SAFETY DATA SHEET

Based upon Regulation (EC) No 1907/2006, as amended by Regulation (EU) No 2020/878

zinc alloys Die Casting

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

1.1. Product identifier

Product name : zinc alloys Die Casting

Synonyms : AC41A; AC43A; AG40A; alloy 2; alloy 3; alloy 5; kayem1; kayem2; ZA-12; ZA-27; ZA-8; zamak 12; zamak 2; zamak 27; zamak 3; zamak 5; zamak 8; zamak KS; zinc alloys DC; zinc alloys for Die Casting; ZL0400; ZL0410; ZL0430; ZL0810; ZL1110; ZL12; ZL2; ZL27; ZL2720; ZL3; ZL5; ZL8; ZnAl11Cu1; ZnAl18Cu1; ZnAl27Cu2; ZnAl4; ZnAl4Cu1; ZnAl4Cu3; HF Zinc Aluminium Alloy; Superloy; Zamak 4

Registration number REACH : Not applicable (mixture)

Product type REACH : Mixture/alloy

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

1.2.1 Relevant identified uses

Metal industry: pressure die casting, centrifugal die casting, gravity die casting

1.2.2 Uses advised against

No uses advised against known

1.3. Details of the supplier of the safety data sheet

Supplier of the safety data sheet

Nyrstar Belgium N.V. on behalf of Nyrstar Sales & Marketing A.G.
Zinkstraat 1
B-2490 Balen
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Nyrstar Budel B.V. on behalf of Nyrstar Sales & Marketing A.G.
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Nyrstar France S.A.S. on behalf of Nyrstar Sales & Marketing A.G.
Rue Jean Jacques Rousseau
F-59950 Auby
☎ +32 14 44 96 80
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infoSDS@nyrstar.com

Manufacturer of the product

Nyrstar Sales & Marketing SA
1 Rue de Jargonnant
CH-1207 Geneva
infoSDS@nyrstar.com

1.4. Emergency telephone number

24h/24h (Telephone advice: English, French, German, Dutch) :
+32 14 58 45 45 (BIG)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Not classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

2.2. Label elements

Not classified as dangerous according to the criteria of Regulation (EC) No 1272/2008

2.3. Other hazards

The criteria of PBT and vPvB as listed in Annex XIII of Regulation (EC) No 1907/2006 do not apply to inorganic substances
The melting down of moist metal leads to explosion risk
Heated product causes burns

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name REACH Registration No	CAS No EC No	Conc. (C)	Classification according to CLP	Note	Remark	M-factors and ATE
zinc 01-2119467174-37	7440-66-6 231-175-3	69.70% ≤C≤96.10%		(2)(10)	Constituent	
aluminium	7429-90-5 231-072-3	3.90% ≤C≤28.00%		(2)	Constituent	
copper	7440-50-8 231-159-6	0% ≤C<3.90%		(2)(10)	Constituent	
magnesium, powder or turnings	7439-95-4 231-104-6	0.02% ≤C<0.6%	Flam. Sol. 1; H228 Water-react. 2; H261 Self-heat. 1; H251	(1)(10)	Constituent	

(1) For H- and EUH-statements in full: see section 16
(2) Substance with a Community workplace exposure limit
(10) Subject to restrictions of Annex XVII of Regulation (EC) No. 1907/2006

SECTION 4: First aid measures

4.1. Description of first aid measures

General:
If you feel unwell, consult a doctor/medical service.

After inhalation:
After inhalation of fume: Remove victim into fresh air. In case of respiratory problems, consult a doctor/medical service.

After skin contact:
In case of burns: Wash immediately with plenty of water for 30 minutes or shower. Cut clothing; never remove burnt clothing from the wound. Do not give any pain medication. Consult a doctor/medical service.

After eye contact:
In case of burns: Rinse immediately with plenty of water for 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Consult a doctor/medical service.

After ingestion:
Not applicable.

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

4.2.1 Acute symptoms

After inhalation:
AFTER INHALATION OF DUST: Irritation of the nasal mucous membranes. Dry/sore throat. Coughing. AFTER INHALATION OF FUME: Feeling of weakness. Metal fume fever. Vomiting. Nausea.

After skin contact:
IF MELTING: Burns.

After eye contact:
IF MELTING: Burns.

After ingestion:
Not applicable.

4.2.2 Delayed symptoms
No effects known.

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

If applicable and available it will be listed below.

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.1.1 Suitable extinguishing media:
Small fire: Dry sand, Quick-acting D powder extinguisher.

5.1.2 Unsuitable extinguishing media:
Small fire: Quick-acting CO2 extinguisher, Water, Foam, Quick-acting ABC powder extinguisher, Quick-acting BC powder extinguisher.
Major fire: Water, Foam.

5.2. Special hazards arising from the substance or mixture

On burning formation of metal oxides (zinc oxide). In molten state: violent to explosive reaction with water (moisture).

5.3. Advice for firefighters

5.3.1 Instructions:

Dilute toxic gases with water spray. Take account of toxic/corrosive precipitation water. In case of metal bath fire: add metal blocks. When cooling/extinguishing: no water in the substance.

5.3.2 Special protective equipment for fire-fighters:
Gloves (EN 374). Protective clothing (EN 14605 or EN 13034). Heat/fire exposure: self-contained breathing apparatus (EN 136 + EN 137).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

No naked flames. Exposure to fire/heat: keep upwind. Exposure to fire/heat: consider evacuation. Exposure to fire/heat: have neighbourhood close doors and windows.

