

Carus Proprietary Zinc Phosphate and Orthophosphate Water Treatment Chemicals

Product Safety Summary

Summary:

Carus Proprietary Zinc Phosphate and Orthophosphate Water Treatment Chemicals are premier corrosion inhibitors for use in potable and industrial water systems. They are mostly liquid concentrates with a few dry blends of exceptional purity, clarity and stability utilizing a blend of zinc-based chemicals and/or phosphoric acid.

Chemical Identity, Chemical Formula and CAS #:

One or more of the following chemicals may be present in each product in this category:

Chemical Identity	Chemical Formula	CAS #
Phosphoric acid	H ₃ PO ₄	7664-38-2
Phosphoric acid sodium salt	Na ₂ HPO ₄	7558-80-7
Polyphosphoric acid, sodium salt	(NaPO ₃) ₆	68915-31-1
Sulfuric acid, zinc salt	ZnSO ₄	7733-02-0
Hydrochloric acid, zinc salt (2:1)	ZnCl ₂	7646-85-7
Phosphoric acid, zinc salt (2:3)	Zn ₂ (PO ₄) ₃	7779-90-0
Sulfuric acid, monosodium salt	NaHSO ₄	7681-38-1
Sulfuric acid	H ₂ SO ₄	7664-93-9
Hydrochloric acid	HCl	7647-01-0

What are Carus Proprietary Zinc Phosphate and Orthophosphate Water Treatment Chemicals and What are They Used for?

The Carus Proprietary Zinc Phosphate Water Treatment Chemicals are liquid or dry products containing one or more of the above mentioned chemicals. The products are prepared by the reaction of raw materials or by blending of two or more chemicals listed above along with water to form a liquid blend product or dry blends of various chemicals available as dry powders. The blended phosphates are a mixture of zinc-based phosphates and are used as an additive to eliminate or prevent corrosion as well as used to isolate and hold unwanted impurities from getting into the water system. They are sold under the trade names of Carus™, QUANTICHEM®, CALCIQUEST® and AQUADENE® Water Treatment Chemicals.

Carus proprietary zinc phosphate water treatment chemicals are primarily used as an integral part of corrosion control processes used by municipal drinking water authorities or other industries to purify and improve the quality of drinking water as it is distributed to the public. Controlling staining (red water caused by iron-based impurities and black water caused by manganese-based impurities), controlling copper, and controlling lead release to the public is the primary application of phosphate based products.

The main benefits by the use of phosphate products are the following:

1. Extends the operating life of the water distribution system by reducing corrosion and scale formation.
2. Eliminates and/or minimizes the presence of lead, copper, iron and manganese impurities in the municipal drinking water.

3. Increases the water quality by preventing rusty and dirty water, discoloration, staining, mineral buildup, or leaching of heavy metals.

In addition to the water treatment application where Carus products are used, some phosphates are also generally consumed by the public in multiple products. It is found in toothpaste, cola based products, cheeses, as well as leavening agents in baking. Phosphoric acid can be found in many popular soft drinks.

Physical-chemical Properties:

Carus' liquid zinc phosphate and orthophosphate products are clear, homogeneous acidic solutions, meaning they have a low pH. They have a markedly corrosive action on all body tissues and should be handled with care. Even dilute solutions may be acidic and may have a destructive effect on tissue after prolonged contact. Inhalation of mists can cause damage to the upper respiratory tract. Ingestion can cause sore throat, abdominal pain, nausea, and severe burns of the mouth, throat, and stomach.

The liquid products have a specific gravity of about 1.2-1.6 g/ml. They are of acidic pH (<1) and are corrosive. The dry product blends are powders of either white or off-white color. The bulk densities of the dry blends are approximately 80 lbs/cubic feet and are soluble in water. Both liquid and dry blends are stable under normal conditions. They are not flammable but are reactive because of their corrosive nature. We recommend storing these products away from incompatibles like caustics in a tightly closed container in a cool, dry area and protecting containers from physical damage. Avoid freezing the liquid product blends.

Since they are corrosive, they are stored in high-medium density polyethylene, cross-linked polyethylene, and fiber enforced plastic. It is not compatible with black iron, mild steel, galvanized metals, aluminum, zinc, stainless steel, copper, lead, brass, bronze, tin and other base metals.

Health and Environmental Effects:

The health effects of Carus' zinc phosphate and orthophosphate products are mainly due to its corrosive properties. They are corrosive to skin, eyes, or respiratory tract. Contact with skin may cause redness, pain, and severe skin burns. Contact with eyes may cause redness, pain, blurred vision, eye burns, and permanent eye damage. In applications where dust, vapors, or mist are created, inhalation may cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath. Ingestion may cause sore throat, abdominal pain, nausea, and severe burns of the mouth, throat, and stomach. Severe exposures can lead to shock, circulatory collapse, and death. Phosphates are slowly and incompletely absorbed when ingested, and seldom result in systemic effects. Such effects, however, have occurred. Symptoms may include vomiting, lethargy, diarrhea, blood chemistry effects, heart disturbances and central nervous system effects. The toxicity of phosphates is because of their ability to sequester calcium.

