

# Palladium Plating Solution

## Safety Data Sheet

### SECTION 1: Identification

#### 1.1. Identification

Product name: Palladium Plating Solution

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

Use of the substance/mixture: Palladium plating

#### 1.3. Details of the supplier of the safety data sheet

Nano3D Systems LLC  
1110 N.E. Circle Blvd.  
Building 11/ATAMI  
Corvallis, OR 97330

#### 1.4. Emergency telephone number

Emergency number: **1-800-424-9300**

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### Classification (GHS-US)

Acute toxicity 4,	H302
Eye irritation 2A	H319
Skin sensitization 1	H317
Acute aquatic toxicity 2	H401

#### 2.2. Label elements

##### GHS-US labeling



Hazard pictograms (GHS-US)

Signal word (GHS-US)

: Danger

Hazard statements (GHS-US)

: H301 – Toxic if swallowed.  
H314 – Causes severe skin burns and eye damage.  
H317 – May cause an allergic skin reaction.  
H319 – Causes serious eye irritation.  
H400 – Very toxic to aquatic life.  
H411 – Toxic to aquatic life with long lasting effects.

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Precautionary statements (GHS-US) : P261 – Avoid breathing dust/fume/gas/mist/vapors/spray.

P264 – Wash skin thoroughly after handling.

P270 – Do not eat, drink, or smoke when using this product.

P272 – Contaminated work clothing should not be allowed out of the workplace.

P273 – Avoid release to the environment.

P280 – Wear protective gloves/ protective clothing/eye protection/ face protection.

P301 + P310 + P312 + P330 – IF SWALLOWED: Immediately call a POISON CENTER/doctor if you feel unwell. Rinse mouth

P301 + P330 + P331 – IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

P302 + P352 – IF ON SKIN: Wash with plenty of soap and water.

P303 + P361 + P353 – IF ON SKIN (or hair) – Take off immediately all clothing. Rinse skin with water/shower.

P304 + P340 + P310 – IF INHALED: Remove person to fresh air and keep comfortable for Breathing. Immediately call a POISON CENTER/doctor.

P305 + P351 + P338 + P310 – IF IN EYES: Rinse cautiously with water for several minute. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

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

P363 – Wash contaminated clothing before reuse.

P391 – Collect spillage.

P405 – Store locked up.

P501 – Dispose of contents/container to an approved waste disposal plant.

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### 2.3. Other hazards

Lachrymator.

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Product identifier	%	Classification (GHS-US)
Palladium(II) chloride	(CAS No) 7647-10-1 (EC No) 231-596-2	Trade Secret	Acute Tox. 3, H301 Eye Irrit. 2A, H317 Skin Sens. 1, H319
Ammonium chloride	(CAS No) 12125-02-9 (EC No) 235-186-4 (Index No) 017-014-00-8	Trade Secret	Acute Tox. 4, H302 Eye Irrit. 2A, H319 Aquatic Acute. 2, H401
Ammonium Hydroxide	(CAS No) 1336-21-6 (EC No) 215-647-6 (Index No) 007-001-01-2	Trade Secret	Acute Tox. 4, H302 Skin Corr. 1B, H314 Aquatic Acute 1, H400 Aquatic Chronic 2, H411

Full text of H-phrases: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures after inhalation	: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
First-aid measures after skin contact	: Wash with soap and water. Seek medical advice if skin irritation develops or persists.
First-aid measures after eye contact	: Immediately flush the eyes with plenty of water for at least 15 minutes while holding eyelids apart to ensure flushing of the entire surface of the eye. Continue flushing for an additional 15 minutes if a physician is not immediately available. Seek medical attention, preferably an ophthalmologist, immediately.
First-aid measures after ingestion	: If the material is swallowed, get immediate medical attention or advice. DO NOT induce vomiting unless directed to do so by medical personnel.

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

Symptoms/injuries after inhalation	: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Symptoms/injuries after skin contact	: May cause an allergic skin reaction.
Symptoms/injuries after eye contact	: Causes serious eye damage.
Symptoms/injuries after ingestion	: Harmful if swallowed.

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

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

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

Fire hazard: None known. Explosion hazard: None known.

### 5.3. Advice for firefighters

Protection during firefighting: Wear self-contained breathing apparatus for firefighting if necessary.

