

TANAKA DENSHI KOGYO K.K

Material Safety Data Sheet

COMPANY INFORMATION

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Product Name **Gold Alloy Bonding Wire : GPG-2**

Material specifications Type of material: Simple substance product(Alloy)
 Chemical Name: Gold-Palladium Alloy
 Ingredients & composition: Au 99 mass % + Pd 1mass %
 Chemical formula: 99Au-1Pd
 No. of the Existing chemical substance: NA(Au, Pd)
 CAS Registry No.: 7440-57-5(Au), 7440-05-3(Pd)
 UN No.: NA(Au, Pd)

Physical property of the Alloy

Appearance: Golden lustrous metal.
 Specific gravity: 19.20
 Melting point: 1077 (Solidus), 1082 (Liquidus)
 Solubility in water: Insoluble.

[**About Gold (Au)**]

Classification of hazardsj

Name of classification: NA
 Danger: NA
 Harm: NA
 Environmental impact: Not reported.

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First aid measures

Eye contact:	Not reported.
Skin contact:	Not reported.
Inhalation:	Not reported.
Ingestion:	Not reported.

Fire fighting measures

Extinguishing instructions:	Gold is noninflammable.
Extinguishing media:	Not otherwise specified.

Accidental release measures: Gold is a simple metal. There is no fear of leakage.

Handling and storage instructions

Handling:	Not otherwise specified.
Storage:	Not otherwise specified.

Exposure prevention measures

Controlled concentration:	Not established.	
Permissible concentration (TWA)		
Japan Association on Industrial Health:	Not established.	
ACGIH:	Not established.	
Facilities:	Good general ventilation should be sufficient for many cases.	
Safety tools:		
Respirator:	Not needed in most cases.	
Safety glasses:	Not needed in most cases.	
Safety gloves:	Not needed in most cases.	
Safety wears:	Not needed in most cases.	

Physical/Chemical Characteristics

Appearance:	Golden lustrous metal.
Specific gravity:	19.320
Melting point:	1064°C
Boiling point:	2710°C
Solubility:	Insoluble in water under normal temperature.

Information on the dangerousness

Flash point:	Not detected.
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Ignition point:	Not detected.
Explosion limits:	Upper limit: Not detected. Lower limit: Not detected.
Flammability:	Noninflammable.
Spontaneous combustibility:	Not detected.
Oxidizability:	Not detected.
Self-reactivity/Explosiveness:	Not detected.
Dust explosiveness:	Not reported.
Stability/Reactivity:	Gold has little chemical reactivity and does not react with oxygen(O ₂), sulfur(S) and ordinary acid and base. But it reacts with halogen, so is soluble in aqua regia that releases chlorine. It is soluble in the solution containing cyanic ion under the existence of oxygen, and makes complex ion [Au(CN) ₂].

Information on the harmfulness

Corrosive property:	Tumorigenesis is indicated through animal experiments.
Irritating property(skin/eyes):	Not reported.
Sensitization:	Not cause.
Acute toxicity (containing 50% of lethal dose):	Not reported.
Sub-acute toxicity:	Not reported.
Chronic toxicity:	Not reported.
Cancer source property:	Not reported.
Variation property (microorganism, abnormality of chromosome):	Not reported.
Reproduction toxicity:	Not reported.
Teratological property:	Not reported.

Effect on the environment

Decomposition property:	Not bio-degradable.
Accumulation property:	Not reported.
Fish poisoning property:	Not reported.

Cautions on waste disposal: No special cautions should be needed for ecology.

Notes for transportation: Not a dangerous goods for transportation.

* IMDG (maritime transport)
Class : No information available

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* IATA-DGR (air transport)
Class : no information available

Relevant laws or regulations: Our product does not contain the substances prohibited in RoHS instruction.
Follow all regulations in your country.

[**About Palladium (Pd)**]

Classification of dangerousness & harmfulness

Name of classification: NA
 Dangerousness: NA
 Harmfulness: NA
 Environmental impact: Not reported.

Emergency measures

When enters eyes: Not reported.
 When contacts skin: Not reported.
 When inhaled: Not reported.
 When swallowed: Not reported.

Fire fighting measures

Extinguishing method: Palladium is noninflammable.
 Extinguishing agents: Not otherwise specified.

Measures for leakage: Palladium is a simple metal, so there is no fear of leakage.

Instruction manual & notes for handling and storage

Handling: Palladium should not be mixed with arsenic (As), Carbon(C), ozonide and sodiumtetrahydroborate (NaBH₄).
 Storage: Not reported.

Exposure prevention measures

Controlled concentration: Not established.
 Permissible concentration (TWA)
 Japan Association on Industrial Health: Not established.
 ACGIH: Not established.

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Facilities:	Especially, not necessary.
Safety tools:	
Respirator:	Especially, not necessary.
Safety glasses:	Especially, not necessary.
Safety gloves:	Especially, not necessary.
Safety wears:	Especially, not necessary.

Physical/Chemical Characteristics

Appearance:	Silver gray metal.
Specific gravity:	12.02
Melting point:	1554°C
Boiling point:	3140°C
Solubility:	Insoluble in water.

