 <p>SANIMET S.p.A. Via Quasimodo, 19 - 25020 FLERO (BS) Ph.: 030-3583686 Fax: 030-2684659 <a href="mailto:info@sanimet.it">info@sanimet.it</a> <a href="http://www.sanimet.it">www.sanimet.it</a></p>	<b>Sanimet S.p.A.</b>	Review no. 9 Revision date 09/02/2023 Supersedes Revision No. 8 of 10/12/2021 Page no. 1/17
	<b>MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION (DOUBLE SALT IN AQUEOUS SOLUTION, CONCENTRATION ≥ 45%)</b>	

## Safety Data Sheet

### 1 SECTION 1: IDENTIFICATION OF SUBSTANCE/MIXTURE AND COMPANY/ENTERPRISE

#### 1.1 Product Identifier

Name	<b>MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION (DOUBLE SALT IN AQUEOUS SOLUTION, CONCENTRATION ≥ 45%)</b>
Trade name	<b>MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION (DOUBLE SALT IN AQUEOUS SOLUTION, CONCENTRATION ≥ 45%)</b>
UFI	<b>TTHU-TRKP-K508-GWYN</b>

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

##### Relevant identified uses

The mixture is used for the surface treatment of metals prior to galvanising.

##### Uses advised against

Uses other than industrial uses indicated in the previous paragraph and described in the attached exposure scenarios.

#### 1.3 Details of the Supplier on the Safety Data Sheet

Business name	<b>Sanimet S.p.A.</b>
Address	<b>Via S. Quasimodo, 19-23</b>
Town and Country	<b>25010 Flero (BS) - Italy</b>
Telephone	<b>+390303583686</b>
Fax	<b>+390302684659</b>
e-mail address of the person responsible for the safety data sheet	<b><a href="mailto:info@sanimet.it">info@sanimet.it</a></b>

#### 1.4 Emergency telephone number

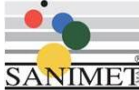
For urgent inquiries refer to:

- Sanimet SpA – Via S. Quasimodo, 19-23 – 25020 Flero (BS)  
Ph. +390303583686 Active Monday to Friday, 8:30 a.m. to 5:30 p.m.
- Poison control centres (H24):  
Milan Poison Control Centre Ph. +39 02 66101029 (CAV Niguarda Ca' Granda Hospital - Milan)  
Poison Control Center of Pavia Ph. +39 0382 24444 (CAV IRCCS Fondazione Maugeri-Pavia)  
Bergamo Poison Control Centre Ph. +39 800 883300 (CAV Azienda Ospedaliera Papa Giovanni XXII)  
Florence Poison Control Centre Ph. +39 055 7947819 (CAV Caredayi Hospital - Florence)  
Rome Poison Control Centre Ph. +39 06 3054343 (CAV Policlinico Gemelli - Rome)  
Poison Control Center Rome Ph. +39 06 49978000 (CAV Policlinico Umberto I – Rome)  
Rome Poison Control Centre Ph. +39 06 68593726 (CAV Osp. Bambino Gesù Paediatric Hospital - Unit of Emergency and Admission DEA)  
Poison Control Center of Naples Ph. +39 081 7472870 (CAV Cardarelli hospital-Naples)  
Poison Control Center of Foggia Ph. 800183459 (CAV Az. Hosp. Univ. Foggia)  
Verona Poison Control Centre Ph. 800011858 (Azienda Ospedaliera Integrata Verona)

### 2 SECTION 2: IDENTIFICATION OF HAZARDS

#### 2.1 Classification of substance or mixture

The product is classified as a dangerous substance pursuant to the provisions laid down in Regulation (EC) 1272/2008 (CLP) (and subsequent amendments and adjustments). The product requires therefore a safety data sheet in accordance with the provisions of Regulation (EC) 1907/2006 and subsequent amendments.

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**Classification and hazard statements Regulation (EC) 1272/2008 (CLP):**

Acute Tox. 4	H302
Skin Corr. 1B	H314
Eye Dam. 1	H318
STOT SE 3	H335
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

The full text of hazard statements (H) is specified in section 16 of this data sheet.

**2.2 Label elements**

Hazard labelling in accordance with Regulation (EC) 1272/2008 (CLP) as amended.

**Hazard signs**



**Warnings: Danger**

**Hazard indications**

H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation
H410	Very toxic to aquatic life with long lasting effects.

**Additional Hazard Statements**

None

**Precautionary statements**

P273	Do not release to the environment.
P301+P312	IF SWALLOWED accompanied by sickness: contact a POISON CENTER or a doctor.
P303+P361+P353	IF ON SKIN: Remove all contaminated clothing immediately. Rinse skin with water/shower.
P304+P340	IF INHALED: remove victim to fresh air and keep at rest in a position comfortable for breathing
P305+P351+P338	IF IN EYES: rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P501	Dispose of the product/container in accordance with national and local regulations.

