

**Safety data sheet**  
**According to Regulation n. 1907/2006 and Regulation 878/2020**  
**Tetrammine Palladium Chloride Solution 100g/l**



Rev n. XV – 02.04.2024  
 Replaces rev XIV – 27.11.2023

**1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

**1.1 Product identifier**

Commercial name            Tetrammine Palladium Chloride Solution 100 g/L  
 Product code                142  
 Registration number        A registration number is not available for this product as it is a mixture  
 UFI code                        6GJ5-S0AG-7009-KDGM

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

Intended uses                Industrial use. Additive for galvanic baths  
 Advised against uses        None in particular

**1.3 Details of the supplier of the safety data sheet**

Name                            FAGGI ENRICO S.P.A.  
 Address                        Via Majorana, 101/103 50019 Sesto Fiorentino FI  
 Telephone number            055311861  
 Fax number                    055311791  
 Competent person responsible for the safety data sheet    lorenzo.magaldi@faggi.it

**1.4 Emergency telephone number**    111 - Medical helpline operating in England, in Scotland (NHS 24) and in Wales (NHS Direct Wales)

**2. HAZARDS IDENTIFICATION**

**2.1 Classification of the substance or mixture according to Regulation (EC) n. 1272/2008**

Hazard classes	Category codes	Hazard statements
Skin Corrosive	1B	H314
Skin sensitization	1	H317
STOT SE	3	H335
Aquatic acute	1	H400
Aquatic chronic	1	H410
Corrosive to the respiratory tract		EUH071

**2.2 Label elements**

**Pictograms**



**Signal words**

**DANGER (ammonia)**

**Hazard statements**

H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction
H335	May cause respiratory irritation
H410	Very toxic to aquatic life with long lasting effects
EUH071	Corrosive to the respiratory tract

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<b>Precautionary statements</b>	P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
	P280	Wear protective gloves/protective clothing/eye protection/face protection.
	P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor/if you feel unwell.
	P302+P352	IF ON SKIN: Wash with plenty of water
	P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
	P273	Avoid release to the environment.
<b>2.3 UFI code</b>	6GJ5-SOAG-7009-KDGM	
<b>Other hazards</b>	It does NOT contain PBT / vPvB substances according to Regulation (EC) 1907/2006, annex XIII. It does NOT contain substances that interfere with the endocrine system in accordance with Regulation (EC) 1907/2006 art.59 paragraph 1 and in accordance with the criteria established in Regulation (EU) 2017/2100 and Regulation (EU) 2018/605.	

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**3.2 Mixture**

Product identifier	Concentration %	Classification	
		Hazard classes	Category codes
Ammonia	10 ≤ C ≤ 20	Skin corr. 1 B	H314
CAS 1336-21-6		Acute toxicity 4	H332
EC: 215-647-6		(inhalation)	
INDEX 007-001-01-2		STOT SE 3	H335
REACH n. 01-2119488876-14-XXXX		Aquatic acute 1	H400
ATE (inhalation): 3285 ppm		Aquatic chronic 2	H411
M factor acute toxicity: 1		Corrosive to the	EUH071
M factor chronic: data not available		respiratory tract	
Specific limits:			
STOT SE 3; H335: C ≥ 5 %			
Palladium dichloro tetramine	20 ≤ C ≤ 25	Met corr. 1	H290
CAS 13815-17-3		Acute tox. 4	H302
EC: 237-489-7		Skin sens. 1A	H317
INDEX: not available		Eye irrit. 2	H319
REACH n.: exempt according to art. 6(1)		Aquatic acute 1	H400

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ATE Oral: LD50 933 mg/kg bw (rat)		Aquatic chronic 1	H410
ATE (dermal): LD50 2 000 mg/kg bw (rat)			
M factor acute toxicity: 100			
M factor chronic toxicity: 10			
Water	55 ≤ C ≤ 70	-	-
CAS 1336-21-6			
EC: 215-647-6			

#### 4. FIRST AID MEASURES

##### 4.1 Description of first aid measures

Inhalation	If the person has fainted, keep him stable on his side during transport.
Ingestion	Drink plenty of water and stop in a well-ventilated area. Seek immediate medical attention. Do not induce vomiting.
Skin contact	Wash immediately abundantly with water and soap.
Eye contact	Wash with running water for several minutes holding the eyelids wide open and get medical attention. Do not use eye drops and ointments.

