

## Safety Data Sheet

**Lead free solder tin alloys HQ005, HQ300, HQ305, HQ350, HQ350P, HQ387, HQ400, HQ405, Starli LF2/LF3/SB3, Sn99,5Cu0,4, Sn75Zn25, 91% Hafnia Zn**

Replaces date: 3/11/2022

Revision date: 12/1/2022  
Version: 3.3.0

### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1. Product identifier

**Trade name:** Lead free solder tin alloys HQ005, HQ300, HQ305, HQ350, HQ350P, HQ387, HQ400, HQ405, Starli LF2/LF3/SB3, Sn99,5Cu0,4, Sn75Zn25, 91% Hafnia Zn

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

**Recommended uses:** Soldering.

#### 1.3. Details of the supplier of the safety data sheet

##### Supplier

**Company:** Boliden Bergsøe A/S  
**Address:** Hvissingevej 116  
**Zip code:** 2600  
**City:** Glostrup  
**Country:** DENMARK  
**E-mail:** metal.glostrup@boliden.com  
**Phone:** +45 43268300

#### 1.4. Emergency Telephone Number

+45 43 26 83 00 (company)

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

**CLP-classification:** The product shall not be classified as hazardous according to the classification and labeling rules for substance and mixtures.

**Most serious harmful effects:** Harmful if vapours from molten metal are inhaled or if the skin comes in contact with molten metal.

#### 2.2. Label elements

The product shall not be classified as hazardous according to the classification and labeling rules for substance and mixtures.

#### 2.3. Other hazards

PBT/vPvB: No assessment required, as the product contains inorganic matter only.  
Endocrine disrupting properties: None known.

### SECTION 3: Composition/information on ingredients

#### 3.2. Mixtures

Substance	CAS No./ EC No./ REACH Reg. No.	Concentration	Notes	CLP-classification
Tin	7440-31-5 231-141-8 01-2119486474-28-0024	> 70 %		

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Antimony	7440-36-0 231-146-5 01-2119475609-24-0026	0 - 3.5 %		
Copper	7440-50-8 231-159-6 01-2119480154-42-0184	0 - 3.5 %		
Silver, metallic	7440-22-4 231-131-3 01-2119555669-21-0074	0 - 4 %	12	
Zinc	7440-66-6 231-175-3 01-2119467174-37-0023	0 - 26 %		

Please see section 16 for the full text of H- / EUH-phrases.

12 = The substance is included in the EU list of limit values for occupational exposure

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

- Inhalation:** Seek fresh air. Seek medical advice in case of persistent discomfort.
- Ingestion:** Wash out mouth thoroughly and drink 1-2 glasses of water in small sips. Seek medical advice in case of persistent discomfort.
- Skin contact:** Wash skin with soap and water. Seek medical advice in case of persistent discomfort.
- Eye contact:** Flush with water (preferably using eye wash equipment) until irritation subsides. Seek medical advice if symptoms persist.
- General:** When obtaining medical advice, show the safety data sheet or label.

#### 4.2. Most important symptoms and effects, both acute and delayed

Prolonged exposure to welding smoke and particles constitutes a risk of developing asthmatic diseases, various respiratory disorders and cancer of the respiratory system. Harmful if vapours from molten metal are inhaled or if the skin comes in contact with molten metal.

#### 4.3. Indication of any immediate medical attention and special treatment needed

No special immediate treatment required.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

- Suitable extinguishing media:** Extinguish with powder, foam, carbon dioxide or water mist. Use water or water mist to cool non-ignited stock.
- Unsuitable extinguishing media:** Do not use water stream, as it may spread the fire.

#### 5.2. Special hazards arising from the substance or mixture

The product is not directly flammable. Avoid inhalation of vapour and fumes - seek fresh air.

#### 5.3. Advice for firefighters

Move containers from danger area if it can be done without risk. Avoid inhalation of vapour and flue gases - seek fresh air. Wear Self-Contained Breathing Apparatus (SCBA) with chemical resistant gloves.

