II 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 airtight protective 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.
Wear a mask with a type ABEK-P filter whose category (1, 2 or 3) must be chosen according to the limit of use concentration. (see standard EN 14387).
The risk assessment should take into account: the hazard class of the substance/mixture, the mode of exposure, the timing of exposure, the exposure concentrations.
The risk assessment should take into account the use of PPE also in situations where the exposure may not be perceived by the worker.
The selection of the PPE should take into account the maximum concentration limit of the substance/mixture, and the maximum time of exposure at which the filters provide the protection of the worker, based on the technical sheet of the PPE. The risk assessment should replace the filter mask with open-circuit compressed air breathing apparatus (in compliance with standard EN 137) or external air-intake breathing apparatus (in compliance with standard EN 138) in cases where a filter mask does not provide sufficient protection for the worker on the basis of the methods of use, the concentration of the substance/mixture in the air or the timing of exposure.

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	Yellow
Odour	not available
Melting point / freezing point	not available
Initial boiling point	40 °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	not available
pH	8-10
Kinematic viscosity	not available
Solubility	Fully miscible in water
Partition coefficient: n-octanol/water	not available
Vapour pressure	not available
Density and/or relative density	not available
Relative vapour density	not available
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

There are no particular risks of reaction with other substances in normal conditions of use.

10.2. Chemical stability

The product is stable in normal conditions of use and storage.

10.3. Possibility of hazardous reactions

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

10.4. Conditions to avoid

Heating and heat sources. Avoid contamination from any source including metals, dust and organic materials.

10.5. Incompatible materials

AMMONIA: silver, lead, zinc and their salts; hydrochloric acid, nitric acid, oleum, halogens, acrolein, nitromethane and acrylic acid.

10.6. Hazardous decomposition products

Ammonia,
Metal oxides,
Nitrogen oxides (NOx)
Chlorine compounds

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
AMMONIA
On contact with moisture, anhydrous ammonia is rapidly transformed into ammonia responsible for the caustic attack on skin and mucous membranes (INRS, 2007).

Information on likely routes of exposure
AMMONIA
The main potential routes of exposure are skin contact and ingestion.

Delayed and immediate effects as well as chronic effects from short and long-term exposure
AMMONIA
Ingestion of a concentrated solution (pH > 11.5) is immediately followed by oral, retrosternal and epigastric pain. Frequent is vomiting, usually bloody. Examination of the oral cavity shows, almost always, severe burns. The esophagoduodenal fibroscopy allows to make a balance of the caustic lesions of the upper digestive tract. There is metabolic acidosis and increased tissue enzymes, a sign of necrosis and hyperleucocytosis always present (INRS, 2007). Complications may include: digestive hemorrhages, esophageal or gastric perforations, secondary shock due to heavy bleeding or perforation, severe metabolic acidosis and/or disseminated intravascular coagulation, respiratory distress due to laryngeal edema or inhalation pneumonia or exotracheal fistula. Evolution may be a digestive stenosis (INRS, 2007). Inhalation of high concentrations of steam can cause laryngeal edema, inflammation of the respiratory tract, and chemical pneumonia. Effects may be delayed (IPCS, 1995). Lungs may be damaged by repeated or prolonged exposure to steam or aerosols (IPCS, 1995).

Interactive effects
Information not available

ACUTE TOXICITY

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

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 401
Reliability (Klimisch score):2
Species: rat (Sprague-Dawley; male/female)
Exposure: oral
Results: LD50 = 933 mg/kg
Method :OECD 402
Reliability (Klimisch score):2
Species: rat (Sprague-Dawley; male/female)
Exposure: Dermal
Results: LD50 > 2000 mg/kg

AMMONIA
CL50-2 h(Inhalation): 7600 mg/m3 (Rat INRS, 2007)
LD50 (Oral): 350 mg/kg Rat (SIAM 24, 17-20 April 2007, OECD)

SKIN CORROSION / IRRITATION
Causes skin irritation

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 404
Reliability (Klimisch score):1
Species: rabbit (New Zealand White)
Results: not irritating

AMMONIA
Causes severe skin burns (Harmonized classification, Annex VI, CLP Reg)

SERIOUS EYE DAMAGE / IRRITATION
Causes serious eye damage

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 405
Reliability (Klimisch score):1
Species: rabbit (New Zealand White)
Results: irritating

AMMONIA
Causes serious eye damage (Harmonized classification, Annex VI, CLP Reg)

RESPIRATORY OR SKIN SENSITISATION
Sensitising for the skin

AMMONIA
Based on the evidence of available data, determined by the judgement of experts, the substance is not classified for the hazard class CLP of respiratory or skin sensitization.