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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

##### 6.1.1. For non-emergency personnel

Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

##### 6.1.2. For emergency responders

No additional information available.

#### 6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

#### 6.3. Methods and material for containment and cleaning up

For containment: Stop the flow of material, if this is without risk.

Methods for cleaning up: Confine spill and soak up with absorbent. Place in an approved container and dispose in accordance with local, state and federal regulations.

#### 6.4. Reference to other sections

For disposal see section 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Precautions for safe handling: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

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

Storage conditions: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. May develop pressure. Handle and open container with care.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

##### Palladium(II) dichloride (7647-10-1)

Contains no substances with occupational exposure limit values.

##### Ammonium Chloride (12125-02-9)

10.000000 mg/m<sup>3</sup>, USA. ACGIH Threshold Limit Values (TLV)

##### Ammonium Hydroxide (1336-21-6)

25.000000 ppm, USA, ACGIH Threshold Limit Values (TLV)

#### 8.2. Exposure controls

Appropriate engineering controls	: Local exhaust and general ventilation must be adequate to meet exposure standards.
Hand protection	: Use impervious gloves such as neoprene, nitrile, or rubber for hand protection.
Eye protection	: Safety glasses.
Skin and body protection	: Wear suitable working clothes.
Respiratory protection	: If airborne concentrations are above the applicable exposure limits, use NIOSH approved respiratory protection.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Appearance	Pale yellow liquid
Odor	Slight ammonia odor
Odor Threshold	No data available
pH	9.5-10.0
Melting/Freezing Point	No data available
Initial Boiling Point	No data available
Boiling Range	No data available
Flash Point	No data available
Evaporation Rate	No data available
1/18/2018	EN (English US)

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Flammability	No data available
Upper/Lower Flammability or Explosive Limits	No data available
Vapor Pressure	No data available
Relative Density	No data available
Water Solubility	No data available
Partition Coefficient: n-octanol/water	No data available
Auto-Ignition Temperature	No data available
Decomposition Temperature	No data available
Viscosity	No data available
Explosive Properties	No data available
Oxidizing Properties	No data available

### 9.2. Other information

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No information available.

### 10.2. Chemical Stability

The product is stable at normal handling and storage conditions.

### 10.3. Possibility of hazardous reactions

No information available.

### 10.4. Conditions to avoid

No information available.

### 10.5. Incompatible materials

Strong oxidizing agents.

### 10.6. Hazardous decomposition products

Hydrogen chloride gas, carbon oxides, nitrogen oxides.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

<b>Acute toxicity:</b>	LD50 Oral – Rat – 200 mg/kg (PdCl <sub>2</sub> )
Inhalation:	No information available.
<b>Skin corrosion/irritation:</b>	No information available.
<b>Serious eye damage/irritation:</b>	Eye irritation.
<b>Respiratory or skin sensitization:</b>	No information available.
<b>Germ cell mutagenicity:</b>	Human, lymphocyte, DNA inhibition
<b>Carcinogenicity:</b>	Mouse – Oral
Tumorigenic:	Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration: Tumors. Blood: Tumors.
IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by OSHA.
<b>Reproductive toxicity:</b>	Rat - Intratesticular
Paternal Effects:	Spermatogenesis
<b>Specific target organ toxicity (single exposure):</b>	No information available.
<b>Specific target organ toxicity (repeated exposure):</b>	No information available.
<b>Aspiration hazard:</b>	No information available.
<b>Additional Information:</b>	RTECS: RT3500000 Contact with skin can cause: Dermatitis, Allergic reactions (PdCl <sub>2</sub> )

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### SECTION 12: Ecological information

#### 12.1. Toxicity

**Palladium Dichloride** – No information available.

**Ammonium Chloride** – Toxicity to fish LC50 – Oncorhynchus mykiss (rainbow trout) – 3.98 mg/l – 96 h

NOEC – Oncorhynchus mykiss (rainbow trout) – 57 mg/l – 96 h

Toxicity to daphnia and other aquatic invertebrates LC50 – Daphnia magna (water flea) – 161 mg/l – 48 hr