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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

**For non-emergency personnel:** Wear safety goggles if there is a risk of dust contact with eyes. Provide good ventilation.

**For emergency responders:** In addition to the above: Normal protective clothing equivalent to EN 469 is recommended.

#### 6.2. Environmental precautions

Prevent spillage from entering drains and/or surface water.

#### 6.3. Methods and material for containment and cleaning up

Sweep up/collect spills for possible reuse or transfer to suitable waste containers.

#### 6.4. Reference to other sections

See section 8 for type of protective equipment. See section 13 for instructions on disposal.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Work processes where generation of dust may occur must be performed under effective process ventilation (e.g. local exhaust ventilation). Running water and eye wash equipment must be available. Wash hands before breaks, before using restroom facilities, and at the end of work. Running water and eye wash equipment must be available. Wash hands before breaks, before using restroom facilities, and at the end of work.

#### 7.2. Conditions for safe storage, including any incompatibilities

The product should be stored safely, out of reach of children and away from food, animal feeding stuffs, medicines, etc. Store in a dry area. Do not store with the following: Acids/ Alkalis/ Strong oxidisers/ Chlorine-containing compounds/ Chlorine.

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

**Occupational exposure limit:** Contains no substances subject to reporting requirements

**Measuring methods:** Compliance with occupational exposure limits may be checked by occupational hygiene measurements.

**Legal basis:** Commission Directive 2000/39/EC (Occupational Exposure Limits) as subsequently amended. Last amended by Commission Directive 2019/1831/EU. Directive 2004/37/EC (Exposure to carcinogens or mutagens at work) as subsequently amended. Last amended by Directive 2022/431/EU. Resolution 2019/2182(INL) (Protecting workers from asbestos) as subsequently amended. Last amended by resolution 2022/C 184/03.

#### PNEC

Zinc, cas-no 7440-66-6				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC sediment (freshwater)	117,8 mg/kg dw			
PNEC sediment (marine water)	56,5 mg/kg dw			

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PNEC soil	35,6 mg/kg dw			
	52 µg/l			
PNEC aqua (freshwater)	20,6 µg/l			
PNEC aqua (marine water)	6,1 µg/l			

Silver, metallic, cas-no 7440-22-4				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC aqua (freshwater)	0,04 µg/l			
PNEC aqua (marine water)	0,86 µg/l			
PNEC sediment (freshwater)	438 mg/kg			
PNEC sediment (marine water)	438 mg/kg			
PNEC soil	0,794 mg/kg			
PNEC STP (wastewater-treatment facilities)	0,025 mg/l			

Antimony, cas-no 7440-36-0				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC aqua (freshwater)	0,113 µg/l			
PNEC aqua (marine water)	0,0113 µg/l			
PNEC sediment (freshwater)	7,8 mg/kg dw			
PNEC sediment (marine water)	1,56 mg/kg dw			
PNEC soil	37 mg/kg dw			
PNEC STP (wastewater-treatment facilities)	2,55 g/l			

Copper, cas-no 7440-50-8				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC aqua (freshwater)	7,8 µg/l			
PNEC aqua (marine water)	5,2 µg/l			
PNEC sediment (freshwater)	87 mg/kg dw			
PNEC sediment	288 mg/kg dw			
PNEC sediment (marine water)	676 mg/kg dw			
PNEC soil	65,5 mg/kg dw			
PNEC STP (wastewater-treatment facilities)	230 g/l			

### DNEL - workers

Zinc, cas-no 7440-66-6					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Oral DNEL (long-term exposure - systemic effects)	50 mg/kg bw/day				
Dermal DNEL (long-term exposure - systemic effects)	5000 mg/kg bw/day				