Carus' zinc phosphate and orthophosphate products are expected to be toxic to aquatic life when present in high concentrations, mainly due to its acidic nature. When released into the soil, this material may leach into groundwater. When released to water, natural water hardness minerals may readily reduce acidity. The phosphate, however, may persist indefinitely. During transport through the soil, phosphoric acid will dissolve some of the soil material, in particular, carbonate-based materials. The acid will be neutralized to some degree. However, significant amounts of acid will remain for transport down toward the groundwater table. Since it is an inorganic compound and contains no degradable functional groups, it exerts no biological oxygen demand.

Exposure Potential:

Carus' zinc phosphate and orthophosphate products are corrosive to all body tissues and they should be handled with care. The most likely ways exposure could occur are:

1. Worker Exposure- Exposure could occur in the manufacturing facility, to transportation personnel, or users in municipal drinking water or waste water treatment facilities and or industrial facilities that use. When exposures occur, they are typically skin, eye or inhalation exposures. Ingestion exposure is not very likely to occur. To minimize the risk of exposure good industrial hygiene practice, engineering controls and the use of personal protective equipment, such as chemical goggles, gloves, and work clothing that covers arms and legs as needed, have been established. Emergency responders such as firefighters could also be exposed to phosphates if they are present during an incident. Normal turnout protective gear for first responders such as positive pressure breathing units, chemical resistant suits, boots and gloves will minimize their risk.
2. Consumer Exposure – Carus Corporation does not sell Carus zinc phosphate nor orthophosphate water treatment chemicals in retail stores, although some components present in our products may also be an ingredient in some consumer products from other manufacturers. Public exposure to phosphates is possible through accidents, spills, and inadvertent misuse of the products or overdosing from the municipal water treatment systems.
3. Releases: Non-routine releases to the environment can occur from accidents, spills and inadvertent misuse of the products. If a spill occurs, emergency personnel should wear protective equipment suitable for the task to minimize exposures. Avoid runoff into storm sewers and ditches that lead to waterways. If releases to environment are in CERCLA reportable quantities, report to the required agencies. Clean up spills immediately. Contain spill by collecting the liquid in a pit or holding behind a dam (clay like material or soil). Absorb with inert media and dispose of properly. Flush area with large amounts of water. Do not flush to sewer. Disposal of all materials shall be in full and strict compliance with all federal, state, and local regulations pertaining to phosphates and corrosive liquids.

Risk Management Measures:

The primary mechanism for providing advice on the handling of phosphates is through the Safety Data Sheet (SDS). Carus provides a SDS to all customers and others directly involved in handling the products, and to other stakeholders upon request through the company website. All of the pertinent handling information is reemphasized in Product Data (specification) Sheets and in Technical Bulletins targeted to specific uses of phosphates.

Carus also provides customers advice and assistance in the design and construction of equipment used to safely handle phosphates. For example, municipal water treatment authorities are offered bulk liquid dosing options.

Carus has prepared a series of Technical Briefs that advise customers how to safely and effectively use phosphates.

In addition Carus provides PowerPoint safety presentations given by the Technical Services Department or trained personnel. In many municipal bids this is written in as a requirement of the vendor.

REGULATORY INFORMATION / CLASSIFICATION AND LABELLING

The classification and labelling according to GHS of the chemical substances in the phosphate products are provided below.

Phosphoric acid sodium salt	Na₂HPO₄	7558-80-7
Polyphosphoric acid, sodium salt	(NaPO₃)₆	68915-31-1

The above two chemical substances that may be present in some of the phosphate product mixture at any concentration are not classified.

Sulfuric acid, zinc salt	ZnSO₄	7733-02-0
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Physical hazards

None

Health hazards

Acute toxicity – oral	Acute Toxicity, Category 4
Serious eye damage/eye irritation	Eye Damage Category 1

Environmental hazards

Hazardous to the aquatic environment (acute/short-term)	Aquatic Acute, Category 1
Hazardous to the aquatic environment (long-term)	Aquatic Chronic, Category 1

Labelling

Signal word	Danger
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Hazard pictogram

GHS05: corrosion
GHS07: exclamation mark
GHS09: environment

Hazard statements

Harmful if swallowed.
Causes serious eye damage.
Very toxic to aquatic life with long lasting effects.

