



SAFETY DATA SHEET

MATERION

1. Identification

| | | |
|---|--|----------------|
| Product identifier | Palladium Based Products | |
| Other means of identification | | |
| SDS number | 10 | |
| Manufacturer/Importer/Supplier/Distributor information | | |
| Manufacturer | | |
| Company name | Materion Advanced Materials Group | |
| Address | 42 Mt. Ebo Road South Brewster, NY 10509 United States | |
| Telephone | Supplier Phone | 1+845.279.0900 |
| Website | materion.com | |
| E-mail | Not available. | |
| Emergency phone number | Chemtec | 1+703.527.3887 |

2. Hazard(s) identification

| | | |
|------------------------------|--|-------------|
| Physical hazards | Not classified. | |
| Health hazards | Serious eye damage/eye irritation | Category 2B |
| | Sensitization, respiratory | Category 1 |
| | Sensitization, skin | Category 1 |
| | Carcinogenicity | Category 2 |
| Environmental hazards | Hazardous to the aquatic environment, acute hazard | Category 1 |
| OSHA defined hazards | Not classified. | |
| Label elements | | |



| | | |
|--------------------------------|---|--|
| Signal word | Danger | |
| Hazard statement | May cause an allergic skin reaction. Causes eye irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Suspected of causing cancer. Very toxic to aquatic life. | |
| Precautionary statement | | |
| Prevention | Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. In case of inadequate ventilation wear respiratory protection. | |
| Response | If on skin: Wash with plenty of water. If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. If skin irritation or rash occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. If experiencing respiratory symptoms: Call a poison center/doctor. Wash contaminated clothing before reuse. Collect spillage. | |
| Storage | Store locked up. | |

| | |
|--|---|
| Disposal | Dispose of contents/container in accordance with local/regional/national/international regulations. |
| Hazard(s) not otherwise classified (HNOC) | None known. |
| Supplemental information | 64.72% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. |

3. Composition/information on ingredients

Mixtures

| Chemical name | Common name and synonyms | CAS number | % |
|---------------|--------------------------|------------|---------|
| Palladium | | 7440-05-3 | 35 - 99 |
| Silver | | 7440-22-4 | 20 - 40 |
| Copper | | 7440-50-8 | 15 - 40 |
| Cobalt | | 7440-48-4 | 0 - 35 |
| Nickel | | 7440-02-0 | 1 - 30 |
| Platinum | | 7440-06-4 | 1 - 10 |

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

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|---|--|
| Inhalation | If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. |
| Skin contact | Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. |
| Eye contact | Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. |
| Ingestion | Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately. |
| Most important symptoms/effects, acute and delayed | Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash. |
| Indication of immediate medical attention and special treatment needed | Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed. |
| General information | IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse. |

5. Fire-fighting measures

| | |
|--|---|
| Suitable extinguishing media | Dry sand. |
| Unsuitable extinguishing media | Do not use water jet as an extinguisher, as this will spread the fire. Carbon dioxide (CO2). |
| Specific hazards arising from the chemical | During fire, gases hazardous to health may be formed. |
| Special protective equipment and precautions for firefighters | Self-contained breathing apparatus and full protective clothing must be worn in case of fire. |
| Fire fighting equipment/instructions | Move containers from fire area if you can do so without risk. |
| Specific methods | Use standard firefighting procedures and consider the hazards of other involved materials. |
| General fire hazards | No unusual fire or explosion hazards noted. |

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| Components | Type | Value | Form |
|------------------------|------|------------|----------------|
| Cobalt (CAS 7440-48-4) | PEL | 0.1 mg/m3 | Dust and fume. |
| Copper (CAS 7440-50-8) | PEL | 1 mg/m3 | Dust and mist. |
| | | 0.1 mg/m3 | Fume. |
| Nickel (CAS 7440-02-0) | PEL | 1 mg/m3 | |
| Silver (CAS 7440-22-4) | PEL | 0.01 mg/m3 | |

US. ACGIH Threshold Limit Values

| Components | Type | Value | Form |
|--------------------------|------|------------|---------------------|
| Cobalt (CAS 7440-48-4) | TWA | 0.02 mg/m3 | |
| Nickel (CAS 7440-02-0) | TWA | 1.5 mg/m3 | Inhalable fraction. |
| Platinum (CAS 7440-06-4) | TWA | 1 mg/m3 | |
| Silver (CAS 7440-22-4) | TWA | 0.1 mg/m3 | Dust and fume. |

US. NIOSH: Pocket Guide to Chemical Hazards

| Components | Type | Value | Form |
|--------------------------|------|-------------|----------------|
| Cobalt (CAS 7440-48-4) | TWA | 0.05 mg/m3 | Dust and fume. |
| Copper (CAS 7440-50-8) | TWA | 1 mg/m3 | Dust and mist. |
| Nickel (CAS 7440-02-0) | TWA | 0.015 mg/m3 | |
| Platinum (CAS 7440-06-4) | TWA | 1 mg/m3 | |
| Silver (CAS 7440-22-4) | TWA | 0.01 mg/m3 | Dust. |

Biological limit values

ACGIH Biological Exposure Indices

| Components | Value | Determinant | Specimen | Sampling Time |
|------------------------|---------|-------------|----------|---------------|
| Cobalt (CAS 7440-48-4) | 15 µg/l | Cobalt | Urine | * |
| | 1 µg/l | Cobalt | Blood | * |

* - For sampling details, please see the source document.