6.1.1 Protective equipment for non-emergency personnel
See section 8.2

6.1.2 Protective equipment for emergency responders
Gloves (EN 374). Protective clothing (EN 14605 or EN 13034).

Suitable protective clothing
See section 8.2

6.2. Environmental precautions

No data available

6.3. Methods and material for containment and cleaning up

If melted: allow liquid to solidify before taking it up. Pick-up the material. Wash clothing and equipment after handling.

6.4. Reference to other sections

See section 13.

SECTION 7: Handling and storage

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

7.1. Precautions for safe handling

Avoid raising dust. Keep away from naked flames/heat. Observe strict hygiene. On (re)melting down: dry and preheat installation before use. Add only dry material to the metal bath.

7.2. Conditions for safe storage, including any incompatibilities

7.2.1 Safe storage requirements:
Storage temperature: Temperature above dew point. Meet the legal requirements. Store in a cool area. Store in a dry area. Keep container in a well-ventilated place.

7.2.2 Keep away from:
Heat sources, (strong) acids, (strong) bases, halogenated hydrocarbons.

7.2.3 Suitable packaging material:
No data available

7.2.4 Non suitable packaging material:
No data available

7.3. Specific end use(s)

If applicable and available, exposure scenarios are attached in annex. See information supplied by the manufacturer.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 Occupational exposure

a) Occupational exposure limit values

If limit values are applicable and available these will be listed below.

Belgium

Aluminium (métal et composés insolubles)	Time-weighted average exposure limit 8 h	1 mg/m³ **(1)**
Cuivre (en Cu)	Time-weighted average exposure limit 8 h	0.2 mg/m³ **(2)**
	Time-weighted average exposure limit 8 h	1 mg/m³ **(3)**
Zinc (oxyde de)	Time-weighted average exposure limit 8 h	2 mg/m³ **(1)**
	Short time value	10 mg/m³ **(1)**

(1) Fraction alvéolaire
(2) fumées
(3) poussières et brouillards de

The Netherlands

Koper en anorganische koperverbindingen	Time-weighted average exposure limit 8 h (Public occupational exposure limit value)	0.038 ppm **(1)**
	Time-weighted average exposure limit 8 h (Public occupational exposure limit value)	0.1 mg/m³ **(1)**

(1) inhaleerbaar

France

Aluminium (métal)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	10 mg/m³
Aluminium (pulvérulent)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	5 mg/m³
Cuivre, en Cu	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	1 mg/m³ **(1)**
	Short time value (VL: Valeur non réglementaire indicative)	2 mg/m³ **(1)**
Cuivre	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	0.2 mg/m³ **(2)**
Zinc (oxyde de)	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	10 mg/m³ **(1)**
	Time-weighted average exposure limit 8 h (VL: Valeur non réglementaire indicative)	5 mg/m³ **(2)**

(1) poussières
(2) fumées

Germany

Aluminium und seine schwerlöslichen Verbindungen	Time-weighted average exposure limit 8 h (MAK)	0.05 mg/m³ **(1)**
	Time-weighted average exposure limit 8 h (MAK)	0.5 mg/m³ **(2)**
Kupfer und seine anorganischen Verbindungen	Time-weighted average exposure limit 8 h (MAK)	0.01 mg/m³ **(3)**
Zink und seine anorganischen Verbindungen	Time-weighted average exposure limit 8 h (MAK)	0.1 mg/m³ **(4)**
	Time-weighted average exposure limit 8 h (MAK)	2 mg/m³ **(5)**

(1) Alveolengängige Fraktion; UF: II(8)
(2) Einatembare Fraktion; UF: II(8)
(3) Alveolengängige Fraktion; UF: II(2)
(4) Alveolengängige Fraktion; UF: I(4)
(5) Einatembare Fraktion; UF: I(2); Zinkchlorid: Kurzzeitkategorie I(1)

Austria

Aluminium (als Metall) Aluminiumoxid und Aluminiumhydroxid	Tagesmittelwert	10 mg/m³ **(1)**
	Tagesmittelwert	5 mg/m³ **(2)**
	Kurzzeitwert 60(Miw) 2x	10 mg/m³ **(2)**
	Kurzzeitwert 60(Miw) 2x	20 mg/m³ **(1)**
Kupfer und seine Verbindungen(als Rauch)	Tagesmittelwert (MAK)	0.1 mg/m³ **(3)**
	Kurzzeitwert 15(Miw) 4x (MAK)	0.4 mg/m³ **(3)**
Kupfer und seine Verbindungen	Tagesmittelwert (MAK)	1 mg/m³ **(4)**
	Kurzzeitwert 15(Miw) 4x (MAK)	4 mg/m³ **(4)**
Zinkoxid-Rauch	Tagesmittelwert (MAK)	5 mg/m³ **(2)**

(1) Einatembare Fraktion
(2) Alveolengängige Fraktion
(3) Alveolengängige Fraktion; als Cu berechnet
(4) Einatembare Fraktion; als Cu berechnet

UK

Aluminium metal	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	10 mg/m³ **(1)**
	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	4 mg/m³ **(2)**
Copper fume	Time-weighted average exposure limit 8 h (Workplace exposure limit (EH40/2005))	0.2 mg/m³

(1) Inhalable dust
(2) Respirable dust

USA (TLV-ACGIH)

Aluminium metal and insoluble compounds	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	1 mg/m³ **(1)**
Copper dusts and mists, as Cu	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	1 mg/m³
Copper fume, as Cu	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	0.2 mg/m³
Zinc oxide	Time-weighted average exposure limit 8 h (TLV - Adopted Value)	2 mg/m³ **(1)**
	Short time value (TLV - Adopted Value)	10 mg/m³ **(1)**

(1) (R): Respirable fraction

b) National biological limit values

If limit values are applicable and available these will be listed below.