Ingredients: Zinc Chloride, Ammonium Chloride

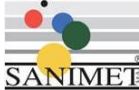
**2.3 Other dangers**

According to the available data, the product does not contain any Candidate List PBT or vPvB or SVHC substances or endocrine disruptors above 0.1%.

**3 SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS**

**3.1 Substances**

Not applicable.

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### 3.2 Mixtures

ID	Conc. % p/p	Classification Reg. (CE) 1272/2008 (CLP)
<b>ZINC CHLORIDE</b> CAS NO. 7646-85-7 N. EC: 231-592-0 Index No: 030-003-00-2 N. REACH Registration: 01-2119472431-44-0012	$25\% \leq C \leq 38\%$	Acute Tox. 4 H302, Skin Corr. 1B H314, Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1 H410 M=1 STOT SE 3 H335 for C ≥ 5 %
<b>AMMONIUM CHLORIDE</b> CAS NO. 12125-02-9 N. EC: 235-186-4 Index No: 017-014-00-8 N. REACH Registration: 01-2119489385-24-XXXX	$20\% \leq C \leq 25\%$	Acute Tox. 4 H302, Eye Irrit. 2 H319

The full text of hazard statements (H) is specified in section 16 of this data sheet.

## 4 SECTION 4: FIRST AID MEASURES

### 4.1 Description of first aid measures

Before any intervention, take care of your own safety.  
Protection of rescuers: take appropriate precautions.

#### Inhalation

Move the subject to fresh air and keep him or her at rest in a position that facilitates breathing. If the irritation persists, consult a doctor.

#### Contact with the skin

Immediately wash the affected area of skin with plenty of water. Take off contaminated clothing. If the irritation persists, consult a doctor.

#### Contact with eyes

Rinse immediately and thoroughly with water, opening the eyelids well, for at least 15 minutes. Remove contact lenses, if present. If the irritation persists, consult a doctor.

#### Ingestion

Rinse the mouth with plenty of water. DO NOT induce vomiting. Never give anything by mouth to an unconscious person unless authorized by your doctor. Consult a doctor immediately.

### 4.2 Main symptoms and effects, both acute and delayed

For symptoms and effects due to contained substances, see Section 11.

### 4.3 Indication of any immediate medical attention or special treatment needed

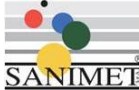
Follow the instructions given in section 4.1.

## 5 SECTION 5: FIRE-FIGHTING MEASURES

### 5.1 Suitable extinguishing

Suitable means of extinction: All conventional extinguishing media can be used; use media suitable for the surrounding fire.

Unsuitable extinguishing media: No one in particular.

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## 5.2 Special hazards arising from the substance or mixture

The product is non-flammable, non-combustible and non-explosive.  
In the event of fire, acidic vapours (hydrochloric acid) may be released due to a rise in temperature.

## 5.3 Recommendations for firefighters

Exposure to combustion products can be a health hazard; do not take action without appropriate protective equipment (acid-resistant clothing, self-contained breathing apparatus or gas mask).  
Apply standard fire-fighting procedures. Use jets of water to cool the containers to prevent product decomposition and the development of substances potentially hazardous for health.  
Containment of fire extinguishing water, which must be collected and not dispersed into the environment through discharge into the sewers. Dispose of extinguishing water and fire residues in accordance with current regulations.

## 6 SECTION 6: ACCIDENTAL RELEASE MEASURES

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

Act only after wearing protective equipment as described in Section 8 and follow the safe handling and use advice in Section 7.

Keep unprotected persons away.  
Ensure sufficient ventilation of the location affected by the leak.  
Avoid contact with eyes and skin. Do not inhale vapours or mists.  
Stop the leak if there is no risk.

### 6.2 Environmental precautions

Do not dispose of the product into the environment. Prevent the product from being discharged or dispersed into soil, sewers, surface groundwater. In case of pollution, inform the competent authorities in accordance with local laws.

### 6.3 Methods and materials for containment and remediation

Isolate the area and prevent the liquid from flowing into water bodies. Suck up the spilled product in appropriate container. Check Section 10 for possible incompatibilities for container material. Absorb residues with absorbent and neutralising material.  
Waste disposal must be carried out in accordance with the provisions of Section 13.  
Avoid water contamination during cleaning and disposal.

### 6.4 Reference to other sections

For more information refer to Section 8 on personal protective equipment, Section 7 on use and handling advice, Section 13 on waste disposal.

## 7 SECTION 7: HANDLING AND STORAGE

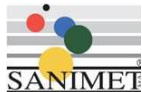
### 7.1 Precautions for safe handling

#### 7.1.1 Protective measures

Check the intact state of the containers before handling.  
Handle with care.  
See Section 8 for personal protective equipment to be used.

#### 7.1.2 Guidance on occupational hygiene

Keep away from food and drink.  
Do not eat, drink or smoke while using the product, in working and storage areas.  
Wash hands after handling the product, before the break or after work is finished.  
Respect normal personal hygiene.



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## Sanimet S.p.A.

**MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION  
(DOUBLE SALT IN AQUEOUS SOLUTION,  
CONCENTRATION  $\geq$  45%)**

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Avoid contaminating clothing with the product, remove contaminated clothing if necessary.  
Remove any contaminated clothing and protective equipment before entering the canteen area.

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

Keep the product in its original containers.  
Keep containers closed, in a ventilated place, away from heat and direct sunlight.  
Use containers made of acid-proof material (PVC, PE, PP, PVDF).  
Keep away from incompatible materials (see Section 10).  
Keep away from food or feed and beverages.  
Store so as to avoid accidental damage.

### 7.3 Special end-uses

The mixture is used for the surface treatment of metals prior to galvanising.  
All uses not expressly indicated are not recommended.

## 8 SECTION 8: EXPOSURE/PERSONAL PROTECTION CONTROLS

### 8.1 Control Parameters

#### Occupational Exposure Limit Values

##### National Limit Values

Zinc chloride: No national limit for this substance.  
Ammonium chloride: No national limit for this substance.

##### EU Limit Values

Zinc chloride: No EU limit for this substance.  
Ammonium chloride: No EU limit for this substance.

#### DNEL values

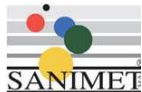
##### Zinc chloride

	Effects	Workers			General population			
		Acute local	Acute systemic	Chronic (local)	Chronic systemic	Acute local	Acute systemic	Chronic (local)
Route of exposure	Oral	Not required				No hazards identified	Not required	No hazards identified
	Inhalation	Medium risk (no derived threshold value)	No hazards identified	Medium risk (no derived threshold value)	No hazards identified	Medium risk (no derived threshold value)	Medium risk (no derived threshold value)	No hazards identified
	Skin	Medium risk (no derived threshold value)	No hazards identified	Medium risk (no derived threshold value)	No hazards identified	Medium risk (no derived threshold value)	Medium risk (no derived threshold value)	No hazards identified
	Eyes	Local effects: Medium risk (no derived threshold value)			Local effects: Medium risk (no derived threshold value)			

##### Ammonium chloride

Long-term systemic effects:

- Dermal exposure - Workers
  - DNEL = 128.9 mg/kg bw/day



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## Sanimet S.p.A.

### MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION (DOUBLE SALT IN AQUEOUS SOLUTION, CONCENTRATION $\geq 45\%$ )

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- Inhalation exposure - Workers
  - DNEL = 33.5 mg/m<sup>3</sup>
- Dermal exposure - Population (consumers)
  - DNEL = 55.2 mg/kg bw/day
- Inhalation exposure - Population (consumers)
  - DNEL = 9.9 mg/m<sup>3</sup>
- Oral exposure - Population (consumers)
  - DNEL = 11.4 mg/kg bw/day

#### Biological Limit Values

Data not available.

#### Atmospheric contaminants

Consider the applicability (for Italy) of Art. 223(1)(d) of Law Decree 81/08 as amended

#### PNEC values

PNEC values for zinc ion

Environmental sector	PNEC
Fresh water	14.4 µg/L
Freshwater sediments	146.9 mg/kg sediment (dry weight)
Sea water	7.2 µg/L
Seawater sediments	162.2 mg/kg mg/kg sediment (dry weight)
Secondary poisoning	No potential for bioaccumulation
Microorganisms in waste water treatment	100 µg/L
Soil (agriculture)	83.1 mg/kg soil (dry weight)
Air	No hazards identified

PNEC values for zinc chloride

Environmental sector	PNEC
Fresh water	30 µg/L
Freshwater sediments	306.2 mg/kg mg/kg sediment (dry weight)
Sea water	15 µg/L
Seawater sediments	338.1 mg/kg mg/kg sediment (dry weight)
Secondary poisoning	No potential for bioaccumulation
Microorganisms in waste water treatment	208.4 µg/L
Soil (agriculture)	173.2 mg/kg soil (dry weight)
Air	No hazards identified

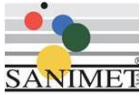
PNEC values for ammonium chloride

Environmental sector	PNEC
Fresh water	0.25 mg/L
Sea water	0.025 mg/L
Freshwater sediments	0.9 mg/kg
Marine sediments	0.09 mg/kg
Soils	50.7 mg/kg
Water Treatment Plant (STP)	13.1 mg/L
Intermittent discharge	0.43 mg/L

#### Recommended monitoring procedures

There are exposure limits for the product, so personal, workplace atmosphere and biological monitoring may be required to determine the effectiveness of ventilation or other control measures and/or respiratory protection.

Refer to monitoring standards, such as the following:



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CHLORIDE IN AQUEOUS SOLUTION  
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- European Standard EN 689 (Atmosphere in the workplace - Guidance on the assessment of inhalation exposure to chemical compounds for comparison with limit values and measurement strategy)
- European Standard EN 14042 (Atmospheres in the workplace - Guide to the application and use of procedures for the assessment of exposure to chemical and biological agents)
- European Standard EN 482 (Atmospheres in the working environment - General requirements for the performance of procedures for measuring chemical agents)

Reference should also be made to national guidance documents on methods for the determination of hazardous substances.

