

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

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

1.1. Product identifier

Trade name: Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

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

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

CLP-classification: Repr. 1A;H360FD Lact.;H362 STOT RE 1;H372

Most serious harmful effects: May damage fertility. May damage the unborn child. May cause harm to breast-fed children. Causes damage to organs through prolonged or repeated exposure. 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. Prolonged or repeated exposure by skin contact or inhalation of vapours may cause damage to the central nervous system.

2.2. Label elements

H-phrases

The specific provisions on labelling laid down in section 1.3 of Annex I of the CLP Regulation apply to this product.

H360FD May damage fertility. May damage the unborn child.
H362 May cause harm to breast-fed children.
H372 Causes damage to organs through prolonged or repeated exposure.

Supplemental information

Restricted to professional users.

2.3. Other hazards

PBT/vPvB: No assessment required, as the product contains inorganic matter only.

SECTION 3: Composition/information on ingredients

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

3.2. Mixtures

Substance	CAS No./ EC No./ REACH Reg. No.	Concentration	Notes	CLP-classification
Lead	7439-92-1 231-100-4 01-2119513221-59-0085	9 - 80%		Repr. 1A;H360FD Lact.;H362 STOT RE 1;H372
Tin	7440-31-5 231-141-8 01-2119486474-28-0024	20 - 95%		
Zinc	7440-66-6 231-175-3 01-2119467174-37-0023	0 - 25%		
Silver, metallic	7440-22-4 231-131-3 01-2119555669-21-0074	0 - 2.5%		
Antimony	7440-36-0 231-146-5 01-2119475609-24-0026	0 - 3%		
Copper	7440-50-8 231-159-6 01-2119480154-42-0184	0 - 2.5%		
Bismuth	7440-69-9 231-177-4	0 - 1.5%		

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

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:	Remove contaminated clothing. 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

May cause harm to breast-fed children. May damage fertility. May damage the unborn child. Causes damage to organs through prolonged or repeated exposure. Harmful if vapours from molten metal are inhaled or if the skin comes in contact with molten metal. Prolonged or repeated exposure by skin contact or inhalation of vapours may cause damage to the central nervous system. Prolonged exposure to welding smoke and particles constitutes a risk of developing asthmatic diseases, various respiratory disorders and cancer of the respiratory system.

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

Treat symptoms. No special immediate treatment required.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: The product is not directly flammable. Choose extinguishing agents based on the

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

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Revision date: 9/17/2021
Version: 3.0.0

surrounding fire.

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 a chemical protection suit only where personal (close) contact is likely.

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 eye splash. In case of insufficient ventilation, wear respiratory protective equipment. Wear gloves. Stay upwind/keep distance from source.

For emergency responders: In addition to the above: Protective suit equivalent to EN 368, type 3, 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 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. A workplace assessment must be conducted to ensure that employees are not exposed to effects that may involve a risk during pregnancy. A workplace assessment must be conducted to ensure that employees are not exposed to effects that may involve a risk when breastfeeding.

7.2. Conditions for safe storage, including any incompatibilities

Store safely, out of reach of children and away from food, animal feeding stuffs, medicines, etc. Store in a cool, dry place. 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

Substance name	Time period	ppm	mg/m ³	fiber/cm ³	Comments	Remarks
Lead	-		0.15			

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

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 2019/983/EU.

PNEC

Lead, cas-no 7439-92-1				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC aqua (freshwater)	2,4 µg/l			
PNEC aqua (marine water)	3,3 µg/l			
PNEC sediment (freshwater)	49,7 - 186 mg/kg dw			
PNEC sediment (marine water)	168 mg/kg dw			
PNEC STP (wastewater-treatment facilities)	0,1 mg/l			
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			
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			
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			
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			

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021

Version: 3.0.0

PNEC STP (wastewater-treatment facilities)	0,025 mg/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			
Bismuth, cas-no 7440-69-9				
Exposure	Value	Assessment Factor	Extrapolation Method	Note
PNEC STP (wastewater-treatment facilities)	17,5 mg/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				
Inhalation DNEL (long-term exposure - systemic effects)	5 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 ³				
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				
Copper, cas-no 7440-50-8					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

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				
Bismuth, cas-no 7440-69-9					
Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Inhalation DNEL (long-term exposure - systemic effects)	13,1 mg/m ³				

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				
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				

Bismuth, cas-no 7440-69-9

Exposure	Value	Assessment Factor	Dose Descriptor	Main Impact Parameter	Note
Oral DNEL (long-term exposure - systemic effects)	13,3 mg/kg bw/day				