##### Reccomendation:

- **Need to see a doctor immediately** YES
- **Possibility of delayed effects following exposure** YES
- **Move the exposed individual from the place of exposure to the open air** YES
- **Remove the clothing and shoes of the exposed individual** YES
- **How to handle contaminated clothing** With gloves
- **For those providing first aid, wear PPE** YES

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

May causes serious eye damage. It can irritate the respiratory tract. Causes severe burns. It can cause heartburn in the mouth, throat, and stomach. Harmful if swallowed.

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

In case of skin contact, ingestion, or inhalation, call a physician immediately.

#### 5. FIREFIGHTING MEASURES

##### 5.1 Extinguishing media

<b>Suitable extinguishing media:</b>	Fire extinguisher with CO <sub>2</sub> or powder or water spray. Extinguish large fires with water spray or alcohol-resistant foam.
<b>Non suitable extinguishing media:</b>	None

##### 5.2 Special hazards arising from the substance or mixture

In case of a fire or if heated, a pressure increase will occur, and the container may burst. Possible formation of ammonia vapors.

##### 5.3 Advice for firefighters

**General information** Isolate the area by removing all people in case of fire. Prevent the water used to extinguish the fire from flowing into the sewer, groundwater, or surface water.

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**Equipment** Normal fire-fighting clothing, such as self-contained open-circuit compressed air breathing apparatus (EN137), flame retardant suit (EN469), flame retardant gloves (EN659) and firefighter boots (HOA29 or A30).

**6. ACCIDENTAL RELEASE MEASURES**

**6.1 Personal precautions, protective equipment, and emergency procedures**

**6.1.1. For non-emergency personnel**

Move away from the contaminated area immediately and keep upwind.

**6.1.2. For emergency responders**

**Use :**

Chemical risk gloves compliant with EN420 EN374 standards.

Splash goggles compliant with Directive 89/686 / CEE and standard EN166: 2001.

Complete antacid clothing compliant with the UNI EN 13034: 2006 type 6 standard.

Mask with K-type filters compliant with EN14387: 2004 + A1: 2008.

**6.2 Environmental precautions**

Prevent infiltration into the sewer, ground water and surface water.

In case of infiltration into bodies of water or sewers, notify the competent authorities.

In case of penetration into the ground, notify the competent authorities.

**6.3 Methods and material for containment and cleaning up**

**6.3.1. Advice to contain a spill**

Collect liquid with absorbent material (sand, universal binder, sawdust). Prevent infiltration into sewers / surface water / groundwater.

**6.3.2. Advice to clean-up a spill**

Use means of neutralization.

**6.3.3 Any other information**

Disposal of contaminated material in accordance with point 13. Provide adequate ventilation.

**6.4 Reference to other sections**

None

**7. HANDLING AND STORAGE**

**7.1. Precautions for safe handling**

**7.1.1. Raccomentations to manipulate the substance or the mixture in a safe manner, such as containment measures and prevention of fire and aerosol and powders formation**

Store in original and labeled packaging. Provide sufficient ventilation / extraction in the workplace. Avoid the formation of aerosols.

**7.1.2. General recommendation on work hygiene**

Do not eat, drink, or smoke in work areas; wash hands thoroughly after use and remove contaminated clothing and protective equipment before entering areas where you eat.

**7.2. Conditions for safe storage, including any incompatibilities**

**7.2.1. Risk management associated with explosive atmospheres, corrosive conditions, flammability hazards, incompatible substances or mixtures, evaporative conditions, potential ignition sources**

Keep the container tight and sealed until use. Keep away from acid substances.

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**7.2.2. Control of weather conditions, ambient pressure, temperature, sunlight, humidity, and vibration**

Store in the original container protected from direct sunlight in a dry, cool, and well-ventilated area.

**7.2.3. Conditions for keeping substances / mixtures intact**

Open containers must be resealed and kept straight.

**7.2.4. Advice regarding the ventilation, specific design for storage rooms or vessels, quantity limits under storage conditions, packaging compatibilities**

Use ADR-approved packaging and store them in a containment basin equal to the capacity of the packaging with greater volume in rooms without sewage drains.

