

SAFETY DATA SHEET

Section 1 – Products and Suppliers

SDS: BA-102 (04-2016)

- Product Identifier:** Brazing Alloys with gallium, indium, manganese, and/or palladium (consisting of ingots, foil (sheet), wire, and powder products)
- Other means of identification:** Wesgo Metals® Products: See Table 1 in Section 16 for specific products and their respective metal constituents.
- Use (and restrictions):** Metal alloys for joining or repairing metal components by brazing/soldering.

Suppliers and emergency contact information:

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Section 2 – Hazard Identification

Braze alloys in solid form (ingots, foil sheets and wire) generally not considered hazardous until used in melting and brazing operations during which metal fumes and dust are generated. Alloys in powder form can create airborne dust during handling and use. Hazardous levels of dust or metal fumes of alloy constituents can create health risks, as described below. Metallic dust and particles can cause a serious fire and/or explosion hazard.

2.1 Classification

Under the Globally Harmonized System of Classification and Labeling and the US OSHA Hazard Communication Standard, dust and fumes released during brazing operations are categorized as hazardous: (incl. Classification according to Regulation (EC) No 1272/2008 [CLP])

Skin irritant, Category 2	H315	due to the presence of palladium, gallium and indium
Eye irritant, Category 2A	H319	due to the presence of palladium and indium

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2.2 Signal word, symbols, hazard and precautionary statements:

Warning



Hazard Statements:

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Note: Accompanying alpha-numeric designations included to address EU regulations.

Precautionary Statements:

P261 Avoid breathing dust and fumes.

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

P280A + P264 Wear protective gloves to prevent skin contact or thermal burns during brazing operations. Wash hands thoroughly after handling.

P280B Wear ANSI-approved eye protection to prevent eye contact.

P302 + P352 + **If on skin:** Wash with plenty of water.

P333 + P313 **If skin irritation or rash occurs:** Get medical advice/attention.

P305 + P351 + P338 + **If in eyes:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337 + P313 **If eye irritation persists:** Get medical attention.

P308 + P309 + P313 **If exposed, concerned, or feel unwell:** Get medical advice/attention.

Other information about health hazards:

The materials in this product are not normally absorbed through the skin. Repeated or prolonged exposure to elevated concentrations of any airborne dust or fumes can irritate or harm the respiratory system, especially as an aggravation to a pre-existing condition. Inhalation of significant quantities of very fine metal dust and metal fumes can cause "metal fume fever," with flu-like symptoms. Avoid creating and breathing airborne dust and fumes.

Other information about physical hazards:

Brazing and soldering operations present a fire hazard to nearby combustible materials. Finely dispersed metal particles can form ignitable and explosive mixtures in air. Maintain good housekeeping.

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Section 3 – Composition/Information on Ingredients

3.1 Mixtures:

See Table 1 in Section 16 for specific products and their respective metal constituents.

Constituent	CAS Registry No.	EINECS No.	Constituent	CAS Registry No.	EINECS No.
Copper (Cu)	7440-50-8	231-159-6	Palladium (Pd)	7440-05-3	231-115-6
Gallium (Ga)	7440-55-3	231-163-8	Silver (Ag)	7440-22-4	231-131-3
Gold (Au)	7440-57-5	231-165-9	Titanium	7440-32-6	231-142-3
Indium (In)	7440-74-6	231-180-0	Vanadium	7440-62-2	231-171-1
Manganese (Mn)	7439-96-5	231-105-1			

Section 4 – First Aid Measures

4.1 Description of first aid measures

Inhalation: Remove affected personnel to an exposure-free environment. If experiencing respiratory symptoms: Call a poison center or doctor if you feel unwell.

Skin contact: Wash hands with soap and water. If skin irritation or rash occurs: Get medical advice/attention.

Eye contact Flush eyes with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. If necessary call a specialist.

Ingestion: Not applicable.

Indication of need for immediate medical attention and special treatment: Skin contact with hot metals or flames during brazing operations can cause thermal burns. Seek medical attention for severe thermal burns.

4.2 Most important symptoms and effects, both acute and delayed

No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed

No further relevant information available.

Section 5 – Fire Fighting Measures

5.1 Extinguishing media

Suitable extinguishing media:

Use dry chemical or carbon dioxide.

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Unsuitable extinguishing media:

Do not use water on a metal fire.

5.2 Special hazards arising from the substance or mixture

Combustion hazards:

Flames from brazing operations can ignite combustibles. In a finely divided form, this product may ignite when exposed to flames or by reaction with incompatible materials. Metal oxides or fumes of constituent metals may be emitted during a fire.

5.3 Advice for firefighters

Special fire-fighting procedures:

Use protective clothing and breathing equipment appropriate to the surrounding fire.

