

Material Safety Data Sheet – FILO AgNi

1. Product and Company Identification

- **A. Product name:** FTOAgNi
- **B. Recommended use and restriction on use:**
 - General use: Soldering
 - Restriction on use: Not available
- **C. Manufacturer / Supplier / Distributor information:**
 - Ragione Sociale: P.M.P. FIRENZE SRL
 - Indirizzo: VIA FRANCESCO BORROMINI 14 – LOC. SAMBUCA
 - Località: 50028 BARBERINO TAVARNELLE – TOSCANA - ITALIA
 - Tel.: 0558071641 - 0558071664
 - e-mail: amministrazione@pmpfirenze.com www.pmpfirenze.com

2. Hazards Identification

A. Hazard · Risk Classification

- Physical Hazards: Not classified
- Health Hazards:
 - Respiratory Sensitization Category 1
 - Skin Sensitization Category 1
 - Carcinogenicity Category 2
 - Specific Target Organ Toxicity (Single Exposure) Category 1
 - Specific Target Organ Toxicity (Repeated Exposure) Category 1
- Environmental Hazards: Not classified

B. Label elements including precautionary statements

- Symbol:



- Signal Word: Danger
- Hazard · Risk Statement:
 - May cause an allergic skin reaction
 - May cause allergy or asthma symptoms or breathing difficulties if inhaled
 - Suspected of causing cancer
 - Causes damage to organs (lung, kidney)
 - Causes damage to organs (lung, kidney, heart..) through prolonged or repeated exposure
- Precautionary Statement (Prevention):
 - Obtain special instructions before use

- Do not handle until all safety precautions have been read and understood
 - Do not breathe dust and fume
 - Avoid breathing dust and fume
 - Wash with water thoroughly after handling
 - Do not eat, drink or smoke when using this product
 - Contaminated work clothing should not be allowed out of the workplace
 - Wear protective gloves/protective clothing/eye protection/face protection
 - Use personal protective equipment as required
 - In case of inadequate ventilation, wear respiratory protection
- **Precautionary Statement (Response):**
 - IF INHALED: If difficult to breathe, remove person to fresh air and keep comfortable for breathing.
 - IF exposed: Call a POISON CENTER or doctor.
 - IF exposed or concerned: Get medical advice/attention.
 - Get medical advice/attention if you feel unwell.
 - Specific treatment.
 - If skin irritation or rash occurs: Get medical advice/attention.
 - If experiencing respiratory symptoms: Call a POISON CENTER or doctor.
 - Wash contaminated clothing before reuse.
- **Precautionary Statement (Storage):** Store locked up.
- **Precautionary Statement (Disposal):** Dispose of contents/container to official regulations.

C. Other Hazard · Risk wich are not included in the classification criteria (NFPA Rating 0~4)

- **Silver:**
 - Health: 1
 - Flammability: 0
 - Reactivity: 0
- **Nickel:**
 - Health: 2
 - Flammability: 4
 - Reactivity: 1

3. Composition / Information on Ingredients

Chemical Name	Other Name	CAS No.	Content (%)
Silver	Silver atom	7440-22-4	90
Nickel	Nickel element	7440-02-0	10

4. First Aid Measures

● **A. Eye contact:**

Get medical attention immediately.

Immediately flush skin and eyes with plenty of running water for at least 20 minutes.

- **B. Skin contact:**

If affected by the product hot, cool down affected area with plenty of cold water or flush to remove heat. Remove contaminated clothing and shoes and isolate contaminated area. Flush skin and eyes with plenty of running water for at least 20 minutes. In case of slight contact with skin, prevent the spread of contaminated area. If skin irritation or red spots is present, seek medical advice. Launder contaminated clothing before reuse.

- **C. Inhalation:**

If difficult to breathe, remove person to fresh air and keep comfortable for breathing. Remove person to fresh air. Keep person warm and comfortable.

- **D. Ingestion:**

If swallowed or inhaled, do not conduct mouth-to-mouth artificial respiration and use appropriate respiratory protective equipment.

- **E. Indication of immediate medical attention and notes for physician:**

If exposed, call for medical personnel and administer emergency treatment including follow-up survey. Notify medical personnel of contaminated situations and have them take appropriate protective measures.

5. Fire-Fighting Measures

- **A. Suitable (Unsuitable) extinguishing media:**

- Suitable: Alcohol foam, Carbon dioxide or Water spray.
In case of oxygen dilution extinguish, use dry sand soil.
- Unsuitable: Not available.

- **B. Specific hazards arising from the chemical:**

May form toxic gases as decomposed at high temperatures.
Container may explode if heated.
Some substances may burn but not readily ignite.
Substance itself does not burn, but decompose when heated and may cause corrosive/toxic fume.