Germany

Aluminium (Aluminium)	Urin: am schichtende, bei langzeitexposition nach mehreren vorangegangenen schichten	50 µg/g Kreatinin	

8.1.2 Sampling methods

Product name	Test	Number
Aluminium	NIOSH	7013
Aluminum (Al)	NIOSH	7302
Aluminum (Al)	NIOSH	7304
Aluminum (Al)	NIOSH	7306
Aluminum (Al)	NIOSH	8310
Aluminum (Elements)	NIOSH	7300
Aluminum (Elements, aqua regia ashing)	NIOSH	7301
Aluminum (Elements, hot block/HCl/HNO3 digestion)	NIOSH	7303
Aluminum	OSHA	ID 121
Copper (Cu)	NIOSH	7302
Copper (Cu)	NIOSH	7304
Copper (Cu)	NIOSH	7306
Copper (Cu)	NIOSH	8005
Copper (Cu)	NIOSH	8200
Copper (Cu)	NIOSH	8310
Copper (Elements on wipes)	NIOSH	9102
Copper (Elements)	NIOSH	7300
Copper (Elements, aqua regia ashing)	NIOSH	7301
Copper (Elements, hot block/HCl/HNO3 digestion)	NIOSH	7303
Copper Dust and fume	NIOSH	7029
Copper	OSHA	1006
Copper	OSHA	ID 121
Copper	OSHA	ID 125G
Copper	OSHA	ID 206
Magnesium (Elements)	NIOSH	7300
Magnesium (Elements, aqua regia ashing)	NIOSH	7301
Magnesium (Elements, hot block/HCl/HNO3 digestion)	NIOSH	7303
Magnesium (Mg)	NIOSH	7306
Magnesium (Mg)	NIOSH	8005
Magnesium (Mg)	NIOSH	8200
Magnesium	OSHA	ID 121
Zinc & Cpds (as Zn)	NIOSH	7030
Zinc (Elements on wipes)	NIOSH	9102
Zinc (Elements)	NIOSH	7300
Zinc (Elements, aqua regia ashing)	NIOSH	7301
Zinc (Elements, hot block/HCl/HNO3 digestion)	NIOSH	7303
Zinc (Zn)	NIOSH	7306
Zinc (Zn)	NIOSH	8005
Zinc (Zn)	NIOSH	8200
Zinc (Zn)	NIOSH	8310
Zinc Oxide	NIOSH	7030
Zinc Oxide	NIOSH	7502
Zinc Oxide	OSHA	ID 121
Zinc Oxide	OSHA	ID 143
Zinc	NIOSH	7030
Zinc	OSHA	1006
Zinc	OSHA	ID 121
Zinc	OSHA	ID 125G

8.1.3 Applicable limit values when using the substance or mixture as intended

If limit values are applicable and available these will be listed below.

8.1.4 Threshold values

DNEL/DMEL - Workers

aluminium

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	3.72 mg/m³	

copper

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects dermal	137 mg/kg bw/day	
	Acute systemic effects dermal	273 mg/m³	

magnesium, powder or turnings

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	10 mg/m³	

DNEL/DMEL - General population

copper

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects dermal	137 mg/m³	
	Acute systemic effects dermal	273 mg/m³	

magnesium, powder or turnings

Effect level (DNEL/DMEL)	Type	Value	Remark
DNEL	Long-term systemic effects inhalation	10 mg/m³	
	Long-term systemic effects oral	3.6 mg/kg bw/day	

PNEC

zinc

Compartments	Value	Remark
Fresh water	19.7 µg/l	Zinc ion
Marine water	7.7 µg/l	Zinc ion
STP	100 µg/l	Zinc ion
Fresh water sediment	146.9 mg/kg sediment dw	Zinc ion
Marine water sediment	162.2 mg/kg sediment dw	Zinc ion
Soil	83.1 mg/kg soil dw	Zinc ion

aluminium

Compartments	Value	Remark
Fresh water	74.9 µg/l	
STP	20 mg/l	

copper

Compartments	Value	Remark
Fresh water	6.3 µg/l	
Marine water	5.2 µg/l	
STP	230 µg/l	
Fresh water sediment	87 mg/kg sediment dw	
Marine water sediment	676 mg/kg sediment dw	
Soil	65 mg/kg soil dw	

magnesium, powder or turnings

Compartments	Value	Remark
Fresh water	0.41 mg/l	
Fresh water (intermittent releases)	1.4 mg/l	
Marine water	0.41 mg/l	
STP	10.8 mg/l	
Fresh water sediment	268 mg/kg sediment dw	
Marine water sediment	268 mg/kg sediment dw	
Soil	268 mg/kg soil dw	

8.1.5 Control banding

If applicable and available it will be listed below.

8.2. Exposure controls

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

8.2.1 Appropriate engineering controls

Avoid raising dust. Keep away from naked flames/heat. Measure the concentration in the air regularly. Carry operations in the open/under local exhaust/ventilation or with respiratory protection.