Unusual fire and explosion hazards:

Metal powder mixtures can cause fires and/or explosions when present in air at high concentrations.

Section 6 – Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

No special measures required.

6.2 Environmental precautions:

No special measures required.

6.3 Methods and material for containment and cleaning up:

Metal scrap should be collected and contained using normal procedures. Metal particulates, shavings, powders and granules should be cleaned up using wet-sweeping methods to avoid creating dust. Vacuum only with HEPA filtered equipment. **Do not** use compressed air for clean-up. Some fine metal powders may ignite or explode under specific conditions; avoid creating high airborne dust concentrations and accumulating dust. Appropriate personal protective equipment should be used when cleaning up dust. Recovered material should be placed in sealed containers and recycled for their metal content. Dispose in accordance with applicable waste disposal regulations.

6.4 Reference to other sections

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

Section 7 – Handling and Storage

7.1 Precautions for safe handling

Avoid skin contact; wash hands after handling chemicals. Do not eat, drink or smoke while handling these products. All employees who handle this material should be trained to handle it safely. Maintain good

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housekeeping practices, such as wet sweeping or vacuuming to remove dust accumulation. Avoid dust inhalation or ingestion and contact of materials with eyes. Certain metal powder mixtures can cause fires and/or explosions when present in air at high concentrations.

7.2 Conditions for safe storage, including any incompatibilities

Store in closed containers in a cool, dry, well-ventilated, fire-resistant area away from oxidizing agents and sources of heat and ignition.

7.3 Specific end use(s)

No further relevant information available.

Section 8 – Exposure Controls and Personal Protection

8.1 Control parameters

Exposure limits and guidelines:

Constituents	OSHA PEL 8-Hr TWA	ACGIH TLV 8-Hr TWA
Copper (Cu)	1 mg/m ³ (dust); 0.1mg/m ³ (fume)	1 mg/m ³ (dust); 0.2 mg/m ³ (fume)
Gallium (Ga)	None established	None established
Gold (Au)	None established	None established
Indium (In)	None established	0.1 mg/m ³
Manganese (Mn)	5 mg/m ³ (C) ^{Note 1} (dust and fume)	0.2 mg/m ³ (dust and fume)
Palladium (Pd)	None established	None established
Silver (Ag)	0.01 mg/m ³	0.1 mg/m ³
Titanium (Ti)	None established	None established
Vanadium (V)	None established	None established

Other jurisdictions may have different exposure limits and control guidelines. Users are advised to consult and comply with local regulations.

¹C (Ceiling Value) - The concentration that shall not be exceeded during any part of the work exposure.

8.2 Exposure controls

Engineering controls:

Use local exhaust ventilation during brazing operations to minimize or eliminate concentrations of airborne contaminants.

Personal protective equipment:

Wear ANSI-approved eye protection to prevent eye contact. Wear protective gloves to prevent skin contact or thermal burns during brazing operations. Use NIOSH-approved respiratory protective equipment if exposures exceed established limits or guidelines.

General hygiene considerations:

Do not eat, drink or smoke when handling these products. Wash hands after handling these products.

Limitation and supervision of exposure into the environment

The legal issue values and limitations are to be paid attention!

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Section 9 – Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Colors vary according to metals	Odor:	No odor
Odor threshold:	Not applicable	pH:	Not applicable
Melting point:	Not applicable	Boiling point:	Not applicable
Flash point:	Not applicable	Evaporation rate:	Not applicable
Flammability:	Not applicable	LEL/UEL:	Not applicable
Vapor pressure:	Not applicable	Vapor density:	Not applicable
Relative density:	Not applicable	Water solubility:	Not applicable
Partition coefficient (n-octanol/water):	Not applicable	Auto ignition temperature:	Not applicable
Decomposition temperature:	Not applicable	Viscosity:	Not applicable

9.2 Other information

No further relevant information available.

Section 10 – Stability and Reactivity

10.1 Reactivity

10.2 Chemical stability

Braze alloy products are stable when stored in closed containers at room temperature under normal storage and handling conditions.

10.3 Possibility of hazardous reactions

Heating to elevated temperatures may liberate metal/metal oxide fumes (i.e., during brazing operations). Metal powder mixtures can cause fires and explosions (if present at high airborne concentrations).

10.4 Conditions to avoid:

Avoid open flames around fine metal powders.

10.5 Incompatible materials:

Metals in particulate form are typically incompatible with strong acids and strong oxidizing agents.

10.6 Hazardous decomposition products:

No dangerous decomposition products known.