Control parameters Follow standard monitoring procedures.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

Wear positive pressure self-contained breathing apparatus (SCBA).

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance

Physical state

Solid.

Form

Solid.

Color

Not available.

Odor

Not applicable.

Odor threshold

Not available.

pH

Not available.

Melting point/freezing point

1760.9 °F (960.5 °C) estimated

Initial boiling point and boiling range

3632 °F (2000 °C) estimated

Flash point

Not available.

Evaporation rate

Not available.

Flammability (solid, gas)

Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)

Not available.

Flammability limit - upper (%)

Not available.

Explosive limit - lower (%)

Not available.

Explosive limit - upper (%)

Not available.

Vapor pressure

0.11 hPa estimated

Vapor density

Not available.

Relative density

Not available.

Solubility(ies)

Solubility (water)

Not available.

Partition coefficient (n-octanol/water)

Not available.

| | |
|----------------------------------|-----------------------------------|
| Auto-ignition temperature | Not applicable. |
| Decomposition temperature | Not available. |
| Viscosity | Not available. |
| Other information | |
| Density | 11.15 g/cm ³ estimated |
| Explosive properties | Not explosive. |
| Oxidizing properties | Not oxidizing. |
| Specific gravity | 11.15 estimated |

10. Stability and reactivity

| | |
|---|---|
| Reactivity | The product is stable and non-reactive under normal conditions of use, storage and transport. |
| Chemical stability | Material is stable under normal conditions. |
| Possibility of hazardous reactions | No dangerous reaction known under conditions of normal use. |
| Conditions to avoid | Contact with incompatible materials. |
| Incompatible materials | Strong acids. Aluminum. Phosphorus. |
| Hazardous decomposition products | No hazardous decomposition products are known. |

11. Toxicological information

Information on likely routes of exposure

| | |
|---------------------|---|
| Inhalation | May cause allergy or asthma symptoms or breathing difficulties if inhaled. Prolonged inhalation may be harmful. |
| Skin contact | May cause an allergic skin reaction. |
| Eye contact | Causes eye irritation. |
| Ingestion | Expected to be a low ingestion hazard. |

Symptoms related to the physical, chemical and toxicological characteristics Irritation of eyes. Exposed individuals may experience eye tearing, redness, and discomfort. Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

Information on toxicological effects

| | |
|--|--|
| Acute toxicity | May cause an allergic skin reaction. |
| Skin corrosion/irritation | Prolonged skin contact may cause temporary irritation. |
| Serious eye damage/eye irritation | Causes eye irritation. |
| Respiratory or skin sensitization | |
| Respiratory sensitization | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Skin sensitization | May cause an allergic skin reaction. |
| Germ cell mutagenicity | No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic. |
| Carcinogenicity | Suspected of causing cancer. |

IARC Monographs. Overall Evaluation of Carcinogenicity

| | |
|------------------------|-------------------------------------|
| Cobalt (CAS 7440-48-4) | 2B Possibly carcinogenic to humans. |
| Nickel (CAS 7440-02-0) | 2B Possibly carcinogenic to humans. |

US. National Toxicology Program (NTP) Report on Carcinogens

| | |
|------------------------|---|
| Nickel (CAS 7440-02-0) | Known To Be Human Carcinogen. Reasonably Anticipated to be a Human Carcinogen. |
|------------------------|---|

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

| | |
|---|--|
| Specific target organ toxicity - single exposure | Not classified. |
| Specific target organ toxicity - repeated exposure | Not classified. |
| Aspiration hazard | Not an aspiration hazard. |
| Chronic effects | Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects. |

12. Ecological information

Ecotoxicity Very toxic to aquatic life.

| Product | Species | Test Results |
|--------------------------|--------------|---------------------------------|
| Palladium Based Products | | |
| Aquatic | | |
| Crustacea | EC50 Daphnia | 0.0492 mg/l, 48 hours estimated |
| Fish | LC50 Fish | 7.6612 mg/l, 96 hours estimated |

* Estimates for product may be based on additional component data not shown.

| | |
|--------------------------------------|---|
| Persistence and degradability | No data is available on the degradability of this product. |
| Bioaccumulative potential | No data available. |
| Mobility in soil | No data available. |
| Other adverse effects | No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component. |