**7.3. Specific end use(s)**

Industrial use. Galvanic additive

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.1. Control parameters**

**SUBSTANCE: AMMONIA**

(Annex XXXVIII Legislative Decree 81/06)

**EU OEL:**

TWA (8h) 14 mg/m<sup>3</sup> or 20 ppm (gaseous state)

STEL (short term) 36 mg/m<sup>3</sup> or 50 ppm (gaseous state)

**DNEL**

**Workers**

Systemic effects for long-term exposure – inhalation: 47.6 mg/m<sup>3</sup>

Systemic effects for short-term exposure – inhalation: 47.6 mg/m<sup>3</sup>

Local effects for long-term exposure – inhalation: 14 mg/m<sup>3</sup>

Local effects for short-term exposure – inhalation: 36 mg/m<sup>3</sup>

Systemic effects for long-term exposure – dermal: 6.8 mg/kg body weight per day

Systemic effects for short-term exposure – dermal: 6.8 mg/kg body weight per day

Local effects for Long-term exposure – dermal: moderate risk (no threshold derived)

Local effects for short-term exposure – dermal: moderate risk (no threshold derived)

Eye hazards: moderate risk (no threshold derived)

**General population**

Systemic effects for long-term exposure – inhalation: 23.8 mg/m<sup>3</sup>

Systemic effects for short-term exposure – inhalation: 23.8 mg/m<sup>3</sup>

Local effects for long-term exposure – inhalation: 2.8 mg/m<sup>3</sup>

Local effects for short-term exposure – inhalation: 7.2 mg/m<sup>3</sup>

Systemic effects for long-term exposure – dermal: 6.8 mg/kg body weight per day

Systemic effects for short-term exposure – dermal: 6.8 mg/kg body weight per day

Local effects for long-term exposure – dermal: moderate risk (no threshold derived)

Local effects for short-term exposure – dermal: moderate risk (no threshold derived)

Systemic effects for long-term exposure – oral: 6.8 mg/kg body weight per day

Systemic effects for short-term exposure – oral: 6.8 mg/kg body weight per day

Eye hazards: moderate risk (no threshold derived)

**PNEC**

Freshwater: 0.001 mg/l (Anhydrous ammonia)

Marine water: 0.001 mg/l (Anhydrous ammonia)

Soil: 0.022 mg/kg dry soil

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**SUBSTANCE: PALLADIUM DICHLOROTETRAMMINE**

**DNEL**

**Workers**

Systemic effects for long-term exposure – inhalation: 0.19 mg/m<sup>3</sup>

Systemic effects for short-term exposure – inhalation: no hazard identified

Local effects for long-term exposure – inhalation: moderate hazard (no derived threshold)

Local effects for short-term exposure – inhalation: moderate hazard (no derived threshold)

Systemic effects for long-term exposure – dermal: 0.27 mg/kg body weight per day

Systemic effects for short-term exposure – dermal: no hazard identified

Local effects for long-term exposure – dermal: high hazard (no derived threshold)

Local effects for short-term exposure – dermal: high hazard (no derived threshold)

Eye hazards: low hazard (no derived threshold)

**General population.**

Hazard unknown but no further information is needed as no exposure is expected

**PNEC**

Freshwater: 45 ng/L

Marine water: 4 ng/L

Sewage treatment plants: 526 µg/L

Sediment (freshwater): 0.274 mg/kg dry sediment

Sediment (marine water): 0.027 mg/kg dry sediment

Soil: 0.02 mg/kg dry soil

**8.2. Exposure controls**

**8.2.1. *Appropriate engineering controls***

Local suction systems, emergency showers and eye washing system near the work area.

**8.2.2. *Individual protection measures, such as personal protective equipment***

**Eye/face protection**

Splash goggles compliant with Directive 89/686 /CEE and standard EN166: 2001.

**Skin protection (hands)**

Chemical risk gloves compliant with EN420 EN374 standards.

Material: latex, nitrile rubber

Thickness: 0.4 mm

Breakthrough time: > 240 min

**Skin protection (body)**

Complete antacid clothing compliant with the UNI EN 13034: 2006 type 6 standards.

**Respiratory protection**

Mask with K-type filters.

**Thermal hazards**

Not available data.

**8.2.3. *Environmental exposure controls***

Maintain all environments in suction using localized collection and ambient air exchange systems. Convey the aspirated volumes to an abatement system and then into the atmosphere. Do not use air recirculation suction systems. Avoid any spill into the environment.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**9.1 Information on basic physical and chemical properties**

Physical state	Liquid
Colour	Pale Yellow
Odour	Ammoniacal

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Melting point/freezing point	Not available data
Boiling point or initial boiling point and boiling range	> 80 °C
Flammability	Not flammable
Lower and upper explosion limit	Not explosable
Flash point	Not flammable
Auto-ignition temperature	Not flammable
Decomposition temperature	Data not available
pH	8,5-9,5 at 20 °C
Kinematic viscosity	Not available
Solubility	Fully miscible in water
Partition coefficient n-octanol/water (log value)	Not applicable
Vapour pressure	Approx 830 hPa at 20 °C
Density and/or relative density	approx. 1.14 g/ml <sup>3</sup>
Relative vapour density	Data not available
Particle characteristics	Not applicable

**9.2. Other information**

None.