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Section 11 – Toxicological Information

11.1 Information on toxicological effects

User-generated dusts and fumes may, on contact with the skin or eyes, produce mechanical irritation. Chronic exposures could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of powders or user-generated fumes from welding/ brazing with these products may, depending on the specific features of the process used, pose a long-term health hazard. The composition of fumes and gases generated in user operations will depend on the metal alloy, base metal and the specific process being used and may include metals, metal oxides, carbon monoxide, ozone, and oxides of nitrogen.

Additional toxicological information is available through the U.S. National Institute for Occupational Safety and Health (NIOSH) and the Registry of Toxic Effects of Chemical Substances (RTECS).

See website: <http://www.cdc.gov/niosh/ipcsneng/nengrtec.html>. Applicable product components and their respective RTECS numbers are listed below:

Copper	GL5325000	Indium	NL1050000	Silver	VW3500000
Gallium	LW8600000	Manganese	OO9275000	Titanium	XR1700000
Gold	MD5070000	Palladium	RT3489500	Vanadium	YW1355000

Section 12 – Ecological Information

12.1 Toxicity

When used in their intended manner, these products would not be expected to be released to the environment. Adverse effects on ecosystems are not anticipated under normal and recommended conditions of handling, use, storage and disposal. None of the constituents in these products are classified as environmentally persistent, bio-accumulative toxic chemicals. Copper is a marine pollutant. Silver is an environmental pollutant.

Section 13 – Disposal Considerations

13.1 Waste treatment methods

Manage waste materials in accordance with applicable waste and disposal regulations. Whenever possible, try to recycle and reclaim due to the intrinsic value of certain braze alloy constituents. Whatever cannot be saved for recovery or recycling should be shipped to a permitted waste management facility. Certain products may contain silver, which could cause them to be a hazardous waste as defined by US EPA RCRA regulations, if disposed instead of recycled. Process, use or contamination of this product may change the characteristics of the waste and, consequently, how the waste is managed.

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Section 14 – Transport Information

This product is not regulated as a hazardous material or dangerous good for transportation purposes by any known authority.

Special precautions for user

See Section 6 – 8.

Section 15 – Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

- Copper and silver in dust form are hazardous substances as defined by the U.S. Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).
- All brazing product components are listed on the U.S. Toxic Substances Control Act (TSCA) inventory.
- Certain braze alloy products contain copper and/or silver which are subject to the reporting requirements of Section 313 of the U.S. Emergency Planning and Community Right-to-Know Act (SARA Title III). Refer to Table 1 in Section 16 for applicable products.

Section 16 – Other Information

Revision Summary: 15 April 2015: SDS revised to comply with US OSHA Hazard Communication Standard and GHS requirements.
26 Jan 2016: Alpha-numeric designations added to Section 2 hazard statements.
21 April 2016: SDS enhanced to comply with Regulation (EC) No 1272/2008 [CLP].

TABLE 1: METAL COMPOSITION - % WEIGHT

PRODUCTS	Ag	Au	Cu	Ga	In	Mn	Pd	Ti	V
70Ag/30Pd	70						30		
75Ag/25Pd	75						25		
88.7Ag/11.3Pd	88.7						11.3		
70Au/30Pd		70					30		
Gapasil-9	82			9			9		
Incuro-20		20	78		2				
Incuro-60		60	37		3				
Incusil-ABA (wire and foil)	59		27.5		12.5			2	
Incusil-10	63		27		10				

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TABLE 1: METAL COMPOSITION - % WEIGHT

PRODUCTS	Ag	Au	Cu	Ga	In	Mn	Pd	Ti	V
Incusil-15	62		24		15				
Palcusil-5	68		27				5		
Palcusil-10	58		32				10		
Palcusil-15	65		20				15		
Palcusil-25	54		21				25		
Palladium							99.9		
18Pd/82Cu			82				18		
Paloro		92					8		
Paloro-3V		89					8		3
Palsil-10	90						10		
Rocketdyne-50 (RI-50)	66		11			3	20		
Rocketdyne-51 (RI-51)	61		16			3	20		

Reasonable care has been taken in the preparation of information contained in this Safety Data Sheet and the information is provided in good faith. Information provided in this Safety Data Sheet has been prepared by competent and appropriately qualified and trained persons according to the US OSHA Hazard Communication Standard. Morgan Advanced Materials - Wesgo Metals® assumes no responsibility as to the accuracy of information drawn from other sources. No warranty, expressed or implied, is made.

Abbreviations and acronyms

ANSI	American National Standards Institute
ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service (division of the American Chemical Society)
EINECS	European Inventory of Existing Commercial Chemical Substances
HEPA	High-efficiency particulate air filters
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit
RCRA	Resource Conservation and Recovery Act
TLV	Threshold Limit Values
TWA	Time-weighted Average