8.2.2 Individual protection measures, such as personal protective equipment

Observe strict hygiene. Do not eat, drink or smoke during work.

a) Respiratory protection:

Dust production: dust mask with filter type P2.

b) Hand protection:

Protective gloves against chemicals (EN 374), On heating: heat insulating gloves (EN 407).

Materials	Remark
PVC	Good resistance
rubber	Good resistance

c) Eye protection:

On (re)melting down: face shield.

d) Skin protection:

Protective clothing (EN 14605 or EN 13034). On (re)melting down: heatproof clothing (EN 11612). Protective clothing against molten metal splash (EN 9185). Protective clothing for workers exposed to heat (EN 11612). Safety shoes type S3.

8.2.3 Environmental exposure controls:

See sections 6.2, 6.3 and 13

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical form	Solid
	Metal
	Physical state depending on the production process
Colour	Silvery-white
Odour	Odourless
Odour threshold	Not applicable
Melting point	375 °C - 485 °C
Boiling point	900 °C - 910 °C
Flammability	Not classified as flammable
Explosion limits	No data available (test not performed)
Flash point	Not applicable (solid)
Auto-ignition temperature	No data available (test not performed)
Decomposition temperature	No data available (test not performed)
pH	Not applicable (non-soluble in water)
Kinematic viscosity	No data available (test not performed)
Dynamic viscosity	No data available (test not performed)
Solubility	Water ; insoluble
Log Kow	Not applicable (mixture)
Vapour pressure	No data available (test not performed)
Absolute density	5000 kg/m³ - 6700 kg/m³
Relative density	5.0 - 6.7
Relative vapour density	Not applicable (solid)
Particle size	Not applicable (mixture)

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

In molten state: violent to explosive reaction with water (moisture). Oxidizes slowly in moist air.

10.4. Conditions to avoid

Precautionary measures

Avoid raising dust. Keep away from naked flames/heat.

10.5. Incompatible materials

(strong) acids, (strong) bases, halogenated hydrocarbons.

10.6. Hazardous decomposition products

Reacts with (some) acids: release of highly flammable gases/vapours (hydrogen). On burning formation of metal oxides (zinc oxide).

SECTION 11: Toxicological information

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

11.1.1 Test results

Acute toxicity

zinc alloys Die Casting

No (test)data on the mixture available

zinc

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	OECD 401	> 2000 mg/kg bw		Rat (male / female)	Experimental value	
Dermal						Data waiving	
Inhalation (dust)	LC50	OECD 403	> 5.41 mg/l	4 weeks (daily, 5 days / week)	Rat (male / female)	Experimental value	

aluminium

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	Equivalent to OECD 401	> 15900 mg/kg bw		Rat (male / female)	Read-across	
Dermal						Data waiving	
Inhalation (aerosol)	LC50	Equivalent to OECD 403	> 888 mg/m³ air	4 h	Rat (male)	Experimental value	

copper

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	OECD 401	481 mg/kg bw		Rat (male / female)	Experimental value	
Dermal	LD50	OECD 402	> 2000 mg/kg bw	24 h	Rat (male / female)	Experimental value	
Inhalation (dust)	LD50	OECD 436	> 5.11 mg/l	4 h	Rat (male / female)	Experimental value	

magnesium, powder or turnings

Route of exposure	Parameter	Method	Value	Exposure time	Species	Value determination	Remark
Oral	LD50	OECD 423	> 2000 mg/kg bw		Rat (female)	Read-across	
Dermal						Data waiving	
Inhalation						Data waiving	

Conclusion

Not classified for acute toxicity

Corrosion/irritation

zinc alloys Die Casting

No (test)data on the mixture available

zinc

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Not irritating				Rabbit	Literature study	
Not applicable (in vitro test)	Not irritating				In vitro: SkinEthic Reconstituted epithelium model	Experimental value	
Inhalation (ZnO, metal oxides)	Not irritating					Literature study	

aluminium

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Not irritating	Other		1; 24; 48; 72; 168 hours	Rabbit	Read-across	Single treatment without rinsing
Skin	Not irritating	Equivalent to OECD 404	24 h	24; 48; 72 hours	Rabbit	Read-across	

copper

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Slightly irritating	OECD 405		24; 48; 72 hours	Rabbit	Experimental value	Single treatment
Skin	Not irritating	OECD 404	4 h	1; 24; 48; 72 hours	Rabbit	Experimental value	

magnesium, powder or turnings

Route of exposure	Result	Method	Exposure time	Time point	Species	Value determination	Remark
Eye	Not irritating	OECD 405		1; 24; 48; 72 hours	Rabbit	Read-across	
Not applicable (in vitro test)	Not irritating	RHE-model test	15 minutes		Reconstructed human epidermis	Read-across	

Conclusion

Not classified as irritating to the skin
Not classified as irritating to the eyes
Not classified as irritating to the respiratory system

Respiratory or skin sensitisation

zinc alloys Die Casting

No (test)data on the mixture available

zinc

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Dermal (on the ears)	Sensitizing	Equivalent to OECD 429			Mouse (female)	Experimental value	
Skin	Not sensitizing	OECD 406			Guinea pig (male / female)	Experimental value	

aluminium

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing			24 hours	Guinea pig (male)	Read-across	
Intratracheal instillation	Not sensitizing				Mouse (male)	Read-across	

copper

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing	OECD 406			Guinea pig (male)	Experimental value	

magnesium, powder or turnings

Route of exposure	Result	Method	Exposure time	Observation time point	Species	Value determination	Remark
Skin	Not sensitizing	OECD 406			Guinea pig (female)	Experimental value	