## 8.2 Exposure controls

### 8.2.1 Suitable technical checks

Considering that the use of appropriate technical measures should always take priority over personal protective equipment, ensure adequate ventilation in the workplace, where possible installing localised exhaust sources and effective general air exchange systems, except for closed or outdoor processes.

Workplace concentrations must be kept below the stated limit values.

Provide emergency shower and eye wash facilities.

The personal protective equipment should bear the CE marking to certify their compliance with applicable standards.

Observe the usual safety measures when handling chemicals (see Section 7).

### 8.2.2 Personal protection measures, i.e. personal protective equipment

Keep away from food, drink. Do not eat, drink or smoke while handling the product.

Wash hands thoroughly before the break or after work is finished.

Take off contaminated clothing.

#### Hand protection

Wear category III work gloves (ref. standard UNI EN 374). For contact, nitrile rubber gloves are recommended. Recommended material thickness:  $\geq 0.11$  mm. Value for permeation:  $\geq 480$  min.

Final selection of glove material must be made taking into account these factors: compatibility, degradation, permeation and time to failure. The process of using the product and any further products resulting from it must also be evaluated. Gloves have a wear time that depends on the duration of exposure and how they are used.

#### Eye/face protection

Wear safety glasses with side protection (ref. standard UNI EN 166).

If there is a risk of being exposed to splashes or spray in relation to the work performed, adequate face protection (full face shield) must be provided in order to avoid accidental absorption (ref. standard UNI EN 402).

#### Skin protection

Wear acid-resistant long-sleeved work clothes and category II safety shoes (ref. Legislative Decree no. 475/92 and EN ISO 20344).

In case of necessity (maintenance, emergencies), wear full overalls with acid-proof headgear and rubber boots.

#### Respiratory protection

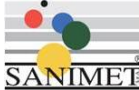
In the event of high concentrations in the work environment, wear suitable respiratory protective equipment (mask with filter for acid vapours type B - ref. standard EN 149).

In an emergency, wear self-contained compressed air breathing apparatus (ref. standards EN 137 or 138).

#### Thermal hazards

The product does not present any thermal hazards, so no special considerations are necessary.

Wear heat-resistant gloves if there are thermal hazards during work.

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### 8.2.3 Environmental exposure controls

Do not dispose of the product into the environment.

Avoid discharging or dispersing the product or its residues into sewers or surface groundwater.

Emissions from manufacturing processes, including those from ventilation equipment, should be controlled for the purposes of compliance with the rules and regulations on environmental protection.

In the field of environmental protection, consider (for Italy) the applicability of Art. 225, paragraph 2, of Legislative Decree no. 81/08 as amended

## 9 PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on fundamental physical and chemical properties

(a) Physical state:	liquid
(b) Colour:	transparent
(c) Odour:	slightly ammoniacal. No data are available on the olfactory threshold.
(d) melting point/freezing point:	no data available
(e) Initial boiling point or boiling point and boiling range:	> 110 °C
(f) Flammability:	non-flammable
(g) Lower and upper explosive limits:	non applicable
(h) Flash point:	non applicable
(i) Autoignition temperature:	non-flammable
(j) Decomposition temperature:	no data available
(k) pH:	3-5
(l) Kinematic viscosity:	not available
(m) Solubility:	very soluble (4320 g/l ZnCl <sub>2</sub> in water at 25° C, 294 g/l NH <sub>4</sub> Cl at 0°C)
(n) partition coefficient n-octanol/water (logarithmic value):	not applicable (inorganic mixture)
(o) Vapour pressure:	negligible at 20°C
(p) Density and/or relative density:	1.25-1.70 kg/l (relative density)
(q) Relative vapor density:	no data available
(r) characteristics of the particles:	not applicable (the mixture is liquid)

### 9.2 Other information

The product contains no chemical groups either associated with explosive or oxidising properties. No other known dangers.

## 10 SECTION 10: STABILITY AND REACTIVITY

### 10.1 Reactivity

The product is non-reactive under normal conditions of use.

### 10.2 Chemical stability

The product is stable under normal conditions of use and storage.

### 10.3 Possibility of dangerous reactions

There are no predictable hazardous reaction under normal conditions of use and storage.

Reactions with alkaline compounds.





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### 10.4 Conditions to avoid

None in particular. In any case, take the usual precautions when handling chemicals.  
It can corrode metals.

### 10.5 Incompatible materials

Alkaline compounds.

### 10.6 Hazardous decomposition products

Gases and vapours potentially harmful to health may be released by thermal decomposition or in the event of fire (acid vapours).

## 11 SECTION 11: TOXICOLOGICAL INFORMATION

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

#### Acute toxicity

Based on the available data, the criteria for classification as toxic by ingestion are met for the mixture.