Information on the dangerousness

Flash point:	Not detected.
Ignition point:	Not detected.
Explosion limits:	Upper limit: Not detected. Lower limit: Not detected.
Flammability:	Powder of palladium burns when exposed to heat or flame.
Spontaneous combustibility:	NA
Oxidizability:	Not reported.
Self-reactivity/Explosiveness:	Powder of palladium is in danger of explosion.
Dust explosiveness:	NA
Stability/Reactivity:	Palladium reacts with oxygen(O ₂) to produce PdO when heated to the temperature changing its color dark red, and dissociates at the higher temperature than it. It reacts with fluorine (F ₂) and chlorine (Cl ₂). Moreover it reacts with sulfur (S), selenium (Se), phosphorus (P), and arsenic (As) when heated. It dissolves easily in aqua regia, gradually in diluted nitric acid (HNO ₃), and well in concentrated nitric acid (HNO ₃) containing nitrogen oxides. It dissolves in concentrated sulfuric acid (H ₂ SO ₄) generating sulfur dioxide (SO ₂) when heated. It turns to PdO with sodium peroxide (Na ₂ O ₂) when heated. It reacts violently with hydrogen (H ₂), oxygen fluoride(OF ₂), and sulfur (S) existing together with isopropyl alcohol [CH ₃ CH(OH)CH ₃].

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Information on the harmfulness

Corrosive property:	Not reported.
Irritating property(skin/eyes):	Not reported.
Sensitization:	Not reported.
Acute toxicity (containing 50% of lethal dose):	Administering in the vein of lethal dose causes anorexia, a hemolyzation, a calm kidney, and the marrow damage.
Sub-acute toxicity:	The action of a various ferments is obstructed, and the energy use of the nerve and muscle is also obstructed. The failure of the lung and embryo's anomalous are caused.
Chronic toxicity:	It seems that palladium unites with various elements in cells at the stage of the laboratory.
Cancer source property:	Not reported.
Variation property (Microorganism, Abnormality of chromosome):	Not reported.
Reproduction toxicity:	Not reported.
Teratological property:	Not reported.

Effect on the environment

Decomposition property:	Not bio-degradable.
Accumulation property:	Not reported.
Fish poisoning property:	Not reported.

Cautions on waste disposal: No special cautions should be needed for ecology.

Notes for transportation: Not a dangerous goods for transportation.

* IMDG (maritime transport)
Class : No information available

* IATA-DGR (air transport)
Class : no information available

Relevant laws or regulations: Our product does not contain the substances prohibited in RoHS instruction.
Follow all regulations in your country.

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Others (References)

- 1) *Handbook on Dangerousness & Harmfulness of Chemical Substances*
Compiled under the editorial supervision of The Safety and Hygiene Department of The Labor Ministry, edited and published by Central Labor Accident Prevention Association
- 2) *Threshold Limit Values for Chemical Substances and Physical Agents, and Biological Exposure Indices (1998)*
Published by ACGIH
- 3) *Handbook of Reactive Chemical Hazards*
Written by L. Bretherick, translated under the supervision of Tadao Yoshida and Shozo Tamura, published by Maruzen Co., Ltd.
- 4) *Safety Data Book for Chemical Substances*
Edited by the Society for the Study of Safety Information of Chemical Substances under the editorial supervision of Yoichi Uehara, published by Ohm-sha Co., Ltd.
- 5) *Hazardous Chemicals Desk Reference*
Written by N. Irving Sax and Richard J Lewis, Sr., translated under the supervision of Shizuo Fujiwara, published by Maruzen Co., Ltd.
- 6) *Data Book on Dangerous Objects*
Edited by Tokyo Fire Protection Association under the editorial supervision of The Metropolitan Fire Department, published by Maruzen Co., Ltd.
- 7) *Handbook for Dangerous Objects*
Written by Tetsu Yamamoto, published by Shinsei Publishing Co., Ltd.
- 8) *Regulations on Chemical Products Application*
Published by The Chemical Daily Co., Ltd.
- 9) *Science of Precious Metal*
Compiled under the editorial supervision by Seiichiro Tanaka, Taira Suzuki and Kenjiro Meguro, published by Tanaka Kikinzoku Kogyo K.K.
- 10) *Story on Precious Metal*
Edited by Hironobu Yamamoto, published by Gihodo Publishing Co., Ltd.
- 11) *Dictionary of Elements*
Edited by Hisao Mabuchi, published by Asakura Bookstore Co., Ltd.
- 12) *Encyclopaedia Chimica*
Edited by The Editing Committee for Encyclopedia Chimica Published by Kyoritsu Publishing Co.,Ltd.
- 13) *New Chemical Index*
Published by The Chemical Daily Co., Ltd.
- 14) *Chemistry Handbook*
Edited by The Chemical Society of Japan, published by Maruzen Co., Ltd.

Notes: This document is based on currently available information and materials, and no guarantee is made concerning the data or evaluation mentioned herewith. The datasheet is only applicable under normal application conditions; thus for special purposes, please refer to other relevant documents.