13. Disposal considerations

| | |
|--|--|
| Disposal instructions | Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations. |
| Local disposal regulations | Dispose in accordance with all applicable regulations. |
| Hazardous waste code | The waste code should be assigned in discussion between the user, the producer and the waste disposal company. |
| Waste from residues / unused products | Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). |
| Contaminated packaging | Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal. |

14. Transport information

DOT

| | |
|-------------------------------------|---|
| UN number | UN3077 |
| UN proper shipping name | Environmentally hazardous substances, solid, n.o.s. |
| Transport hazard class(es) | |
| Class | 9 |
| Subsidiary risk | - |
| Label(s) | 9 |
| Packing group | III |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| Special provisions | 8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33 |
| Packaging exceptions | 155 |
| Packaging non bulk | 213 |
| Packaging bulk | 240 |

IATA

| | |
|------------------------------|---|
| UN number | UN3077 |
| UN proper shipping name | Environmentally hazardous substance, solid, n.o.s. |
| Transport hazard class(es) | |
| Class | 9 |
| Subsidiary risk | - |
| Packing group | III |
| Environmental hazards | No. |
| ERG Code | 9L |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |
| Other information | |
| Passenger and cargo aircraft | Allowed. |
| Cargo aircraft only | Allowed. |

IMDG

| | |
|------------------------------|---|
| UN number | UN3077 |
| UN proper shipping name | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. |
| Transport hazard class(es) | |
| Class | 9 |
| Subsidiary risk | - |
| Packing group | III |
| Environmental hazards | |
| Marine pollutant | No. |
| EmS | F-A, S-F |
| Special precautions for user | Read safety instructions, SDS and emergency procedures before handling. |

DOT; IATA; IMDG



General information IMDG Regulated Marine Pollutant.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

| | |
|------------------------|---------|
| Cobalt (CAS 7440-48-4) | Listed. |
| Copper (CAS 7440-50-8) | Listed. |
| Nickel (CAS 7440-02-0) | Listed. |
| Silver (CAS 7440-22-4) | Listed. |

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
 Delayed Hazard - Yes
 Fire Hazard - No
 Pressure Hazard - No
 Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

| Chemical name | CAS number | % by wt. |
|----------------------|-------------------|-----------------|
| Silver | 7440-22-4 | 20 - 40 |
| Copper | 7440-50-8 | 15 - 40 |
| Cobalt | 7440-48-4 | 0 - 35 |
| Nickel | 7440-02-0 | 1 - 30 |

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Cobalt (CAS 7440-48-4)

Nickel (CAS 7440-02-0)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations**US - New Jersey RTK - Substances: Listed substance**

Cobalt (CAS 7440-48-4)

Copper (CAS 7440-50-8)

Nickel (CAS 7440-02-0)

Platinum (CAS 7440-06-4)

Silver (CAS 7440-22-4)

US - Pennsylvania RTK - Hazardous Substances: All compounds of this substance are considered environmental hazards

Cobalt (CAS 7440-48-4)

Copper (CAS 7440-50-8)

Nickel (CAS 7440-02-0)

Silver (CAS 7440-22-4)

US - Pennsylvania RTK - Hazardous Substances: Special hazard

Nickel (CAS 7440-02-0)

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Cobalt (CAS 7440-48-4)

Copper (CAS 7440-50-8)

Nickel (CAS 7440-02-0)

Platinum (CAS 7440-06-4)

Silver (CAS 7440-22-4)

US. Massachusetts RTK - Substance List

Cobalt (CAS 7440-48-4)

Copper (CAS 7440-50-8)

Nickel (CAS 7440-02-0)

Platinum (CAS 7440-06-4)

Silver (CAS 7440-22-4)

US. New Jersey Worker and Community Right-to-Know Act

- Cobalt (CAS 7440-48-4)
- Copper (CAS 7440-50-8)
- Nickel (CAS 7440-02-0)
- Silver (CAS 7440-22-4)

US. Pennsylvania RTK - Hazardous Substances

- Cobalt (CAS 7440-48-4)
- Copper (CAS 7440-50-8)
- Nickel (CAS 7440-02-0)
- Platinum (CAS 7440-06-4)
- Silver (CAS 7440-22-4)

US. Pennsylvania Worker and Community Right-to-Know Law

- Cobalt (CAS 7440-48-4)
- Copper (CAS 7440-50-8)
- Nickel (CAS 7440-02-0)
- Platinum (CAS 7440-06-4)
- Silver (CAS 7440-22-4)

US. Rhode Island RTK

- Cobalt (CAS 7440-48-4)
- Copper (CAS 7440-50-8)
- Nickel (CAS 7440-02-0)
- Silver (CAS 7440-22-4)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

- | | |
|------------------------|-------------------------|
| Cobalt (CAS 7440-48-4) | Listed: July 1, 1992 |
| Nickel (CAS 7440-02-0) | Listed: October 1, 1989 |

16. Other information, including date of preparation or last revision

Issue date 07-20-2015

Version # 01

Disclaimer Materion Brewster LLC cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.