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 406, in vivo
Reliability (Klimisch score): 1
Species: guinea pig (Dunkin-Hartley; male)
Results: Sensitising, Cat. 1A

GERM CELL MUTAGENICITY
Does not meet the classification criteria for this hazard class

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 476, in vitro, read-across
Reliability (Klimisch score):2
Species : mouse lymphoma L5178Y
Results: negative
Method:OECD 474, in vivo
Reliability (Klimisch score):2
Species: mouse (male)
Exposure: oral
Results: negative

AMMONIA
Based on the available data, the substance has no mutagenic effects and is not classified under the CLP hazard class of mutagenicity on germ cells.

CARCINOGENICITY
Does not meet the classification criteria for this hazard class

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Based on the evidence of available data, the substance is not classified for the hazard class CLP of carcinogenecity

AMMONIA
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

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Based on the evidence of available data, the substance is not classified for the hazard class CLP of toxicity to reproduction

AMMONIA
Based on the evidence of available data, the substance is not classified for the hazard class CLP of toxicity to reproduction

Adverse effects on sexual function and fertility

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Method: OECD 421
Reliability (Klimisch score):1
Species: rat (Wistar; male/female)
Exposure: oral
Results: NOAEL 100 mg/kg bw/day general toxicity

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

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
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.

AMMONIA
Corrosive to the respiratory tract and by ingestion (IPCS, 1995).
Specific concentration limits H335: C ≥ 5 % (Annex VI Reg. 1272/2008)

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

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
Based on the available data, the substance does not have any specific toxicity effects for target organs from repeated exposure and is not classified under its CLP hazard class.
Method: EU Method B.7
Reliability (Klimisch score):2
Species: rat (Sprague-Dawley; male/female)
Exposure: oral
Results: NOAEL 15 mg/kg bw/day

AMMONIA
Lungs may be damaged by repeated or prolonged exposure to steam or aerosol (IPCS,1995).

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

TETRAAMMINEPALLADIUM(2+) DICHLORIDE
There no available data for the hazard class CLP of aspiration hazard.

AMMONIA
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 highly toxic for aquatic organisms. In the long term, it has negative effects on the aquatic environment.

12.1. Toxicity

TETRAAMMINEPALLADIUM(2+) DICHLORIDE	
LC50 - for Fish	0,15 mg/l/96h Oncorhynchus mykiss; OECD 203
EC50 - for Crustacea	0,035 mg/l/48h Daphnia Magna; OECD 202
EC50 - for Algae / Aquatic Plants	0,004 mg/l/72h Raphidocelis subcapitata; OECD 201
Chronic NOEC for Crustacea	0,0143 mg/l/21d Daphnia Magna, OECD 211
Chronic NOEC for Algae / Aquatic Plants	0,002 mg/l/72h Raphidocelis subcapitata; OECD 201

AMMONIA

Short-term effects
Fish (Lepomis macrochirus) LC50-48 h: 0,024-0,093 mg/l (HSDB, 2015).
Crustaceans (Daphnia magna) EC50-48 h: 0,66 mg/l (HSDB, 2015; Prevent, 2015).
Algae LC50-72 hours > 5 mg/l (Prevent, 2015).
Long term effects
Data not available.

12.2. Persistence and degradability

TETRAAMMINEPALLADIUM(2+) DICHLORIDE	
Degradability: information not available	inorganic substance

AMMONIA

Degradability: information not available	inorganic substance

12.3. Bioaccumulative potential

Information not available

12.4. Mobility in soil

Information not available

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.

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 3266

14.2. UN proper shipping name

ADR / RID: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (ammonia, Tetraamminepalladium(2+) dichloride)
IMDG: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (ammonia, Tetraamminepalladium(2+) dichloride)

IATA: CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (ammonia, Tetraamminepalladium(2+) dichloride)

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: III

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: 5 lt	Tunnel restriction code: (E)
	Special provision: 274		
IMDG:	EMS: F-A, S-B	Limited Quantities: 5 lt	
IATA:	Cargo:	Maximum quantity: 60 L	Packaging instructions: 856
	Passengers:	Maximum quantity: 5 L	Packaging instructions: 852
	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:
E1

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

not applicable

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 not been performed for the preparation/for the substances indicated in section 3.

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	Expert judgement
Serious eye damage, category 1	H318	Calculation method
Skin irritation, category 2	H315	Calculation method
Skin sensitization, category 1A	H317	Calculation method
Hazardous to the aquatic environment, acute toxicity, category 1	H400	Calculation method
Hazardous to the aquatic environment, chronic toxicity, category 1	H410	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
Acute Tox. 4	Acute toxicity, category 4
Skin Corr. 1B	Skin corrosion, category 1B
Eye Dam. 1	Serious eye damage, category 1
Eye Irrit. 2	Eye irritation, category 2
Skin Irrit. 2	Skin irritation, category 2
STOT SE 3	Specific target organ toxicity - single exposure, category 3
Skin Sens. 1A	Skin sensitization, category 1A
Aquatic Acute 1	Hazardous to the aquatic environment, acute toxicity, category 1
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic toxicity, category 1
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H315	Causes skin irritation.
H335	May cause respiratory irritation.
H317	May cause an allergic skin reaction.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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)
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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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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.