#### *Zinc chloride*

	Dose/concentration effect	Species	Method/source
<b>Acute oral toxicity</b>	LD <sub>50</sub> 1.100 mg/kg of body weight	Rat	OECD 401
	LD <sub>50</sub> 1.260 mg/kg of body weight	Mouse	
<b>Acute inhalation toxicity</b>	LD <sub>50</sub> < 1.975 mg/m <sup>3</sup>	Rat	No guidelines followed
<b>Acute skin toxicity</b>	LD <sub>50</sub> > 2.000 mg/kg of body weight	Rat	OECD 402

#### *Ammonium chloride*

LD<sub>50</sub> (rat) = 1410 mg/kg (oral) OECD 401

#### Skin corrosion/skin irritation

Based on the available data, the criteria for classification as corrosive/dermal irritant are met for the mixture.

#### *Zinc chloride*

Species	Source	Outcome
Rabbit, mouse, guinea pig	Lansdown, 1991	Skin Corr 1B

#### *Ammonium chloride*

no skin irritation (rabbit)

#### Severe eye damage/irritation

Based on the available data, the criteria for classification as an ocular irritant are met.

#### *Zinc chloride*

Species	Method	Outcome
Classification based on skin irritation test results		Category 1

#### *Ammonium chloride*

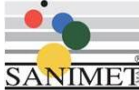
irritant to eyes (rabbit)

Causes serious eye irritation.

#### Respiratory or skin sensitisation

Based on the available data, the criteria for classification as a sensitiser are not met for the mixture.

#### *Zinc chloride*

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	<b>MIXTURE OF ZINC CHLORIDE AND AMMONIUM  CHLORIDE IN AQUEOUS SOLUTION  (DOUBLE SALT IN AQUEOUS SOLUTION,  CONCENTRATION <math>\geq</math> 45%)</b>	

Species	Method	Outcome
Mouse, guinea pig	LLNA, GPMT	Non-sensitizing

#### *Ammonium chloride*

There are no sensitizing effects

#### Mutagenicity on germ cells

Based on the available data, the criteria for classification as a mutagen are not met for the mixture.

#### *Zinc chloride*

Based on the existing results of available in vitro and in vivo genotoxicity tests, it is concluded that zinc compounds have no biologically relevant genotoxic activity. Consequently, no classification for germ cell mutagenicity is applicable. This conclusion is in line with those reached by other regulatory reviews on the genotoxicity of zinc compounds (WHO, 2001; SCF, 2003; EU RAR, 2004, MAK, 2009). Therefore, no classification and labelling for mutagenicity is required.

#### Carcinogenicity

Based on the available data, the criteria for classification as a carcinogen are not met for the mixture.

#### *Zinc chloride*

No adequate studies are available to assess the carcinogenicity of zinc compounds for humans.

#### Reproductive toxicity

Based on the available data, the criteria for classification as a carcinogen are not met for the mixture.

#### *Zinc chloride*

Fertility impairment and developmental toxicity are not considered endpoints of concern in humans for zinc compounds. Based on the information available in experimental animals and humans, there is no reason to classify any zinc compounds for this hazard class.

#### Specific toxicity to target organs (STOT) - single exposure

Based on the available data, the mixture is classified as toxic to target organs category 3 (may irritate the respiratory tract).

#### *Zinc chloride*

Specific concentration limit: STOT SE 3, H335: C $\geq$ 5%

#### Specific toxicity to target organs (STOT) - repeated exposure

Based on the available data, the criteria for classification as toxic to target organs - repeated exposure are not met for the mixture.

#### *Zinc chloride*

No evidence of specific target organ toxicity (repeated oral/inhalatory exposure) for animals or humans. According to the criteria of Regulation (EC) No 1272/2008, none of the zinc compounds are classified for Specific Target Organ Toxicity by Repeated Exposure (STOT-RE).

#### Aspiration hazard

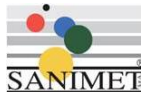
Based on the available data, the classification criteria for aspiration hazard are not met for the mixture.

#### Likely routes of exposure

Ingestion, dermal contact.

#### Effects related to physical, chemical and toxicological characteristics

Exposure symptoms include: burning sensation, coughing, asthmatic breathing, laryngitis, shortness of breath, headache, nausea and vomiting.



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**MIXTURE OF ZINC CHLORIDE AND AMMONIUM  
CHLORIDE IN AQUEOUS SOLUTION  
(DOUBLE SALT IN AQUEOUS SOLUTION,  
CONCENTRATION  $\geq$  45%)**

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### Ingestion:

The product is harmful if ingested, and even small amounts ingested can cause significant health problems, including abdominal pain with burning, nausea, vomiting and diarrhoea. Ingestion can cause burns to the mouth, throat and oesophagus, oedema, swelling of the larynx and subsequent suffocation. Perforation of the gastrointestinal tract may also occur.

### Contact with skin:

The product is corrosive and causes severe skin burns and blistering, which can also appear after exposure. Burns cause strong burning sensation and pain.

### Contact with eyes:

The product will cause serious eye injury and may cause opacity of the cornea, iris lesion, irreversible coloration of the eye. Symptoms may include redness, oedema, pain and lacrimation.