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Inhalation DNEL (long-term exposure - systemic effects)	5 mg/kg bw/day				
Silver, metallic, cas-no 7440-22-4					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Inhalation DNEL (long-term exposure - systemic effects)	0,1 mg/kg bw/day				
Oral DNEL (long-term exposure - systemic effects)	0,12 mg/kg bw/day				
Antimony, cas-no 7440-36-0					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Dermal DNEL (long-term exposure - systemic effects)	281 mg/kg bw/day				
Inhalation DNEL (long-term exposure - local effects)	0,5 mg/m <sup>3</sup>				
Copper, cas-no 7440-50-8					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Dermal DNEL (long-term exposure - systemic effects)	0,041 mg/kg bw/day				
Inhalation DNEL (long-term exposure - systemic effects)	0,041 mg/kg bw/day				
Oral DNEL (long-term exposure - systemic effects)	0,041 mg/kg bw/day				
Dermal DMEL (acute/short-term exposure - systemic effects)	0,082 mg/kg bw/day				
Inhalation DNEL (acute/short-term exposure - systemic effects)	0,082 mg/kg bw/day				
Oral DMEL (acute/short-term exposure - systemic effects)	0,082 mg/kg bw/day				

### DNEL - general population

Zinc, cas-no 7440-66-6					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Oral DNEL (long-term exposure - systemic effects)	50 mg/kg bw/day				
Dermal DNEL (long-term exposure - systemic effects)	5000 mg/kg bw/day				

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Inhalation DNEL (long-term exposure - systemic effects)	2,5 mg/kg bw/day				
Silver, metallic, cas-no 7440-22-4					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Inhalation DNEL (long-term exposure - systemic effects)	0,04 mg/kg bw/day				
Oral DNEL (long-term exposure - systemic effects)	0,12 mg/kg bw/day				

### 8.2. Exposure controls

**Appropriate engineering controls:** Wear the personal protective equipment specified below.

**Personal protective equipment, eyeface protection:** Eye protection must conform to EN 166.

**Personal protective equipment, hand protection:** Wear protective gloves which protect against contact and splashing from molten metal. Gloves must conform to EN 12477.

**Personal protective equipment, respiratory protection:** In case of heating/use of the product in an area with inadequate ventilation, wear respiratory protection with filter B/P3. Respiratory protection must conform to one of the following standards: EN 136/140/145.

**Environmental exposure controls:** Ensure compliance with local regulations for emissions.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Parameter	Value/unit
State	Solid substance
Colour	Grey / White
Odour	No data
Solubility	Insoluble

Parameter	Value/unit	Remarks
Odour threshold	No data	
Melting point	217 - 310 °C	
Freezing point	No data	
Initial boiling point and boiling range	> 600 °C	
Flammability (solid, gas)	No data	
Flammability limits	No data	
Explosion limits	No data	
Flash Point	No data	
Auto-ignition temperature	> 400 °C	
Decomposition temperature	No data	
pH (solution for use)	No data	
pH (concentrate)	No data	
Kinematic viscosity	No data	
Viscosity	No data	
Partition coefficient n-octanol/water	No data	

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Vapour pressure	No data	
Density	No data	
Relative density	7.2 - 7.5 g/cm <sup>3</sup>	
Vapour density	No data	
Relative density (sat. air)	No data	
Particle characteristics	No data	

### 9.2. Other information

**Other Information:** None.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reacts with the following: Alkalis/ Acids/ Strong oxidisers/ Chlorine-containing compounds/ Chlorine

### 10.2. Chemical stability

The product is stable when used in accordance with the supplier's directions.

### 10.3. Possibility of hazardous reactions

None known.

### 10.4. Conditions to avoid

None known.

### 10.5. Incompatible materials

Acids/ Alkalis/ Oxidisers/ Chlorine-containing compounds/ Chlorine

### 10.6. Hazardous decomposition products

None known.

## SECTION 11: Toxicological information

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

#### Acute toxicity - oral

##### Tin, cas-no 7440-31-5

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 2000 mg/kg		OECD 423	

##### Silver, metallic, cas-no 7440-22-4

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 2000 mg/kg			

##### Antimony, cas-no 7440-36-0

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 20000 mg/kg			

##### Copper, cas-no 7440-50-8

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 300 mg/kg bw			

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met.

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### Acute toxicity - dermal

#### Tin, cas-no 7440-31-5

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 2000 mg/kg		OECD 402	

#### Antimony, cas-no 7440-36-0

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rabbit	LD50		> 8300 mg/kg			

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met.

