

# ZACLON LLC

## ZINC CHLORIDE

### *Granular Solid and Aqueous Solutions*

Zinc Chloride is a white deliquescent salt that forms acidic solutions in water and in polar organic solvents such as ethanol, acetone and ether. Neutral solutions can be prepared with anhydrous zinc chloride and acetone. Zinc chloride is available from Zaclon LLC as a granular solid, or in the form of aqueous solutions ranging in concentration from 50 to 70%. Solution color is water white to a straw color.

### CHEMICAL PROPERTIES

- ❖ Anhydrous zinc chloride hydrolyzes with moisture to form hydrochloric acid. It also forms complex ions with water, ammonia and some organic solvents. Alkaline materials precipitate zinc hydroxide from zinc chloride solutions.
- ❖ Zinc laurate, linoleate or resinolate can be formed from zinc chloride solutions and solutions of the corresponding sodium salt.
- ❖ Zinc chloride is a Lewis acid and therefore electrophilic in character. Its catalytic activity is milder than that of aluminum chloride in, for example, Friedel-Crafts type reactions. Zinc chloride is particularly effective in catalyzing reactions that eliminate molecules of water, ammonia or mercaptans.
- ❖ Zinc chloride solutions gelatinize cellulosic materials and induce crosslinking in such polymer formers as the methylol ureas.
- ❖ Zinc chloride solution has no USP designation, though the purity of Zaclon zinc chloride solutions can match anything made from USP-grade dry zinc chloride solution.

### USES AND APPLICATIONS

- ❖ **Galvanizing, Soldering and Tinning Fluxes:** When heat decomposes moist fluxes based on zinc chloride, hydrochloric acid is formed. The acid removes oxides and salts from metal surfaces and provides good metal-to-metal bonding.
- ❖ **Odor Control:** Zinc chloride reacts with sulfide to minimize release of H<sub>2</sub>S gas in waste treatment facilities.
- ❖ **Oil-Gas Wells:** High-density solutions of zinc chloride and calcium chloride give good performance in well completion and work-over operations; the solutions also have merit as packer fluids under certain well conditions. Zinc chloride has been used in specialty corrosion inhibitors and invert emulsion breakers.
- ❖ **Vulcanized Fiber:** Water-leaf paper is gelatinized with a 72 Bé zinc chloride solution is less tacky, drier and less moisture-absorbent than caustic reclaimed rubber. The zinc chloride not only dissolves the cellulosic fibers in the scrap, but also catalyzes depolymerization of the elastomer.
- ❖ **Reclaimed Rubber:** Rubber reclaimed from natural, styrene-butadiene rubber (SBR), and mixed scrap with 70 Bé zinc chloride not only dissolves the cellulosic fibers in the scrap, but also catalyzes depolymerization of the elastomer.
- ❖ **Textile Finishing:** Zinc chloride induces cross-linking in such polymer formers as the methylol ureas. Zinc chloride is a more active catalyst than magnesium chloride and almost as active as zinc nitrate. It does not contribute to resin yellowing on white goods and has little effect on dye shades in tinted materials. Zinc chloride solutions induce cross-linking between cellulose and durable-press resins, such as those based on imidazolidone -- for example: dimethyldihydroxyethyleneurea (DMDHEU). Zaclon LLC Zinc Chloride Solution has a low concentration of color-inducing metal-ion contaminants. The textile grade is used as a catalyst in resin systems that impart a durable-press or wash and wear finish to cotton and cotton-synthetic blend fabrics. Zinc Chloride 50% Solution also serves as a high quality mercerizing agent for cotton.

## NOTICE: ZINC CHLORIDE CAUSES SKIN & EYE BURNS. See Personal Safety and First Aid.

- ❖ **Liquid Fertilizer:** Zinc chloride may be used with chelating agents for a micronutrient in liquid fertilizers.
- ❖ **Dry Cell Batteries:** Zinc chloride acts as moisture absorbent for the ammonium chloride electrolyte and as corrosion retardant for the cathodic zinc casing.
- ❖ **Organic Syntheses:** Zinc chloride absorbs readily on charcoal or silica for catalyzing acylations and alkylations by Friedel-Crafts synthesis. In esterifications and condensation reactions, zinc chloride facilitates the elimination of water or ammonia molecules from the reactants. One example is the Fischer idole synthesis.

### STANDARD ZINC CHLORIDE SOLUTION PROPERTIES

<b>SOLUTION GRADE</b>	<b>50%</b>	<b>62.5%</b>	<b>70°Be</b>	<b>72°Be</b>
Gravity, Baume units, 16 °C (60 °F)	53.3	65.05	70.2	72.3
ZnCl <sub>2</sub> % Min.	50.0	62.5	68.5	70.5
Sulfates as So <sub>3</sub> %	0.025	0.03	0.035	0.035
Total iron as Fe %	0.001	0.0015	0.0015	0.0015
NH <sub>4</sub> Cl %	0.10	0.1	0.1	0.1
Calcium as CaCl <sub>2</sub> %	0.035	0.045	0.05	0.05
Manganese as Mn %	0.002	0.0025	0.003	0.003
Clarity	Clear	Clear	Clear	Clear
Color	Water White	Water White	Water White	Water White
Basicity as ZnO %	0.05-0.15	0.05-0.15	0.05-0.15	0.05-0.15
Alkali-chlorides %	No test	0.625	no test	no test
TOC	Negligable	Negligable	0.0	0.0
Total Heavy Metals (Cd,Pb,Cu) %	0.001	0.001	0.001	0.001

