

MATERIAL SAFETY DATA SHEET ACCORDING TO 91/155/EWG

Tradename: VD90.5101 / VD90.5104 / VD90.5105 / VD90.5106 / VD90.5108 / VD90.5109 /
VD90.5110 / VD90.5115 - MARTIN Solder Balls (LF)

Issue July. 2013

Reference: MSDS Lotkugeln SnAgCu (LF)-e.doc

1. Identification of the substance/preparation and of the company

1.1 Identification of the substance/preparation

MARTIN Solder Balls lead free
Alloy: Sn96.5;Ag3;Cu0.5

1.2 Company/undertaking identification

MARTIN GmbH
Argelsrieder Feld 1b
D-82234 Wessling
Phone: +49-8153-932 93-0
Fax: +49-8153-932 93-9
www.martin-smt.de

1.3 Emergency telephone

Please contact the nearest poison emergency center.

2. Hazards identification

2.1 To people

See point 11 and 15.
Preparation is not classified as hazardous in the sense of directive 1999/45EC.
In the event of contact with the hot product: Danger of burns.

2.2 To the environment

See point 12.

3. Composition and ingredients

3.1 Alloy containing:

| Name | Symbol | CAS No. | EINECS | Content % |
|--------|--------|-----------|-----------|-----------|
| Tin | Sn | 7440-31-5 | 231-141-8 | Balance |
| Silver | Ag | 7440-22-4 | 231-131-3 | 3.0-4.0 |
| Copper | Cu | 7440-50-8 | 231-159-6 | 0.4-0.6 |

For complete wording of the R-phrases refer to point 15.

4. First aid procedure

4.1 After inhalation

During processing: Supply person with fresh air. Call doctor immediately.

4.2 After eye contact

In the event of contact with the hot product:
Wash thoroughly for several minutes using copious water. Seek medical help if necessary.

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4.3 After skin contact

In the event of contact with the hot product: Wash off with cold water. Do not attempt to remove hardened product.

4.4 After ingestion

Call doctor immediately - Have data sheet available.

4.6 Special resources necessary for first aid

n.g.

5. Fire fighting measures

5.1 Suitable extinguishers

Adapt to the nature and extent of fire. If applicable: Metal fire extinguisher.

5.2 Unsuitable extinguishers

n.g.

5.3 Severe Dangers from this material, products of burning or heating

In case of fire the following can develop: Fume; irritating gases.

5.4 Special protective Equipment

Protective respirator with independent air supply.
According to size of fire: Full protection if necessary.

5.5 Further Information

Dispose of contaminated extinction water according to official regulations.

6. Accidental release measures

Refer to point 13 and for personal protection refer to point 8.

6.1 Personal precautions

No special measures required.

6.2 Environmental measures

Prevent from entering drainage system.

6.3 Methods for cleaning up

Collect mechanically and dispose of according to point 13. Allow the hot product to solidify.

7. Handling and storage

7.1 Handling

Tips for safe handling: See point 6.1.
General hygiene measures for the handling of chemicals are applicable.
Suction measures at the workplace or on the processing machines required.
Observe directions on label and instructions for use.
Switch on available suction system.
Do not inhale dust / fume / mist.

7.2 Storage

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7.2.1 Requirements to be met by storerooms and containers

Store products only unopened, in original packing.
Not to be stored in gangways or stair wells.

7.2.2 Special storage conditions

See point 10.2.

8. Exposure controls and personal protection

Ensure good ventilation. This can be achieved by local suction or general air extraction.
If this is insufficient to maintain the concentration under the OES, MEL or MAK values, suitable breathing protection should be worn.
Applies only if maximum permissible values are listed here.

| | | | |
|---|----------------------|--------------------|-----|
| (GB) Chemical Name | Silver | | |
| WEL-TWA: 0.1 mg/m ³ (metallic) (WEL, EC) | | WEL-STEL: --- | --- |
| BGMV: --- | | Other information: | --- |
| (GB) Chemical Name | Copper (dust) | | |
| WEL-TWA: 1.0 mg/m ³ | | WEL-STEL: --- | --- |
| BGMV: --- | | Other information: | --- |

(GB) WEL-TWA = Workplace Exposure Limit - Long-term exposure limit (8h TWA (= time weighted average

reference period).

WEL_STEL = Workplace Exposure Limit - Short-term exposure limit (15-minute reference period).

BGMV = Biological monitoring guidance value.

Sen = Capable of causing occupational asthma.

Sk = Can be absorbed through the skin.

Carc = Capable of causing cancer and/or heritable genetic damage.

8.1 Personal protective equipment

8.1.1 Respiratory protection: Normally not necessary.
During processing: Filter P2 EN 143

8.1.2 Hand protection: Normally not necessary.
Protective hand crème recommended.
During processing: Leather gloves

Additional information on hand protection - No tests has been performed.

Selection made for preparations according to the best available knowledge and information on the ingredients.

Selection of materials derived from glove manufacturer's indications.