Growth inhibition NOEC – Daphnia magna (water flea) - .01 mg/l – 216 h

**Ammonium Hydroxide** - No information available.

#### 12.2. Persistence and degradability

**Palladium Dichloride** – No information available.

**Ammonium Chloride** – No information available.

**Ammonium Hydroxide** - No information available.

#### 12.3. Bioaccumulative potential

**Palladium Dichloride** – No information available.

**Ammonium Chloride** – No information available.

**Ammonium Hydroxide** - No information available.

#### 12.4. Mobility in soil

**Palladium Dichloride** – No information available.

**Ammonium Chloride** – No information available.

**Ammonium Hydroxide** - No information available.

#### 12.5. Other adverse effects

**Palladium Dichloride** – No information available.

**Ammonium Chloride** – Toxic to aquatic life.

**Ammonium Hydroxide** – Very toxic to aquatic life.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

Waste disposal recommendations: Dispose of contents/container in accordance with local/regional/national/international regulations.

### SECTION 14: Transport information

#### Department of Transportation (DOT)

##### DOT (US)

UN number: 2672 Class: 8 Packing group: III

Proper shipping name: Ammonia solution

Reportable Quantity (RQ): 1621 lbs Marine pollutant: Yes

Poison Inhalation Hazard: No

##### IMDG

UN number: 2672 Class: 8 Packing group: III EMS-No: F-A, S-B

Proper shipping name: AMMONIA SOLUTION

Marine pollutant: Yes

##### IATA

UN number: 2672 Class: 8 Packing group: III

Proper shipping name: Ammonia solution

### SECTION 15: Regulatory information

**Palladium Dichloride:**

#### SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, section 302.

#### SARA 313 Components

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This material does not contain any chemical components with known CAS numbers that exceed the threshold (DeMininis) reposting levels established by SARA Title III, section 313.

### Massachusetts Right To Know Components

No components are subject to the Massachusetts Right to Know Act.

### Pennsylvania Right To Know Components

Palladium dichloride CAS-No 7647-10-1

### New Jersey Right To Know Components

Palladium dichloride CAS-No 7647-10-1

### California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any reproductive harm.

### Ammonium Chloride:

#### SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, section 302.

#### SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (DeMininis) reposting levels established by SARA Title III, section 313.

#### SARA 311/312 Hazards

Acute Health Hazard

#### Massachusetts Right To Know Components

Ammonium chloride CAS-No. 12125-02-9 Revision Date 1994-04-01

#### Pennsylvania Right To Know Components

Ammonium chloride CAS-No. 12125-02-9 Revision Date 1994-04-01

#### New Jersey Right To Know Components

Ammonium chloride CAS-No. 12125-02-9 Revision Date 1994-04-01

#### California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any reproductive harm.

### Ammonium Hydroxide:

#### SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, section 302.

#### SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, section 313:

Ammonium hydroxide CAS-No. 1336-21-6 Revision Date 2007-03-01

#### SARA 311/312 Hazards

Acute Health Hazard

#### Massachusetts Right To Know Components

Ammonium hydroxide CAS-No. 1336-21-6 Revision Date 2007-03-1

#### Pennsylvania Right To Know Components

Ammonium hydroxide CAS-No. 1336-21-6 Revision Date 2007-03-1

Water CAS-No. 7732-18-5

#### New Jersey Right To Know Components

Ammonium hydroxide CAS-No. 1336-21-6 Revision Date 2007-03-1

Water CAS-No. 7732-18-5

#### California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any reproductive harm.

## SECTION 16: Other information

### Full text of H-phrases:

Acute Tox. 3, H301	Acute toxicity, Category 3. Toxic if swallowed.
Eye Irrit. 2A, H317	Eye irritant, Category 2A. Causes serious eye irritation.
Skin Sens. 1, H319	Skin sensitization, Category 1. May cause an allergic skin reaction
Acute Tox. 4, H302	Acute toxicity, Category 4. Harmful if swallowed.
Aquatic Acute. 2, H401	Aquatic acute toxicity, Category 2. Very toxic to aquatic life with long lasting effects.
Skin Corr. 1B, H314	Skin corrosion, Category 1B. Causes severe skin burns and eye damage.
Aquatic Acute 1, H400	Aquatic acute toxicity, Category 1. Very toxic to aquatic life.
Aquatic Chronic 2, H411	Aquatic chronic toxicity, Category 2. Toxic to aquatic life with long lasting effects.

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**SDS Preparation date:** January 18, 2018 **Supersedes previous version:** New SDS

**This SDS contains revisions in the following sections(s):** Not applicable. New SDS.

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**End of Safety Data Sheet**