### Inhalation:

Inhalation of vapours causes irritation of the lower and upper respiratory tract with coughing and breathing difficulties. At higher concentrations it can also cause pulmonary oedema. Symptoms become manifest sometimes only after a few hours.

### Immediate, delayed and chronic effects from short-term and long-term exposure

See above.

### Interactive effects

Information not available.

## 11.2 Information on other hazards

The product does not contain any substances with endocrine-disrupting properties in excess of 0.1 % by weight.

## 12 SECTION 12: ECOLOGICAL INFORMATION

The product is to be regarded as environmentally hazardous and has a high toxicity to aquatic organisms with long-term adverse effects on the aquatic environment.

Use in accordance with normal working practices, avoiding dispersion of product in the environment.

When assessing the ecotoxicity of metals in different environmental compartments (aquatic, terrestrial and sediment), it is assumed that toxicity is not controlled by the total concentration of a metal, but by its bioavailable form. For metals, this bioavailable form is generally regarded as the free metal ions. With regard to zinc chloride, it is assumed that the ecotoxicity of zinc compounds is due to the  $Zn^{2+}$  ion.

For zinc compounds, the reference values for ecotoxicity are based on the soluble  $Zn^{2+}$  ion and are determined from the extensive data set available from acute and chronic ecotoxicity tests.

### 12.1 Toxicity

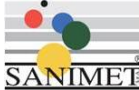
#### **Zinc chloride**

##### Toxicity to the aquatic environment

The available high-quality data were normalised against two sets of physico-chemical conditions (two different pH ranges). This normalisation is possible because established bioavailability models (so-called 'Biotic Ligand Models' or BLMs) for zinc exist for algae, invertebrates and fish, which allow the prediction of acute and chronic zinc ecotoxicity as a function of the physical-chemical test conditions. The acute aquatic toxicity database on zinc contains data on 59 species (5 algae, 29 invertebrates, 21 fish species, 3 amphibians and 1 aquatic plant). The chronic aquatic toxicity database on zinc contains high-quality data on 41 species (17 taxonomic groups).

##### *Reference values for ecotoxicity*

Parameter	pH	$Zn^{2+}$ ion concentration	Species
NOEC	pH 6	154 $\mu$ g Zn/l	<i>Daphnia magna</i>

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Acute toxicity	NOEC	pH 8	41 µg Zn/l	<i>Pseudokirchneriella subcapitata</i>
Chronic toxicity	NOEC	pH 6	99 µg Zn/l	<i>Pseudokirchneriella subcapitata</i>
	NOEC	pH 8	11 µg Zn/l	<i>Pseudokirchneriella subcapitata</i>

#### Toxicity to aquatic sediments

Parameter	Range of values	Data source	PNEC extrapolation method
NOEC/ EC <sub>10</sub>	218 to 1101 µg/l	Endpoints for 7 benthic species	Species Sensitivity Distribution (SSD)

#### Soil toxicity

Parameter	Range of values	Data source	PNEC extrapolation method
NOEC/ EC <sub>10</sub>	31.2 and 8003.5 mg Zn/kg (dry weight)	Endpoints for 12 terrestrial plants, 10 invertebrates and 13 microbial species	Species Sensitivity Distribution (SSD)

#### Toxicity to micro-organisms in waste water treatment plants

Parameter	Range of values	Data source	PNEC extrapolation method
NOEC	100 µg Zn/l	Nitrification inhibition test Juliausti et al. 2003	Assessment factor AF=1

#### Ammonium chloride

Acute toxicity for fish:

LC50 (96 h) = 42.91 mg/l (*Oncorhynchus mykiss*)

LC50 (96 hours) = 46.27 mg/l (*Prosopium williamsoni*)

#### Acute toxicity to aquatic invertebrates

EC50 (48 h) = 98.5 mg/l (*Ceriodaphnia dubia*)

EC50 (48 h) = 136.6 mg/l (*Daphnia magna*)

#### Toxicity on algae/cyanobacteria

EC50 (5 d) = 1300 mg/l (*Chlorella vulgaris*)

EC50 (18 d) = 2700 mg/l (*Chlorella vulgaris*)

#### Chronic fish toxicity

EC (30 d) = 4.28 mg/l (*Lepomis macrochirus*)

#### Chronic toxicity to aquatic invertebrates

EC10 (70 d) = 2,52 mg/l

### 12.2 Persistence and degradability

Biodegradation is not applicable to inorganic metals/substances.

### 12.3 Potential for bioaccumulation

Due to homeostatic control mechanisms, bioaccumulation is not relevant for essential elements in general and zinc in particular.

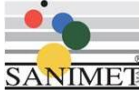
### 12.4 Mobility in the soil

#### Zinc chloride

Distribution	Type of transport	Parameter	Outcome	Method
Soil - water	Adsorption	Log Kp	3.24 (0.30 – 4.31)	OECD 106

### 12.5 PBT and VPvB Assessment Results

Considering what is stated in 12.2. and 12.3. above, zinc and zinc compounds are not PBT or vPvB.