**10 STABILITY AND REACTIVITY**

**10.1 Reactivity**

The product has alkaline properties.

**10.2 Chemical stability**

The product is chemically stable.

**10.3 Possibility of hazardous reactions**

Under normal conditions of use and storage no dangerous reactions are foreseeable.

It can react violently with acids and reducing agents generating heat.

**10.4 Conditions to avoid**

Exposure to the sun and heat.

**10.5 Incompatible materials**

Strong acids, reducing agents.

**10.6 Hazardous decomposition products**

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Ammonia, ammonium chloride.

**11 TOXICOLOGICAL INFORMATION**

**11.1 Information on hazard classes as defined in Regulation (CE) No 1272/2008**

**Acute toxicity** Substance: palladium dichloro tetramino  
ATE (oral): LD50 933 mg/kg bw (rat)  
ATE (dermal): LD50 > 2000 mg/kg bw (rat)  
ATE (inhalation): scientifically unjustified studies

Substance: ammonia  
ATE (inhalation): 3285 ppm

**Skin corrosion/irritation** Mixture:  
ATE (oral): LD50 3731 mg/kg bw (rat)  
Causes serious skin burns

**Serious eye damage/irritation** Causes serious eye damage

**Respiratory or skin sensitization** May cause allergic reactions

**Germ cell mutagenicity** Based on available data, the classification criteria are not met

**Carcinogenicity** Based on available data, the classification criteria are not met

**Reproductive toxicity** Based on available data, the classification criteria are not met

**(STOT) single exposure** Respiratory tract irritation

**(STOT) repeated exposure** Based on available data, the classification criteria are not met

**11.2 Information on other hazards**

It does NOT contain PBT / vPvB substances according to Regulation (EC) 1907/2006, annex XIII.

It does NOT contain substances that interfere with the endocrine system in accordance with Regulation (EC) 1907/2006 art.59 paragraph 1 and in accordance with the criteria established in Regulation (EU) 2017/2100 and Regulation (EU) 2018/605.

**12 ECOLOGICAL INFORMATION**

**12.1 Toxicity**

Substance: ammonia  
LC50 (96h): 0.083 mg/L (fish)  
LOEC: 0.027 mg/L (fish)  
NOEC: 0.0135 mg/L (fish)

Substance: palladium dichloro tetramino  
LC10 (96h): 180 µg/L (fish)  
EC50 (48h): 35.19 µg/L (invertebrates)  
NOEC (21 days) 28.4 µg/L (invertebrates)



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<b>12.2</b>	<b>Persistence and degradability</b>	Substance: ammonia Easily biodegradable
<b>12.3</b>	<b>Bioaccumulative potential</b>	Substance: palladium dichloro tetramino Not applicable Substance: ammonia Log Kow < 3: bioaccumulation is not expected
<b>12.4</b>	<b>Mobility in soil</b>	Substance: palladium dichloro tetramino Not applicable Substance: ammonia Ammonia applied directly to the soil is quickly transformed, due to bacteria, into other forms that plants use and return it to the atmosphere via so-called denitrification. Therefore, exposure of soil organisms is not expected.
<b>12.5</b>	<b>Results of PBT and vPvB assessment</b>	Substance: palladium dichloro tetramino Log Kp(solids-water in soils): 2.64 Not applicable
<b>12.6</b>	<b>Endocrine disrupting properties</b>	No known effects
<b>12.7</b>	<b>Other adverse effects</b>	No known effects
<b>13</b>	<b>DISPOSAL CONSIDERATIONS</b>	
<b>13.1.</b>	<b>Waste treatment methods</b>	Either the mixture or packages must be sent to approved facilities for the disposal of industrial wastes.
<b>14</b>	<b>TRANSPORT INFORMATION</b>	
<b>14.1</b>	<b>UN number or ID number</b>	ONU: 3266
<b>14.2</b>	<b>UN proper shipping name</b>	Basic corrosive inorganic liquid n.o.s. (ammonia in solution, palladium dichloro tetramino)
<b>14.3</b>	<b>Transport hazard class(es) ADR/RID/IMDG/ICAO-IATA ADR/RID/IMDG/ICAO-IATA IMDG Contaminante marino</b>	8
<b>14.4</b>	<b>Packing group</b>	II
<b>14.5</b>	<b>Environmental hazards</b>	YES
<b>14.6</b>	<b>Special precautions for user</b>	Transport must be carried out by vehicles authorized to transport dangerous goods according to the provisions of the current edition of the A.D.R. Agreement. and the applicable national provisions. Transportation must be carried out in the original packaging and, in any case, in packaging that is made of materials that