- **C. Special protective equipment and precautions for fire-fighters:**

Silver: Fire fighters should wear suitable protective equipment.
Start using the extinguisher from a safe distance away.
Be careful since some materials could be transported as melted.
Dike the contaminated fire extinguishing water separately and take action not to be scattered.
Move containers from fire area, if you can do without the risk.
Extinguish as far as possible from the fire or use an unattended and water devices in case of tank fire.
Even when extinguished, keep containers cool with plenty of water in case of tank fire.

Draw back immediately if high pitched sounds rises from venting safety device or any discoloration founded in case of tank fire.

Do not access if the tank is on fire.

In case of large fire in tank, use an unattended and water devices. And if it is impossible, let things burn.

Nickel: Fire fighters should wear suitable protective equipment.

Start using the extinguisher from a safe distance away.

Be careful since some materials are transported as flammable liquid.

Move containers from fire area, if you can do without the risk.

If it is impossible to extinguish the fire, protect surroundings and let the fire extinguished.

6. Accidental Release Measures

- **A. Personal precautions, protective equipment and emergency procedures:**

Avoid breathing dust and hume.

Clean up spills immediately and follow the proper precautions in protective equipment section.

Isolate a contaminated area.

Keep unauthorized people away and deny entry to persons not wearing appropriate protective equipment.

Remove all sources of ignition.

Stop leak if you can do it without risk.

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Cover with plastic sheets to prevent the spread.

Please note incompatible materials and conditions to avoid.

- **B. Environmental precautions and protective procedures:**

Prevent the influx to waterways, sewers, basements or confined spaces.

- **C. Methods and materials for containment and cleaning up:**

Absorb the spilled material with an inert absorbent (dry sand, earth) material and shovel material into chemical waste container.

Absorb liquid and flush area with water and surfactants.

7. Handling and Storage

- **A. Precautions for safe handling:**

Do not handle until all safety precautions have been read and understood.

Avoid breathing dust and hume.

Wash exposed area thoroughly after handling.

Do not eat, drink or smoke while handling the product.

Do not take contaminated clothing out of the workplace.

Use only in well-ventilated areas.

Since emptied container retains product residue, all labeled hazard precautions (MSDS/Warning label) must be observed.

Handle/store the product with care.

Open bung slowly before open container.

Avoid repeated or prolonged skin contact.
Do not enter the storage place without proper ventilating.
Take precautions on incompatible materials and conditions to avoid.

- **B. Conditions for safe storage:**

Store in locked place.
Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner, or properly disposed of.
Keep away from food and beverages.

8. Exposure Controls & Personal Protection

A. Control parameters (e.g. occupational exposure limit values, biological limit values):

- Silver:
 - Exposure limits in Korea: TWA 0.1 mg/m³ (Metal) / TWA 0.01 mg/m³ (Soluble compounds)
 - ACGIH TLV: TWA 0.1 mg/m³
 - Biological limit values: Not applicable
- Nickel:
 - Exposure limits in Korea: TWA 1 mg/m³ (Metal) / TWA 0.1 mg/m³ (Soluble) / TWA 0.5 mg/m³ (Insoluble)
 - ACGIH TLV: TWA 1.5 mg/m³ (Inhalation) / TWA 0.1 mg/m³ (Soluble) / TWA 0.2 mg/m³ (Insoluble)
 - Biological limit values: Not applicable

Biological exposure limit:

- Silver: Not available
- Nickel: Not available

B. Appropriate engineering controls

Evacuate area when dust, fume or mist is generated by operation to control air levels below the exposure limits.
Isolate operations, use appropriate local exhaust ventilation or engineering controls.
The workplace should be equipped with an emergency shower and eye-rinsing facility.

C. Personal protective equipment

- Respiratory protection:

Wear Korea Occupational Safety and Health Agency authorized appropriate respirator based on exposure limits:

- Silver (soluble): <0.1 mg/m³ (Half-face);
<0.5 mg/m³ (Full-face/powerd).
- Silver (metal): <1 mg/m³ (Half-face);
<2.5 mg/m³ (Loose-fitting hood);
<5 mg/m³ (Full-face).

- *Nickel (metal):* <1 mg/m³ (Half-face);
<2.5 mg/m³ (Loose-fitting);
<5 mg/m³ (Full-face).
- *Nickel (insoluble):* <5 mg/m³ (Half-face);
<12.5 mg/m³ (Loose-fitting).