Conclusion

Not classified as sensitizing for skin

Not classified as sensitizing for inhalation

Specific target organ toxicity

zinc alloys Die Casting

No (test)data on the mixture available

zinc

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (stomach tube)	NOAEL	OECD 408	31.25 mg/kg bw/day	Blood (no effect)	90 day(s)	Rat (male / female)	Experimental value	
Dermal		OECD 411		No effect	90 day(s)	Rat (male / female)	Experimental value	Not quantifiable
Inhalation (aerosol)	NOAEC	OECD 412	0.47 mg/m³ air	No effect	4 weeks (6h / day, 5 days / week)	Rat (male / female)	Experimental value	
Inhalation (ZnO, metal oxides)		Human observation		No effect		Human	Literature study	

aluminium

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (stomach tube)	NOAEL (P/F1)	OECD 422	200 mg/kg bw/day	No effect	28 day(s) - 53 day (s)	Rat (male / female)	Read-across	
Inhalation	LOAEC	Equivalent to OECD 413	50 mg/m³ air	Lung tissue affection/degeneration	15 weeks (6h / day, 5 days / week)	Rat	Experimental value	

copper

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (diet)	NOAEL	Equivalent to EU Method B.26	1000 ppm	No effect	92 day(s)	Rat (male / female)	Experimental value	
Oral (diet)	LOAEL	Equivalent to EU Method B.26	2000 ppm	Liver (enlargement /affection of the liver)	92 day(s)	Rat (male / female)	Experimental value	
Dermal							Data waiving	
Inhalation (dust)	NOAEL	OECD 412	≥ 2 mg/m³ air	Lungs (no effect)	4 weeks (6h / day, 5 days / week)	Rat (male / female)	Experimental value	

magnesium, powder or turnings

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (diet)	NOAEL	Equivalent to OECD 408	299 mg/kg bw/day - 308 mg/kg bw/day	No effect	13 week(s)	Rat (male / female)	Read-across	
Dermal							Data waiving	
Inhalation	NOAEC			No effect	4 weeks (6h / day, 5 days / week)	Rat (male)	Read-across	Not quantifiable

Conclusion

Not classified for subchronic toxicity

Mutagenicity (in vitro)

zinc alloys Die Casting

No (test)data on the mixture available

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

zinc

Result	Method	Test substrate	Effect	Value determination	Remark
Negative with metabolic activation, negative without metabolic activation	OECD 471	Bacteria (S. typhimurium and E. coli)		Experimental value	
Negative with metabolic activation, negative without metabolic activation	OECD 473	Chinese hamster lung fibroblasts (V79)		Experimental value	

aluminium

Result	Method	Test substrate	Effect	Value determination	Remark
Negative with metabolic activation, negative without metabolic activation	OECD 476	Mouse (lymphoma L5178Y cells)		Read-across	

copper

Result	Method	Test substrate	Effect	Value determination	Remark
Negative with metabolic activation, negative without metabolic activation	OECD 471	Bacteria (S.typhimurium)		Experimental value	

magnesium, powder or turnings

Result	Method	Test substrate	Effect	Value determination	Remark
Negative with metabolic activation, negative without metabolic activation	Equivalent to OECD 476	Mouse (lymphoma L5178Y cells)		Experimental value	

Mutagenicity (in vivo)

zinc alloys Die Casting

No (test)data on the mixture available

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

zinc

Result	Method	Exposure time	Test substrate	Organ/Effect	Value determination	Remark
Negative (Inhalation (aerosol))	OECD 474	2 weeks (6h / day, 5 days / week)	Rat (male / female)	Bone marrow (no effect)	Experimental value	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

aluminium

Result	Method	Exposure time	Test substrate	Organ/Effect	Value determination	Remark
Negative	OECD 474		Rat (male / female)		Read-across	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

copper

Result	Method	Exposure time	Test substrate	Organ/Effect	Value determination	Remark
Negative (Oral (stomach tube))	EU Method B.12	2 dose(s)/24-hour interval	Mouse (male / female)	No effect	Experimental value	

Conclusion

Not classified for mutagenic or genotoxic toxicity

Carcinogenicity

zinc alloys Die Casting

No (test)data on the mixture available

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

zinc

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (drinking water)	NOAEL	Carcinogenic toxicity study	> 22000 mg/l	No carcinogenic effect	52 week(s)	Mouse (male / female)	Experimental value	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

aluminium

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Inhalation	LOAEC	Equivalent to OECD 413	50 mg/m³ air	Lungs (histopathological changes)	15 weeks (6h / day, 5 days / week)		Experimental value	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

magnesium, powder or turnings

Route of exposure	Parameter	Method	Value	Organ/Effect	Exposure time	Species	Value determination	Remark
Oral (diet)	NOAEL	Carcinogenic toxicity study	> 2810 mg/kg bw/day	No carcinogenic effect	96 week(s)	Mouse (male / female)	Read-across	