Precautionary statements

Wear protective gloves/protective clothing/eye protection/face protection.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a POISON CENTER/doctor
Avoid release to the environment.
Collect spillage.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Hydrochloric acid, zinc salt (2:1)	ZnCl₂	7646-85-7
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Physical hazards

None

Health hazards

Acute toxicity – oral	Acute Toxicity, Category 4
Skin corrosion/irritation	Skin Corrosion, Category 1B

Environmental hazards

Hazardous to the aquatic environment (acute/short-term)	Aquatic Acute Category 1
Hazardous to the aquatic environment (long-term)	Aquatic Chronic Category 1

Labelling

Signal word Danger

Hazard pictogram

GHS05: corrosion
GHS07: exclamation mark
GHS09: environment

Hazard statements

Harmful if swallowed.
Causes severe skin burns and eye damage.
Very toxic to aquatic life with long lasting effects.

Precautionary statements

Do not breathe dust/fume/gas/mist/vapors/spray.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Avoid release to the environment.
Store locked up.
Collect spillage.
Dispose of contents/container in accordance with local/regional/national/international regulations.

Phosphoric acid

H₃PO₄ 7664-38-2

Physical Hazards

None

Health Hazards

Skin corrosion/irritation Category 1B
Serious eye damage/eye irritation Category 1
Specific concentration limits

Concentration range (%)>= 25.0	Skin Corrosion, Category 1B
Concentration range (%)>= 10.0 < 25.0	Eye Irritation, Category 2A Skin Irritation, Category 2

Environmental hazards

None

Labelling

Signal word Danger

Hazard pictogram

GHS05: corrosion

Hazard statements

May be corrosive to metals.
Causes severe skin burns and eye damage.

Precautionary statements

Do not breathe mist or vapor. Wear protective gloves/protective clothing/eye protection/face protection.
Wash thoroughly after handling. Keep only in original container.

IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 Wash contaminated clothing before reuse.
 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 Immediately call a POISON CENTER/doctor/...
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 Store locked up. Store in corrosive resistant container with a resistant inner liner.
 Dispose of contents/container in accordance with local/regional/national/international regulations.

Phosphoric acid, zinc salt (2:3) $Zn_2(PO_4)_3$ 7779-90-0

Physical hazards

None

Health hazards

None

Environmental hazards

Hazardous to the aquatic environment (acute/short-term)

Aquatic Acute Category 1

Hazardous to the aquatic environment (long-term)

Aquatic Chronic Category 1

Labelling

Signal word Warning

Hazard pictogram

GHS09: environment

Hazard statements

Very toxic to aquatic life with long lasting effects.

Precautionary statements

Avoid release to the environment.

Collect spillage.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Sulfuric acid, monosodium salt $NaHSO_4$ 7681-38-1

Physical hazards

None

Health hazards

Serious eye damage /eye irritation

Eye Damage, Category 1

Environmental hazards

None

Labelling

Signal word Danger

Hazard pictogram

GHS05: corrosion

Hazard statements

Causes serious eye damage.

Precautionary statements

Wear protective gloves/protective clothing/eye protection/face protection.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Immediately call a POISON CENTER/doctor.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Hydrochloric acid

HCl

7647-01-0

(Concentration range (%))>= 0.1 < 10.0)

Physical hazards

Corrosive to metals Metal Corrosion, Category 1

Health hazards

None

Environmental hazards

None

Labelling

Signal word Danger

Hazard pictogram

GHS05: corrosion

Hazard statement

May be corrosive to metals

Precautionary statements

Keep only in original container.

Dispose of contents/container in accordance with local/regional/national/international regulations.

Sulfuric acid

H2SO4

7664-93-9

(Concentration range (%))>= 5.0 < 15.0)

Physical hazards

None

Health hazards

(Concentration range (%))>= 5.0 < 15.0)

Skin corrosion / irritation Skin Irritation, Category 2
Eye Irritation, Category 2

Labelling

Signal word Warning

Hazard pictogram

GHS07: Irritant/toxic

Hazard statements

Causes skin and eye irritation

RCRA (Resource Conservation and Recovery Act of USA):

When discarded, the liquid products are considered as a hazardous waste because of its low pH (D002, Compound/characteristic: Corrosivity) as that term is defined by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261. The empty containers should be rinsed clear of any residues before disposal.

Transport Information:

Almost all of the liquid products are classified as corrosive because of its pH and are regulated by DOT, TDG, IMDG and IATA. Some solid products be classified as corrosive because of its pH and or the presence of CAS# 7320-34-5 and is regulated by DOT, TDG, IMDG and IATA.

CONCLUSION

Carus proprietary zinc phosphate water treatment chemicals are primarily used as an integral part of corrosion control processes to purify and improve the quality of drinking water as it is distributed to the public. Exposure to humans and the environment is minimized by good industrial hygiene practice, engineering controls and the use of personal protective equipment.

CONTACT INFORMATION WITHIN COMPANY

For further information on this substance or product safety summaries in general, please contact:

salesmkt@caruscorporation.com or visit our website at <http://www.caruscorporation.com/page/site/responsible-care>

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