9. Physical and Chemical Properties

Physical and chemical properties for product

<u>Category</u>	<u>AgNi</u>
A. Appearance	Not available
B. Odor	Not available
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	Not available
H. Evaporation rate	Not available
I. Flammability (solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	Not available
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	Not available
N. Specific gravity	Not available
O. Partition coefficient of octanol/water	Not available
P. Autoignition temperature	Not available
Q. Decomposition temperature	Not available
R. Viscosity	Not available
S. Molecular weight	Not available

Physical and chemical properties for each component

<u>Category</u>	<u>Silver</u>	<u>Nickel</u>
A. Appearance	polished white metal	silvery metal
B. Odor	Not available	odorless
C. Odor threshold	Not available	Not applicable
D. pH	Not available	Not available
E. Melting point/Freezing point	962°C	1455°C
F. Initial Boiling Point/Boiling Ranges	2212°C	2730°C
G. Flash point	Not available	Not available
H. Evaporation rate	Not available	Not available
I. Flammability (solid, gas)	Not available	Not available
J. Upper/Lower Flammability or explosive limits	Not applicable	Not applicable
K. Vapour density	Not available	1mmHg at 1810°C
L. Solubility	insoluble	insoluble in water
M. Vapour density	Not available	Not available

N.	Specific gravity	10.5 (15°C)	8.9
O.	Partition coefficient of noctanol/water	Not available	Not available
P.	Autoignition temperature	Not available	Not available
Q.	Decomposition temperature	Not available	Not available
R.	Viscosity	Not available	Not available
S.	Molecular weight	107.86	58.7

10. Stability and Reactivity

• A. Chemical stability and hazardous reactions:

- Silver: Can decomposes at high temperatures producing toxic gases.
Container may explode if heated.
Some materials could burn, but not easy to ignite.
Non-flammable, the product itself does not burn but it decompose and may produce corrosive/toxic hume when heated.
- Nickel: Can decomposes at high temperatures producing toxic gases.
Container may explode if heated.
It could be ignited by friction, heat, sparks, flame.
It could re-ignite after fire off.
It reacts fiercely and explosively with water.
Some materials burn with intense heat.
Explosive compounds could be produced by dust and hume reacting with air.
Inhalation or contact with vapors, materials and decomposition product may cause severe injuries or death.
Oxide has sever health adverse effects in case of metal fire.

• B. Conditions to avoid: (e.g. static discharge, shock or vibration, etc):

Silver: source or ignition including heat, spark, open flame
Nickel: friction, heat, spark, open flame

• C. Incompatible materials:

Silver: Combustible material, reducing materials
Nickel: Water

• D. Hazardous decomposition products:

Silver: corrosive/toxic hume
Irritating, corrosive, toxic gases
Nickel: Irritating, corrosive, toxic gases

11. Toxicological Information

A. Information on the likely routes of exposure

Silver: Not available
Nickel: Not available

B. Health hazards information

- Acute Toxicity:
 - Oral:
Silver: LD50 > 5000 mg/kg Rat
Nickel: Not available
 - Dermal:
Silver: LD50 > 2000 mg/kg Rat
Nickel: Not available
 - Inhalation:
Silver: Not available
Nickel: Not available
- Serious corrosion/irritation:
Silver: Slightl irritating
Nickel: Not available
- Skin eye damage/irritation:
Silver: Slightl irritating. Recover within 48 hours
Nickel: Not available
- Respiratory sensitization:
Silver: Not available
Nickel: asthma
- Skin sensitization:
Silver: Causes allergic contact dermatitis
Nickel: positive in patch test
- Carcinogenicity:
Silver: Not available
Nickel: Group 2B (IARC), A5 (ACGIH), Carc 2 (EU CLP)
- Germ cell mutagenicity:
Silver: Not available
Nickel: Not available
- Reproductive toxicity:
Silver: Not available
Nickel: Not available
- Specific target organ toxicity (single exposure):
Silver: Lung disorders, pulmonary edema, irritation to the airways
Nickel: alveolar wall damage and edma in alveolar spaces in the lung and marked tubular necrosis in the kidney
- Specific target organ toxicity (repeated exposure):
Silver: argyria, decreased night vision, bronchitis
Nickel: a high risk of mortality from respiratory disease
- Aspiration hazard:
Silver: Not available
Nickel: Not available

12. Ecological Information

- **Acquatic and terrestrial ecotoxicity:**
 - Fish:
 - Silver: LC50 = 58 mg/L/96h
 - Nickel: Not available
 - Crustaceans:
 - Silver: Not available
 - Nickel: Not available
 - Algae:
 - Silver: Not available
 - Nickel: Not available
- **Persistence and degradability:**
 - Persistence: Not available
 - Degradability: Not available
- **Bioaccumulative potential:**
 - Biodegradation:
 - Silver: Not available
 - Nickel: Not available
 - Bioaccumulative potential:
 - Silver: Not available
 - Nickel: Not available
- **Bioaccumulative potential:**
 - Not available
- **Other adverse effects:**
 - Not available

13. Disposal Considerations

- A. **Disposal method:**
Dispose of waste in compliance with local regulations.
- B. **Disposal precaution:**
Dispose of contents/containers according to official regulations.