### Acute toxicity - inhalation

#### Tin, cas-no 7440-31-5

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LD50		> 5 mg/l		OECD 403	

#### Antimony, cas-no 7440-36-0

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rat	LC50		> 5.5 mg/m <sup>3</sup>			

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met. The product does not release hazardous vapours in metallic form. Metallic oxides which are hazardous to inhale are formed during soldering/welding.

### Skin corrosion/irritation

#### Tin, cas-no 7440-31-5

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rabbit				Non-irritating		

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met. May cause slight irritation.

### Serious eye damage/eye irritation

#### Tin, cas-no 7440-31-5

Organism	Test Type	Exposure time	Value	Conclusion	Test method	Source
Rabbit				Non-irritating		

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met. Temporary irritation.

#### Respiratory sensitisation or skin sensitisation:

The product does not have to be classified. Test data are not available.

#### Germ cell mutagenicity:

The product does not have to be classified. Test data are not available.

#### Carcinogenic properties:

The product does not have to be classified. Test data are not available.

#### Reproductive toxicity:

The product does not have to be classified. Test data are not available.

#### Single STOT exposure:

The product does not have to be classified. Test data are not available. Inhalation of smoke from the soldering / welding process may cause irritation to the upper airways. May cause a burning sensation in the nose, mouth and throat, as well as headaches, coughing and discomfort.

#### Repeated STOT exposure:

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met. Prolonged exposure to welding smoke and particles constitutes a risk of developing asthmatic diseases, various respiratory disorders and cancer of the respiratory system.

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**Aspiration hazard:** The product does not have to be classified. Test data are not available.

### 11.2. Information on other hazards

**Endocrine disrupting properties:** None known.

**Other toxicological effects:** None known.

## SECTION 12: Ecological information

### 12.1. Toxicity

#### Tin, cas-no 7440-31-5

Organism	Species	Exposure time	Test Type	Value	Conclusion	Test method	Source
Fish	Pimephales promelas		96hLC50	> 12.4 µg/l		OECD 203	
Crustacea	Daphnia magna		7dEC50	> 3200 µg/l			
Algae	Pseudokirchneriella subcapitata		72hEC50	> 19.2 µg/l		OECD 201	

#### Silver, metallic, cas-no 7440-22-4

Organism	Species	Exposure time	Test Type	Value	Conclusion	Test method	Source
Fish	Pimephales promelas		96hLC50	1.2 mg/l			
Fish	Oncorhynchus mykiss	196 d	EC10	0.17 mg/l			
Fish	Pimephales promelas	32 d	EC10	0.44 mg/l			
Crustacea	Daphnia magna		48hLC50	0.22 mg/l			
Fish	Pimephales promelas	32 d	NOEC	0.351 mg/l	Permanent damage		
Crustacea	Daphnia magna	21 d	EC10	2.14 mg/l	Permanent damage		
Algae	Chlamydomonas reinhardtii	24 h	EC10	0.54 mg/l			
Algae	Pseudokirchneriella subcapitata	24 h	EC10	0.41 mg/l			
Crustacea	Ceriodaphnia dubia		48hLC50	0.76 mg/l			
Crustacea	Ceriodaphnia dubia	7 d	EC10	2.48 mg/l	Reproduction		
Fish	Salmo trutta	217 d	EC10	0.19 mg/l			
Fish	Oncorhynchus mykiss		96hLC50	1.48 mg/l			
Fish	Pimephales promelas	32 d	EC10	0.39 mg/l	Permanent damage		
Crustacea	Ceriodaphnia reticulata	7 d	NOEC	1 mg/l	Reproduction		
Fish	Salmo gairdneri		96hLC50	6.5 g/l		Soft water	

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Fish	Salmo gairdneri		96hLC50	13 mg/l		Hard water	
Fish	Salmo trutta	217 d	EC10	1.23 mg/l			