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021

Version: 3.0.0

8.2. Exposure controls

Appropriate engineering controls:	Wear the personal protective equipment specified below.
Personal protective equipment, eye/face protection:	Wear safety goggles if there is a risk of eye splash. Eye protection must conform to EN 166.
Personal protective equipment, skin 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
Odour	Characteristic
Solubility	No data

Parameter	Value/unit	Remarks
Odour threshold	No data	
Melting point	179 - 325 °C	
Freezing point	179 - 325 °C	
Initial boiling point and boiling range	No data	
Flammability (solid, gas)	No data	
Flammability limits	No data	
Explosion limits	No data	
Flash Point	No data	
Auto-ignition temperature	No data	
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	
Vapour pressure	No data	
Density	No data	
Relative density	8 - 11.1	
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

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

10.1. Reactivity

Reacts with the following: Strong oxidisers/ Acids/ Alkalis/ 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

Strong oxidisers/ Acids/ Alkalis/ Chlorine-containing compounds/ Chlorine

10.6. Hazardous decomposition products

Product decomposes in fire conditions or when heated to high temperatures, and inflammable and toxic gases may be released.

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		> 2000mg/kg		OECD 423	

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

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

Copper, cas-no 7440-50-8

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

Bismuth, cas-no 7440-69-9

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

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

Acute toxicity - dermal

Tin, cas-no 7440-31-5

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

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		> 5mg/l		OECD 403	

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

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		

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

Serious eye damage/eye irritation

Tin, cas-no 7440-31-5

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

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

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:

May damage fertility. May damage the unborn child. May cause harm to breast-fed children.

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:

Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may cause water in the lungs. Prolonged or repeated exposure by skin contact or inhalation of vapours may cause damage to the central nervous system. Prolonged exposure to welding smoke and particles constitutes a risk of developing asthmatic diseases, various respiratory disorders and cancer of the respiratory system.

Aspiration hazard:

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

11.2. Information on other hazards

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	> 12.4µg/l		OECD 203	
Crustacea	Daphnia magna		7dEC50	> 3200µg/l			

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021

Version: 3.0.0

Algae	Pseudokirchne riella subcapitata		72hEC50	> 19.2µg/l		OECD 201	
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Antimony, cas-no 7440-36-0

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

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

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

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021

Version: 3.0.0

Fish	Salmo gairdneri		96hLC50	6.5g/l		Soft water	
Fish	Salmo gairdneri		96hLC50	13mg/l		Hard water	
Fish	Salmo trutta	217 d	EC10	1.23mg/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

The concept of biodegradability is not relevant, as the substance is inorganic.

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			

Test data are not available.

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

12.7. Other adverse effects

None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Avoid discharge to drain or surface water.

If this product as supplied becomes a waste, it meets the criteria of a hazardous waste (Dir. 2008/98/EU). Collect spills and waste in closed, leak-proof containers for disposal at the local hazardous waste site.

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 06 04 05* wastes containing other heavy metals

Absorbent/cloth contaminated with the product: EWC code: 15 02 02 absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances.

SECTION 14: Transport information

14.1. UN number or ID number: Not applicable.

14.2. UN proper shipping name: Not applicable.

14.3. Transport hazard class(es): Not applicable.

14.4. Packing group: Not applicable.

14.5. Environmental hazards: Not applicable.

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

Revision date: 9/17/2021
Version: 3.0.0

14.6. Special precautions for user

None.

14.7. Maritime transport in bulk according to IMO instruments

Not included.

SECTION 15: Regulatory information

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

Special Provisions:

Regulation (EU) of the European Parliament and of the Council concerning the export and import of hazardous chemicals.
Special care should be applied for employees under the age of 18. Young people under the age of 18 may not carry out any work causing harmful exposure to this product.

Covered by:

The product is comprised by Regulation 1907/2006/EC, Annex XVII concerning restrictions.

Council Directive (EC) on the protection of young people at work.

Council Directive (EC) on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding.

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
01-2119513221-59-0085	Lead
01-2119555669-21-0074	Silver, metallic

SECTION 16: Other information

Version history and indication of changes

Version	Revision date	Responsible	Changes
3.0.0	9/17/2021	Bureau Veritas HSE / MPE	1 - 16

Abbreviations:

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

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 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.

List of relevant H-statements

Safety Data Sheet

Solder tin with lead (Hafnia, Starli, Starli HQ/X/Refresher, 90Sn, Sn60Pb38Cu2, Sn60Pb38Cu2P, Sn62Pb36Ag2, Sn39Pb60Bi1, Bera Super Tin Solder, Fluks, HK)

Replaces date: 5/7/2018

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H360FD	May damage fertility. May damage the unborn child.
H362	May cause harm to breast-fed children.
H372	Causes damage to organs through prolonged or repeated exposure.

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