Conclusion

Not classified for carcinogenicity

Reproductive toxicity

zinc alloys Die Casting

No (test)data on the mixture available

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

zinc

Category	Parameter	Method	Value	Exposure time	Species	Effect	Value determination	Remark
Developmental toxicity (Inhalation (aerosol))	NOAEC	OECD 414	7.5 mg/m³ air	14 days (6h / day)	Rat	No effect	Experimental value	
Maternal toxicity (Inhalation (aerosol))	NOAEC	OECD 414	1.5 mg/m³ air	14 days (6h / day)	Rat	No effect	Experimental value	
Effects on fertility (Oral (stomach tube))	LOAEL	Equivalent to OECD 416	7.5 mg/kg bw/day		Rat (male / female)	Adverse effects on fertility	Experimental value	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

aluminium

Category	Parameter	Method	Value	Exposure time	Species	Effect	Value determination	Remark
Developmental toxicity	NOAEL	Equivalent to OECD 414	266 mg/kg bw/day	10 day(s)	Rat	No effect	Read-across	
Maternal toxicity	NOAEL	Other	3225 mg/kg bw/day	385 day(s)	Rat (female)	No effect	Read-across	
Effects on fertility	NOAEL (P/F1)	OECD 422	1000 mg/kg bw	28 day(s) - 53 day (s)	Rat (male / female)	No effect	Read-across	

The chronic toxicity of the component(s) relates only to the substance in finely divided state and/or in molten state

copper

Category	Parameter	Method	Value	Exposure time	Species	Effect	Value determination	Remark
Developmental toxicity (Oral (stomach tube))	NOAEL	OECD 414	6 mg/kg bw/day	22 days (gestation, daily)	Rabbit	No effect	Experimental value	
Maternal toxicity (Oral (stomach tube))	NOAEL	OECD 414	6 mg/kg bw/day	22 days (gestation, daily)	Rabbit	No effect	Experimental value	
Effects on fertility (Oral (diet))	NOAEL	EPA OPPTS 870.3800	1000 ppm - 1500 ppm		Rat (male / female)	No effect	Experimental value	

magnesium, powder or turnings

Category	Parameter	Method	Value	Exposure time	Species	Effect	Value determination	Remark
Developmental toxicity (Oral (stomach tube))	NOAEL	Developmental toxicity study	> 800 mg/kg bw/day	10 days (1x / day)	Rat	No effect	Read-across	
Maternal toxicity (Oral (stomach tube))	NOAEL	Developmental toxicity study	800 mg/kg bw/day - 1000 mg/kg bw/day	10 days (1x / day)	Rat	No effect	Read-across	
Effects on fertility (Oral (diet))	Dose level		92.87 mg/kg bw/day		Rat (male / female)	No effect	Read-across	Metal ion

Conclusion

Not classified for reprotoxic or developmental toxicity

Aspiration hazard

zinc alloys Die Casting

Judgement is based on the relevant ingredients
Not classified for aspiration toxicity

Toxicity other effects

zinc alloys Die Casting

No (test)data on the mixture available

Chronic effects from short and long-term exposure

zinc alloys Die Casting

No effects known.

11.2. Information on other hazards

No evidence of endocrine disrupting properties

SECTION 12: Ecological information

12.1. Toxicity

zinc alloys Die Casting

No (test)data on the mixture available

zinc

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity crustacea	NOEC		308 µg/l		Daphnia magna			Literature study; Zinc ion
Toxicity algae and other aquatic plants	NOEC		41 µg/l		Pseudokirchneriella subcapitata			Literature study; Acute
	NOEC		11 µg/l - 118 µg/l		Pseudokirchneriella subcapitata			Literature study; Chronic
Toxicity sediment organisms	NOEC		218 µg/l - 1101 µg/l					Literature study; Zinc ion

	Parameter	Method	Value	Duration	Species	Value determination
Toxicity soil micro-organisms	NOEC		31.2 mg/kg soil dw - 8003.5 mg/kg soil dw			Literature study
Toxicity terrestrial plants	NOEC		31.2 mg/kg soil dw - 8003.5 mg/kg soil dw			Literature study

aluminium

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50	ASTM E729-96	> 218.64 mg/l	96 h	Pimephales promelas	Semi-static system	Fresh water	Weight of evidence; GLP
Acute toxicity crustacea	LC50	US EPA	0.72 mg/l - 99.6 mg/l	48 h	Ceriodaphnia dubia	Semi-static system	Fresh water	Weight of evidence; GLP
Toxicity algae and other aquatic plants	ErC50	OECD 201	1.05 mg/l	72 h	Pseudokirchneriella subcapitata	Static system	Fresh water	Weight of evidence; GLP
	NOEC	OECD 201	0.28 mg/l	72 h	Pseudokirchneriella subcapitata	Static system	Fresh water	Weight of evidence; GLP
Long-term toxicity fish	NOEC	US EPA	56.48 mg/l	7 day(s)	Pimephales promelas	Semi-static system	Fresh water	Weight of evidence; GLP
Long-term toxicity aquatic crustacea	NOEC	OECD 211	0.076 mg/l	21 day(s)	Daphnia magna	Semi-static system	Fresh water	Weight of evidence; Reproduction
Toxicity aquatic micro-organisms								Data waiving

	Parameter	Method	Value	Duration	Species	Value determination
Toxicity soil micro-organisms						Data waiving
Toxicity terrestrial plants						Data waiving
Toxicity birds						Data waiving

No classification for aquatic toxicity since the toxicity limits are above the water solubility

magnesium, powder or turnings

	Parameter	Method	Value	Duration	Species	Test design	Fresh/salt water	Value determination
Acute toxicity fishes	LC50	US EPA	541 mg/l	96 h	Pimephales promelas	Static system	Fresh water	Read-across
Acute toxicity crustacea	LC50		140 mg/l - 322 mg/l	48 h	Daphnia magna	Static system	Fresh water	Read-across; Nominal concentration
Toxicity algae and other aquatic plants	ErC50	OECD 201	> 12 mg/l	72 h	Desmodesmus subspicatus	Static system	Fresh water	Read-across; GLP
Long-term toxicity fish								Data waiving
Toxicity aquatic micro-organisms	EC10	OECD 209	> 108 mg/l	3 h	Activated sludge	Static system	Fresh water	Read-across; GLP