### Antimony, cas-no 7440-36-0

Organism	Species	Exposure time	Test Type	Value	Conclusion	Test method	Source
Fish	Pimephales promelas		96hLC50	14.4 mg/l			
Algae	Pseudokirchneriella subcapitata		72hErC50	> 36.6 mg/l			
Fish	Pimephales promelas		28dNOEC	1.13 - 2.31 mg/l			
Crustacea	Daphnia magna		21dNOEC	1.74 - 3.13 mg/l			
Algae	Pseudokirchneriella subcapitata		72hNOEC	2.11 - 4.00 mg/l			
Crustacea	Chlorohydra viridissima		96hEC50	1.77 mg/l			
Fish	Pagrus major		96hLC50	6.9 mg/l			
Algae or other aquatic plants	Lemna minor		4dEC50	> 25.5 mg/l			

The product does not have to be classified. Based on existing data, the classification criteria are deemed not to have been met.

### 12.2. Persistence and degradability

### 12.3. Bioaccumulative potential

#### Tin, cas-no 7440-31-5

Organism	Species	Exposure time	Test Type	Value	Conclusion	Test method	Source
			Log Kd:	2.1 - 4.3			

### Antimony, cas-no 7440-36-0

Organism	Species	Exposure time	Test Type	Value	Conclusion	Test method	Source
			Log Kp	2.07			

No bioaccumulation expected.

### 12.4. Mobility in soil

Test data are not available.

### 12.5. Results of PBT and vPvB assessment

No assessment required, as the product contains inorganic matter only.

### 12.6. Endocrine disrupting properties

None known.

### 12.7. Other adverse effects

None known.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

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Avoid discharge to drain or surface water.

If this product as supplied becomes a waste, it does not meet the criteria of a hazardous waste (Dir. 2008/98/EU). Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

Empty, cleansed packaging should be disposed of for recycling. Uncleansed packaging is to be disposed of via the local waste-removal scheme.

**Category of waste:** EWC code: Depends on line of business and use, for instance 17 04 07 mixed metals  
Absorbent/cloth contaminated with the product: EWC code: 15 02 03 Absorbents, filter materials, wiping cloths and protective clothing other than those mentioned in 15 02 02.

#### SECTION 14: Transport information

**14.1. UN number or ID number:** Not applicable. **14.4. Packing group:** Not applicable.  
**14.2. UN proper shipping name:** Not applicable. **14.5. Environmental hazards:** Not applicable.  
**14.3. Transport hazard class(es):** Not applicable.

#### 14.6. Special precautions for user

None.

#### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

#### SECTION 15: Regulatory information

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

**Special Provisions:** None.

##### 15.2. Chemical Safety Assessment

REACH Reg. No.	Substance name
01-2119467174-37-0023	Zinc
01-2119475609-24-0026	Antimony
01-2119480154-42-0184	Copper
01-2119486474-28-0024	Tin
01-2119555669-21-0074	Silver, metallic

#### SECTION 16: Other information

##### Version history and indication of changes

Version	Revision date	Responsible	Changes
3.3.0	12/1/2022	Bureau Veritas HSE / MPE	1, 2, 16

**Abbreviations:** PBT: Persistent, Bioaccumulative and Toxic  
vPvB: Very Persistent and Very Bioaccumulative  
STOT: Specific Target Organ Toxicity  
PNEC: Predicted No Effect Concentration  
DNEL: Derived No Effect Level

**Other Information:** This safety data sheet has been prepared for and applies to this product only. It is based on our current knowledge and the information that the supplier was able to provide about the product at the time of preparation. The safety data sheet complies with applicable law on preparation of safety data sheets in accordance with 1907/2006/EC (REACH) as

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subsequently changed.

**Training advice:** A thorough knowledge of this safety data sheet should be a prerequisite condition.

**Classification method:** Calculation based on the hazards of the known components.

### SDS is prepared by

Company: Bureau Veritas HSE Denmark A/S  
Address: Oldenborggade 25-31  
Zip code: 7000  
City: Fredericia  
Country: DENMARK  
E-mail: infohse@bureauveritas.com  
Phone: +45 77 31 10 00  
Homepage: www.bureauveritas.dk

**Country:** EU