14. Transport Information

Transport information for product

- A. UN number Not applicable

- | | | |
|----|---|---------------|
| B. | UN proper shipping name: | Not available |
| C. | Transport hazard class: | Not available |
| D. | Packing group: | Not available |
| E. | Marine pollutant: | Not available |
| F. | Special precaution which a user to be aware of or needs comply with connection with transport or conveyance either within or outside their premises:
Local transport follows in accordance with Dangerous goods Safety Management Law. | |

Transport information for Silver

- | | | |
|----|--|----------------|
| A. | UN number | Not applicable |
| B. | UN proper shipping name: | Not applicable |
| C. | Transport hazard class: | Not applicable |
| D. | Packing group: | Not applicable |
| E. | Marine pollutant: | Not applicable |
| F. | Special precaution which a user to be aware of or needs comply with connection with transport or conveyance either within or outside their premises: | |
| | - EmS FIRE SCHEDULE: | Not applicable |
| | - EmS SPILLAGE SCHEDULE: | Not applicable |

Transport information for Nickel

- | | | |
|----|--|---------------------------------|
| A. | UN number: | UN 3089 |
| B. | UN proper shipping name: | METAL POWDER, FLAMMABLE, N.O.S. |
| C. | Transport hazard class: | 4.1 |
| D. | Packing group: | 2 |
| E. | Special precaution which a user to be aware of or needs comply with connection with transport or conveyance either within or outside their premises: | |
| | - EmS FIRE SCHEDULE: | F-G |
| | - EmS SPILLAGE SCHEDULE: | S-G |

15. Regulatory Information

A. Industrial Safety and Health Act

- Chemical needs monitoring workplace exposure limit:
 - Applicable (Silver, Nickel)
- Chemical specified the exposure limit:
 - Applicable (Silver, Nickel)
- Hazardous Substances Requiring Management:
 - Applicable (Silver, Nickel)
- Special health examination substance:
 - Applicable (Nickel)
- Chemical subject to permissible exposure limit:
 - Applicable (Nickel)

B. Chemical Control Act

- Poisonous substances:
 - Not Applicable

- Authorized Chemicals:
 - Not Applicable
- Toxic Release Inventory (TRI) Chemicals:
 - Applicable (Silver, Nickel)
- Accidental Precaution Chemicals:
 - Not Applicable
- Restricted substances:
 - Not Applicable

C. Dangerous Material Safety Control Act:

Silver Not Applicable
Nickel Not Applicable

D. Wastes Management Act:

Silver Not Applicable
Nickel Not Applicable

E. Other requirements in domestic and other countries:

- POPs Management Law: Not applicable
- Information of EU Classification

- Classification:	Silver	Not applicable
	Nickel	Not applicable
- Risk Phrases:	Silver	Not applicable
	Nickel	R40, R43
- Safety Phrases:	Silver	Not applicable
	Nickel	S2, S22, S36
- U.S. Federal regulation

- OSHA PROCESS SAFETY (29CFR1910.119):	Not applicable
- CERCLA Section 103 (40CFR302.4):	453.599 kg 1000 lb (Silver) 45.3599 kg 100 lb (Nickel)
- EPCRA Section 302 (40CFR355.30):	Not applicable
- EPCRA Section 304 (40CFR355.40):	Not applicable
- EPCRA Section 313 (40CFR372.65):	Applicable (Silver, Nickel)
- Rotterdam Convention listed ingredients: Not applicable
- Stockholm Convention listed ingredients: Not applicable
- Montreal Protocol listed ingredients: Not applicable

16. Other Information

A. Information source and references:

Silver

- 1(E. Melting point/Freezing point)
- 1(F. Initial Boiling Point/Boiling Ranges)
- 1(J. Upper/Lower Flammability or explosive limits)
- 1(L. Solubility)
- 1(N. Specific gravity)

2(S. Molecular weight)

(1) ICSC(2) HSDB(3) IUCLID(4) ACGIH(5) PATTY(6) ATSDR

Nickel

ICSC2001(Physical state)

ICSC2001(color)

ICSC2001(e) Melting point/freezing point)

ICSC2001(f) Initial boiling point and boiling range)

HSDB(k) Vapor pressure)

OHM/TADS(l) Solubility)

HSDB(Respiratory sensitization)

HSDB(Skin sensitization)

ATSDR (2005)(Specific target organ toxicity (single exposure))

ICSC2001(Specific target organ toxicity (single exposure))

ECETOC TR33 (1989)(Specific target organ toxicity (repeated exposure))

ICSC2001(Specific target organ toxicity (repeated exposure))

- B. Issuing date:** 2011-09-30
- C. Revision number and date:** 9, 2025-06-09
- D. Others:** No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.