Conclusion

Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008

12.2. Persistence and degradability

aluminium

Biodegradation water

Method	Value	Duration	Value determination
			Data waiving

Biodegradation soil

Method	Value	Duration	Value determination
			Data waiving

Conclusion

Water

Biodegradability: not applicable

12.3. Bioaccumulative potential

zinc alloys Die Casting

Log Kow

Method	Remark	Value	Temperature	Value determination
	Not applicable (mixture)			

zinc

Log Kow

Method	Remark	Value	Temperature	Value determination
	Not applicable (inorganic)			

aluminium

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available			

copper

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available in the literature			

magnesium, powder or turnings

BCF fishes

Parameter	Method	Value	Duration	Species	Value determination
					Data waiving

Log Kow

Method	Remark	Value	Temperature	Value determination
	No data available			

Conclusion

Does not contain bioaccumulative component(s)

12.4. Mobility in soil

zinc

(log) Koc

Parameter	Method	Value	Value determination
	OECD 106	3.24	Literature study

Conclusion

Contains component(s) that adsorb(s) into the soil

12.5. Results of PBT and vPvB assessment

The criteria of PBT and vPvB as listed in Annex XIII of Regulation (EC) No 1907/2006 do not apply to inorganic substances.

12.6. Endocrine disrupting properties

No evidence of endocrine disrupting properties

12.7. Other adverse effects

zinc alloys Die Casting

Greenhouse gases

None of the known components is included in the list of fluorinated greenhouse gases (Regulation (EU) No 2024/573)

Ozone-depleting potential (ODP)

Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009)

zinc

Greenhouse gases

Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 2024/573)

aluminium

Greenhouse gases

Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 2024/573)

copper

Greenhouse gases

Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 2024/573)

magnesium, powder or turnings

Greenhouse gases

Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 2024/573)

SECTION 13: Disposal considerations

The information in this section is a general description. If applicable and available, exposure scenarios are attached in annex. Always use the relevant exposure scenarios that correspond to your identified use.

13.1. Waste treatment methods

13.1.1 Provisions relating to waste

European Union

Can be considered as non hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

Waste material code (Directive 2008/98/EC, Decision 2000/0532/EC).

11 01 99 (wastes from chemical surface treatment and coating of metals and other materials (for example galvanic processes, zinc coating processes, pickling processes, etching, phosphating, alkaline degreasing, anodising): wastes not otherwise specified). Depending on branch of industry and production process, also other waste codes may be applicable.

13.1.2 Disposal methods

Remove waste in accordance with local and/or national regulations. Do not discharge into drains or the environment. Dispose of at authorized waste collection point.

13.1.3 Packaging/Container

No data available

SECTION 14: Transport information

Road (ADR), Rail (RID), Inland waterways (ADN), Sea (IMDG/IMSBC), Air (ICAO-TI/IATA-DGR)

14.1. UN number or ID number

Transport	Not subject

14.2. UN proper shipping name

14.3. Transport hazard class(es)

Hazard identification number	
Class	
Classification code	

14.4. Packing group

Packing group	
Labels	

14.5. Environmental hazards

Environmentally hazardous substance mark	no

14.6. Special precautions for user

Special provisions	
Limited quantities	

14.7. Maritime transport in bulk according to IMO instruments

Annex II of MARPOL 73/78	Not applicable

SECTION 15: Regulatory information

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

Special remark

This substance/mixture does not contain Per-and Polyfluoroalkyl Substances (PFAS). During alloy production, no PFAS is intentionally added as raw material or product additive.

European legislation:

VOC content Directive 2010/75/EU

VOC content	Remark
	Not applicable (inorganic)

Directive 2012/18/EU (Seveso III)

Not subject to registration according to Directive 2012/18/EU (Seveso III)

REACH Candidate list

Does not contain component(s) included in candidate list of substances of very high concern (SVHC) for authorisation (Article 59 of Regulation (EC) No 1907/2006)

REACH Annex XIV - Authorisation

Does not contain component(s) included in Annex XIV of Regulation (EC) No 1907/2006: list of substances subject to authorisation

REACH Annex XVII - Restriction

Contains component(s) subject to restrictions of Annex XVII of Regulation (EC) No 1907/2006: restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