Final selection of glove material must be made taking the breakthrough times, permeation rates and degradation into account.

Selection of a suitable glove depends not only on the material but also on other quality characteristics and varies from manufacturer.

In the case of preparations the resistance of glove materials cannot be calculated in advance so it has to be tested before use. The exact breakthrough time of the glove material can be requested from the protective glove manufacturer and must be observed.

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8.1.3 Eye protection: Normally not necessary.
During processing: Tight fitting protective goggles with side protection (EN166)

8.1.4 Body protection
Protective working garments (e.g. safety shoes EN 344, long-sleeved protective working garments).

9. Physical and chemical properties

9.1 General information

Aggregate state / form: solid
Color: grey
Odor: odourless

9.2 Safety and environmental information

| Parameter | Value/Range | Unit |
|----------------------------|------------------------|-------------------|
| Melting point / range | Depends on composition | °C |
| Boiling point / range | 2270 | °C (tin) |
| Flashpoint | n.a. | |
| Flammability (solid / gas) | n.g. | |
| Auto flammability | n.g. | |
| Vapor pressure | n.g. | |
| Density | Depends on composition | g/cm ³ |
| Bulk density | n.g. | |
| Solubility in water | Insoluble | |

10. Stability and reactivity

10.1 Conditions to avoid

See point 7.
Stable when handled and stored correctly.
Strong heat.

10.2 Substances to avoid

See point 7.
Avoid contact with strong oxidizing agents.

10.3 Hazardous decompositions products

See point 5.3.

10.4 Additional information

Stabilizers necessary: k.D.v.
Stabilizers available: k.D.v.

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11. Toxicological information

11.1 Acute toxicity

| | | | | | |
|--------------|------|-----|--------|----------|------|
| Ingestion | LD50 | rat | oral | (mg/kg): | n.v. |
| Inhalation | LC50 | rat | inhal. | (mg/kg): | n.v. |
| Skin contact | LD50 | rat | dermal | (mg/kg): | n.v. |
| Eye contact | | | | | n.v. |

11.2 Delayed and chronic effects

| | |
|-----------------------|------|
| Sensitization | n.g. |
| Carcinogenicity | n.g. |
| Mutagenicity | n.g. |
| Reproductive toxicity | n.g. |
| Narcosis | n.g. |

11.3 Further information

No classification according to calculation procedure.
Metallic tin is not classified.
Possible risk of impaired fertility.
Danger of cumulative effects.
Inhalation: Product is dangerous to health.
Ingestion: Product is dangerous to health.

12. Ecological information

| | |
|-------------------------------|-------------------------|
| Water hazard class (Germany) | Not hazardous to water. |
| Self classification | No |
| Persistence and degradability | n.v. |
| Behavior in sewage plants | n.v. |
| Aquatic toxicity | n.v. |
| Ecological toxicity | n.v. |

13. Disposal considerations

13.1 For the material / preparation / residue

The waste codes are recommendations based on the scheduled use of that product.
Owing to the user's specific conditions for use and disposal, other waste codes may be allocated under certain circumstances.

13.2 European disposal code

120104 (non-ferrous metal dust and particles - Germany)

170407 (mixed metals - Germany)

Pay attention to local and national official regulations. E.g. dispose at suitable refuse site. Implement substance recycling.

13.3 For contaminated packing material

See point 13.1.

Pay attention to local and national official regulations.

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14. Transport information

14.1 General statements

UN-Number n.a.

14.2 Road / Rail-transport (ADR / RID)

Class / packing-group n.a.

Classification code n.a.

LQ n.a.

14.3 Transport by sea

IMDG.Code n.a. (class/secondary-group)

Marine pollutant n.a.

14.4 Transport by air

IATA n.a. (class/secondary danger/packing-group)

14.5 Additional information

Non-dangerous material according to transport regulations.

15. Regulatory information

15.1 Classification according to Dangerous Product Regulations incl. EC Directives (67/548/EEC and 1999/45/EC)

Symbols n.a.

Indications of danger ---

R-phrases ---

S-phrases ---

Additions n.a.

Safety data sheet available for professional user on request.

Observe restrictions Yes

16. Other information

The statements made here should describe the product with regards to the necessary safety precautions - they are not meant to guarantee definite characteristics - but they are based on our present up-to-date knowledge.

No responsibility.

Legend:

n.a. not applicable

n.v., k.D.v. not available

n.g. not checked

OES Occupational exposure standard

MEL Maximum exposure limit

BMGV Biological monitoring guidance value

AG "Arbeitsplatzgrenzwert" (workplace limit value, Germany)

BG "Biologischer Grenzwert" (biological limit value, Germany)

VbF Regulation for flammable liquids (Austria)

WGK „Wassergefährdungsklasse“ (water hazard class, Germany)

VOC Volatile organic compounds

AOX Adsorbable organic halogen compounds

VwVwS Administrative Order relating to substances hazardous to water (Germany)