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cannot be attacked by the contents and are not likely to generate dangerous reactions with this. Persons responsible for loading and unloading dangerous goods must have received appropriate training on the risks presented by the preparation and on any procedures to be adopted in the event of emergency situations

**14.7 Maritime transport in bulk according to IMO instruments** Bulk transport is not foreseen

**15 REGULATORY INFORMATION**

<b>15.1</b>	<b>Safety, health and environmental regulations/legislation specific for the substance or mixture</b>	<b>Applicability</b>
	<i>Reg. (CE) 1907/2006/CE Reach</i>	YES
	<i>Reg. (CE) 1272/2008 CLP and subsequent amendements</i>	YES
	<i>Reg. (CE) 2037/2000 "Substances that deplete the ozone layer"</i>	NO
	<i>Reg. (CE) 850/2004 "Persistent organic pollutants"</i>	NO
	<i>Reg. (CE) 689/2008 "Export and import of hazardous chemicals"</i>	NO
	<i>Substance listed in Annex I of Dir. 2012/18/EU cd Seveso</i>	YES
	<i>Directive 81/2008 Consolidated Act on protection of health and work safety</i>	YES
	<i>Directive 2014/103/UE "Adr"</i>	YES
	<i>Reg. (CE) 1907/2006/CE Reach art. 59 – Candidate List of Substances of Very High Concern (SVHC)</i>	NO
	<i>Reg. (CE) 1907/2006/CE Reach - Annex XIV – Authorisation List</i>	NO
	<i>Reg. (CE) 1907/2006/CE Reach - Annex XVII – Restriction List</i>	Limited use
	<a href="https://echa.europa.eu/it/substances-restricted-under-reach">https://echa.europa.eu/it/substances-restricted-under-reach</a>	Item 3 - 75 (check link)
<b>15.2</b>	<b>Chemical safety assessment</b> A chemical safety assessment was not carried out.	

**16 OTHER INFORMATION**

**Changes compared to the previous edition**

Sections 1 – 2 – 3 – 8 – 12 – 16

**Acronim and abbreviation legend**

ADR: European agreement concerning the international transport of dangerous goods by road

GHS: Globally Harmonized System of Classification and Labeling of Substances

EINECS: European Inventory of Chemical Substances

CAS: Chemical Abstract Service

Met. Corr: metal corrosive

Skin irrit. : skin irritation

Skin sens.: skin sensitisation

STOT SE: Single target organ toxicity - single exposure

STOT RE: Single target organ toxicity - repeated exposure

ATE: acute toxicity estimate

PBT: Persistent, Bioaccumulative, Toxic

vPvB: very persistent, very bioaccumulative

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LD: lethal dose

PNEC: predicted no effect concentration

DNEL: derived no effect level

TLV (ceiling value): threshold limit value

STEL: short term exposition level

EU-OEL: European occupational exposure limit

TWA: time weighted average

EC: effective concentration

NOAEL: no observed adverse effect level

LC: lethal concentration

NOEC: no observed effect concentration

LOEC: lowest observed effect concentration

Koc: organic carbon-water partition co-efficient

**Main references and data sources**

ECHA's data bank on registered substances and soon to be registered substances:

<http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances>

**Reporting, for mixtures, which methods of evaluating the information were used for the purposes of classification.**

	<b>Classification</b>	<b>Classification procedure</b>
Skin corrosive 1B	H314	Calculation method
Skin sensitization 1	H317	Calculation method
STOT SE 3	H335	Calculation method
Aquatic acute 1	H400	Calculation method
Aquatic chronic 1	H410	Calculation method

**Adequate training for workers to guarantee the protection of human health and the environment**

- Training on the chemical risk ex Directive 81/08 Title IX dangerous substances
- Training on PPE