	Designation of the substance, of the group of substances or of the mixture	Conditions of restriction
· magnesium, powder or turnings	Substances classified as flammable gases category 1 or 2, flammable liquids categories 1, 2 or 3, flammable solids category 1 or 2, substances and mixtures which, in contact with water, emit flammable gases, category 1, 2 or 3, pyrophoric liquids category 1 or pyrophoric solids category 1, regardless of whether they appear in Part 3 of Annex VI to that Regulation or not.	1. Shall not be used, as substance or as mixtures in aerosol dispensers where these aerosol dispensers are intended for supply to the general public for entertainment and decorative purposes such as the following: — metallic glitter intended mainly for decoration, — artificial snow and frost, — “whoopee” cushions, — silly string aerosols, — imitation excrement, — horns for parties, — decorative flakes and foams, — artificial cobwebs, — stink bombs. 2. Without prejudice to the application of other Community provisions on the classification, packaging and labelling of substances, suppliers shall ensure before the placing on the market that the packaging of aerosol dispensers referred to above is marked visibly, legibly and indelibly with: “For professional users only”. 3. By way of derogation, paragraphs 1 and 2 shall not apply to the aerosol dispensers referred to Article 8 (1a) of Council Directive 75/ 324/EEC. 4. The aerosol dispensers referred to in paragraphs 1 and 2 shall not be placed on the market unless they conform to the requirements indicated.
· copper	Substances falling within one or more of the following points: (a) substances classified as any of the following in Part 3 of Annex VI to Regulation (EC) No 1272/2008: — carcinogen category 1A, 1B or 2, or germ cell mutagen category 1A, 1B or 2, but excluding any such substances classified due to effects only following exposure by inhalation — reproductive toxicant category 1A, 1B or 2 but excluding any such substances classified due to effects only following exposure by inhalation — skin sensitiser category 1, 1A or 1B — skin corrosive category 1, 1A, 1B or 1C or skin irritant category 2 — serious eye damage category 1 or eye irritant category 2 (b) substances listed in Annex II to Regulation (EC) No 1223/2009 of the European Parliament and of the Council (c) substances listed in Annex IV to Regulation (EC) No 1223/2009 for which a condition is specified in at least one of the columns g, h and i of the table in that Annex (d) substances listed in Appendix 13 to this Annex. The ancillary requirements in paragraphs 7 and 8 of column 2 of this entry apply to all mixtures for use for tattooing purposes, whether or not they contain a substance falling within points (a) to (d) of this column of this entry.	Mixtures for tattooing purposes are subject to the restrictions of Regulation (EU) 2020/2081
· zinc	Substances falling within one or more of the following points: (a) substances classified as any of the following in Part 3 of Annex VI to Regulation (EC) No 1272/2008: — carcinogen category 1A, 1B or 2, or germ cell mutagen category 1A, 1B or 2, but excluding any such substances	Mixtures for tattooing purposes are subject to the restrictions of Regulation (EU) 2020/2081

	classified due to effects only following exposure by inhalation — reproductive toxicant category 1A, 1B or 2 but excluding any such substances classified due to effects only following exposure by inhalation — skin sensitiser category 1, 1A or 1B — skin corrosive category 1, 1A, 1B or 1C or skin irritant category 2 — serious eye damage category 1 or eye irritant category 2 (b) substances listed in Annex II to Regulation (EC) No 1223/2009 of the European Parliament and of the Council (c) substances listed in Annex IV to Regulation (EC) No 1223/2009 for which a condition is specified in at least one of the columns g, h and i of the table in that Annex (d) substances listed in Appendix 13 to this Annex. The ancillary requirements in paragraphs 7 and 8 of column 2 of this entry apply to all mixtures for use for tattooing purposes, whether or not they contain a substance falling within points (a) to (d) of this column of this entry.	

National legislation Belgium

zinc alloys Die Casting

No data available

National legislation The Netherlands

zinc alloys Die Casting

Waterbezwaarlijkheid	B (4); Algemene Beoordelingsmethodiek (ABM)

National legislation France

zinc alloys Die Casting

No data available

National legislation Germany

zinc alloys Die Casting

WGK	nwg; Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen (AwSV) - 18. April 2017

aluminium

TA-Luft	5.2.1

copper

TA-Luft	5.2.2/III

magnesium, powder or turnings

TA-Luft	5.2.1

National legislation Austria

zinc alloys Die Casting

No data available

National legislation United Kingdom

zinc alloys Die Casting

No data available

Other relevant data

zinc alloys Die Casting

No data available

aluminium

TLV - Carcinogen	Aluminium metal and insoluble compounds; A4

15.2. Chemical safety assessment

No chemical safety assessment is required for a mixture.

zinc

A chemical safety assessment has been performed.

SECTION 16: Other information

Full text of any H- and EUH-statements referred to under section 3:

H228 Flammable solid.
H251 Self-heating: may catch fire.
H261 In contact with water releases flammable gases.

(*)	INTERNAL CLASSIFICATION BY BIG
ADI	Acceptable daily intake
AOEL	Acceptable operator exposure level
ATE	Acute Toxicity Estimate

BCF	Bioconcentration Factor
BEI	Biological Exposure Indices
CLP (EU-GHS)	Classification, labelling and packaging (Globally Harmonised System in Europe)
DMEL	Derived Minimal Effect Level
DNEL	Derived No Effect Level
EC10	Effect Concentration 10 %
EC50	Effect Concentration 50 %
ErC50	EC50 in terms of reduction of growth rate
GLP	Good Laboratory Practice
LC0	Lethal Concentration 0 %
LC50	Lethal Concentration 50 %
LD50	Lethal Dose 50 %
LOAEC/LOAEL	Lowest Observed Adverse Effect Concentration/Lowest Observed Adverse Effect Level
NOAEC/NOAEL	No Observed Adverse Effect Concentration/No Observed Adverse Effect Level
NOEC/NOEL	No Observed Effect Concentration/No Observed Effect Level
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent, Bioaccumulative & Toxic
PNEC	Predicted No Effect Concentration
STP	Sludge Treatment Process
vPvB	very Persistent & very Bioaccumulative

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question. Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided and cannot be held liable for any changes by third parties. This safety data sheet is only to be used within the European Union, Switzerland, Iceland, Norway and Liechtenstein. Any use outside of this area is at your own risk. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement or when this is failing the general conditions of BIG. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult the mentioned agreement/conditions for details.