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The product does not fulfil the PBT or vPvB criteria according to Annex XIII of Regulation (EC) 1907/2006 (REACH).

### 12.6 Properties of interference with the endocrine system

The product contains no substances with endocrine-disrupting properties.

### 12.7 Other adverse effects

Information not available.

## 13 SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1 Waste treatment methods

Waste management methods must be assessed on a case-by-case basis, in relation to the composition of the waste itself and its hazardousness, in light of the provisions of current EU and national legislation.

For handling and measures in the event of accidental spillage of the waste, the indications given in Sections 6 and 7 apply in general; specific precautions and actions must, however, be evaluated in relation to the composition of the waste.

### PRODUCT

Product residues should be considered special hazardous waste. The hazard level of waste containing this product should be evaluated according to applicable regulations.

Disposal should be entrusted to an authorized waste management firm, in compliance with national and local regulations. Waste transportation may be subject to ADR.

### CONTAMINATED PACKAGING

Contaminated packaging must be recovered or disposed of in compliance with national waste management regulations. Contaminated packaging must be emptied completely and, after appropriate remediation, may be reused. Reclaim by washing with water.

## 14 SECTION 14: TRANSPORT INFORMATION

The product is considered dangerous according to the applicable regulations for the transport of dangerous goods by road (ADR), by rail (RID), by sea (IMDG Code) and by air (IATA).

Road transport must be carried out by vehicles authorised to transport dangerous goods in accordance with the requirements of the current edition of the ADR Agreement and the applicable national regulations.

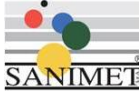
Products should be transported in their original packaging and in any case in packages that are made from materials resistant to their content and unlikely to cause dangerous reactions with it. Employees loading and unloading dangerous goods must have received appropriate training on the risks presented by the substance and on any procedures to be adopted in the event of an emergency situation.

### 14.1 UN number or ID number

ADR/RID, IMDG, IATA: 3264

### 14.2 UN proper shipping name

ADR/RID: CORROSIVE INORGANIC LIQUID, ACIDIC, N.O.S.  
IMDG: CORROSIVE INORGANIC LIQUID, ACIDIC, N.O.S.  
IATA: CORROSIVE INORGANIC LIQUID, ACIDIC, N.O.S.

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### 14.3 Transportation hazard classification

ADR/RID, IMDG, IATA: Class: 8 Label : 8



### 14.4 Packing group

ADR/RID, IMDG, IATA: III

### 14.5 Environmental hazards

ADR/RID: Dangerous for the environment:  
IMDG: NO  
IATA: NO



### 14.6 Special precautions for users

ADR/RID:	N. Kemler: 80	Limited Amounts: 5 L	Code of restriction in tunnels: (E) Special
	Provision: -		
IMDG:	EMS: F-A, S-F	Limited Amounts: 5 L	
IATA:	Cargo:	Maximum quantity: 450 L	Packaging Instructions: 964
	Passengers:	Maximum quantity: 450 L	Packaging Instructions: 964
	Special instructions: A97, A158		

### 14.7 Transport in bulk according to MARPOL Annex II and the IBC Code

Bulk transport is not carried out.

## 15 SECTION 15: REGULATORY INFORMATION

### 15.1 Laws and regulations on health, safety and the environment specific to the substance or mixture

- EC Regulation 18/12/2006 no. 1907 as amended "Registration, Evaluation, Authorisation and Restriction of Chemicals" (REACH)
- EC Regulation 16/12/2008 no. 1272 as amended "Classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC and Regulation 1907/2006/EC"
- Regulation (EU) 2020/878 of 18 June 2020 amending Regulation No. 1907/2006/EC, concerning Annex II "Requirements for the compilation of safety data sheets (SDS)".
- Legislative Decree no. 9/04/2008-N 81 as amended Implementation of Article 1 of Law no. 123 dated August 3, 2007, concerning the protection of health and safety in the workplace' (for Italy)
- M.D. Labour 26/02/2004 'Definition of a first list of indicative occupational exposure limit values for chemical agents' (for Italy)
- Legislative Decree no. 152/06 as amended "Environmental Regulations" (for Italy)

### Restrictions relating to the product or the contained substances according to Annex XVII of EC Regulation 1907/2006 (REACH) as amended.

Product related restrictions: 3 (does not apply to product for intended uses)

Information relating to substances contained: 3, 65 (do not apply to substances for the intended use of the product)

### Candidate List Substances (Art. 59 REACH)

None.

### Substances subject to authorisation (Annex XIV REACH)

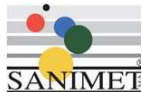
None.

### Substances subject to export notification Reg. (EC) 649/2012 as amended.

None.

### Substances subject to the Rotterdam Convention

None.



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## Sanimet S.p.A.

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### Substances subject to the Stockholm Convention

None.

### Substances subject to the Montreal Protocol

None.

### Provisions relating to Directive 2012/18/EU (Seveso III), transposed by Law Decree 105/2015

The product is included for its aquatic hazard properties in Annex 1, Part 1 of Law D. 105/2015 (decree transposing Directive 2012/18/EU - Seveso III), specifically in category E1. Without prejudice to the scope and exclusions in the decree indicated, for storage greater than the quantities indicated in this annex, please refer to Art. 13, 14 or 15 of the aforementioned decree.

### Regulation (EU) 2019/1148 on the marketing and use of explosives precursors

- Annex I - PRECURSORS OF EXPLOSIVES SUBJECT TO RESTRICTIONS

Product / contained substances: none.

- Annex II - EXPLOSIVE PRECURSORS SUBJECT TO NOTIFICATION

Product / contained substances: none.

### Health Checks

Workers exposed to chemical agents hazardous to health must undergo health surveillance carried out in accordance with the provisions (for Italy) of Art. 41 of Legislative Decree no. 81 of 9 April 2008, unless the risk to the safety and health of the worker has been assessed irrelevant, in accordance with art. 224 paragraph 2.

### 15.2 Assessment of chemical safety

A chemical safety assessment was carried out for ammonium chloride and zinc chloride.

## 16 SECTION 16: MORE INFORMATION

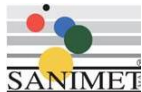
### Text of hazard indications (H) mentioned in sections 2-3 of this sheet

Acute Tox. 4	Acute toxicity, category 4
Skin Corr. 1B	Skin corrosion, category 1B
Eye Irrit. 2	Eye irritation, category 2
STOT SE 3	Specific toxicity to target organs (STOT) - single exposure, category 3
Aquatic Acute 1	Hazardous to the aquatic environment, acute toxicity, category 1
Aquatic Chronic 1	Hazardous to the aquatic environment, chronic toxicity, category 1
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation
H400	Very toxic to aquatic organisms.
H410	Very toxic to aquatic life with long lasting effects.

The classification of the mixture was obtained by means of the calculation methods provided for in Regulation (EC) No. 1272/2008 (CLP Regulation).

### Abbreviations and acronyms

ACGIH: American Conference of Industrial Hygienists  
ADR: European Agreement concerning the transport of dangerous goods by road  
CAS NUMBER: Chemical Abstract Service Number  
CE NUMBER: Number identifier in ESIS (European database of existing substances)  
CLP: Regulation EC 1272/2008  
CSR: Chemical Safety Report  
DNEL: Derived no-effect level  
EC50 or EC50: actual concentration producing 50% of the maximum effect



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EmS: Emergency Schedule

EPA Environmental Protection Agency

GHS: Harmonized System overall for the classification and labelling of chemicals

IC50: Concentration of immobilization of 50% of the population subject to test

IATA: Regulation for the transport of dangerous goods of international air transport association

IMDG: International maritime dangerous goods code

IMO: International Maritime Organisation

INDEX NUMBER: Identification number in Annex VI of the CLP

LC50: Lethal Concentration 50%

LD50: lethal dose 50%

NOEC: No observed effect concentration

OEL: Occupational Exposure Level

PBT: Persistent, bioaccumulative and toxic substance according to REACH

PEC: Predicted Environmental Concentration

PEL: Permissible exposure limit

PNEC: Predicted no-effect concentration

REACH: Regulation CE 1907/2006

RID: Regulation on the international carriage of dangerous goods by rail

TLV: threshold Value

TLV CEILING: Concentration that must not be exceeded during any time of the working exposure.

TLV-TWA: Time Weighted Average Exposure Limit

TWA STEL: Short Term Exposure Limit

SCOEL: Scientific Committee on Occupational Exposure Limit Values

UE: European Union

UFI: Unique Formula Identifier

VOC: Volatile organic compound

vPvB: Very persistent and very bioaccumulative according to REACH

WGK: Water hazard class (Germany)

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Regulation (EC) 1272/2008 of the European Parliament (CLP) et seq.

The Merck Index. - 10th Edition

Handling Chemical Safety

INRS - Fiche Toxicologique (toxicological sheet)

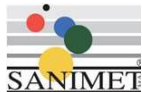
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## Sanimet S.p.A.

### MIXTURE OF ZINC CHLORIDE AND AMMONIUM CHLORIDE IN AQUEOUS SOLUTION (DOUBLE SALT IN AQUEOUS SOLUTION, CONCENTRATION $\geq$ 45%)

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#### Note to the user

The information contained in the present sheet are based on knowledge achieved on the date of the last version. User must verify the suitability and thoroughness of the information provided according to each specific use of the product. This document must not be regarded as a guarantee on any specific product property. The use of this product is not subject to our direct control; therefore, the user must, under his own responsibility, comply with the current health and safety laws and regulations. We accept no liability for any unauthorised or improper use. Provide adequate training for personnel assigned to use chemical products.

#### Changes made since the previous revision.

This version no. 09 amends the previous one in sections 3, 8, 11, 12, 16 and adapts the SDS to the provisions of Reg. (UE) 2020/878.