### ZINC CHLORIDE, GRANULAR PROPERTIES

<b>Zinc Chloride (ZnCl<sub>2</sub>) water soluble %</b>	<b>&gt;97.0 minimum</b>
<b>Ammonia as ammonium chloride (NH<sub>4</sub>Cl) %</b>	1.0 Maximum
<b>Water insoluble matter (basic zinc chloride) as ZnO %</b>	1.0 Maximum
<b>Total iron as Fe ppm</b>	10
<b>Total heavy metals (Cd, Pb)</b>	20
<b>Color</b>	White
<b>Molecular weight</b>	136.28
<b>Melting point C</b>	318 °C 604 °F
<b>Boiling point 760 mm Hg (101.3 kPa)</b>	756 °C 1393 °F
<b>Density 25 °C (77 °F) g/cm<sup>3</sup> (Mg/m<sup>3</sup>)</b>	2.9 180 lb/ft <sup>3</sup>
<b>Solubility in water 25 °C (77 °F) g/100 g solution</b>	81
<b>Product Bulk Density Lb/ft<sup>3</sup></b>	loose 100 packed 110

\* The above tables give typical properties based on historical production performance. Zaclon LLC does not make any express or implied warranty that these products will continue to have these typical properties.

## **ULTRA PURE 999 ZINC CHLORIDE SOLUTION**

This grade has similar properties to our Standard grade but is purified to much stricter levels. On a solids basis it is 99.9% minimum purity, significantly surpassing the USP minimum of 97%. The level for other impurities is far lower than USP Specifications or our Standard Zinc Chloride Solution. More information in Zaclon's Ultra Pure 999 data sheet or from your Zaclon representative.

## **TECHNICAL GRADE ZINC CHLORIDE SOLUTION**

This grade is not as pure as our Standard and Ultra grades but is more cost effective and compatible with certain uses. Its properties are similar to the Standard Grade except for the following differences. It may be straw in color rather than water white. It may also contain up to 0.01% iron, up to 0.02% of fluorides and up to 0.6% TOC.

## **CUSTOM ZINC CHLORIDE PRODUCTS**

Zaclon offers a wide range of Zinc Chloride based products but is also willing to consider your individual needs and custom produce product with unique strengths, purity requirements, additives or other chemical components.

## **STORAGE AND HANDLING**

Metal drums of granular zinc chloride should be stored, tightly closed, in a warm 10-24 °C (50-75 °F) dry place, protected from direct sunlight. Because anhydrous zinc chloride readily absorbs moisture, an inventory turnover rate of about 2-3 months is recommended to minimize the possibility of caking. Drums of zinc chloride solutions should be stored with the bung at the top to minimize leakage, and drums should never be emptied by air pressure.

Heated storage may be necessary for 70 Baume Technical and 72 Baume Technical zinc chloride solutions to avoid freezing. These grades are also shipped in insulated tank cars equipped with steam coils. If the load freezes in transit, it can be thawed by connecting the plant steam line to the tank car coils. Freezing and thawing will not affect product quality.

## **MATERIALS OF CONSTRUCTION**

Caution should be exercised in selecting materials for use with zinc chlorides. Steel tanks are not satisfactory for storage of zinc chloride solutions. For storage at normal temperatures, rubber-lined steel tanks or fiberglass-reinforced polyester tanks are recommended. Small polyethylene or polypropylene tanks can also be used.

## **HEALTH HAZARDS**

Zinc Chloride is an acidic material and causes skin and eye burns. The principal hazard is to the eye, since even brief contact with zinc chloride in water may produce permanent damage. Deaths, in which severe damage occurred to the esophagus and pylorus, have been known to occur from swallowing zinc chloride.

The U.S. Department of Labor has ruled that an employee's exposure to zinc chloride fumes in any eight-hour work shift of a 40 hour week, shall not exceed a time weighted average of 1 mg/m<sup>3</sup> of air (29 CFR 1910.1000) Air Contaminants.

## **SAFETY PRECAUTIONS**

Do not get zinc chloride in eyes, on skin or clothing. Do not take it internally. Avoid inhaling mist, dust and fumes. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling.

Exposure of the eyes and skin can be minimized by wearing chemical safety goggles and rubber gloves. Additional protective equipment, such as transparent face shield, rubber gauntlets, rubber pants and jacket, and rubber shoes may be desirable where there is a high probability of contact with concentrated solutions of zinc chloride.

### **FIRST AID**

In the event of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes, while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

If inhaled, remove to fresh air immediately. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Call a physician.

If swallowed, give large quantities of water or milk. Do not induce vomiting. Call a physician. Never give anything by mouth to an unconscious person.

### **PACKAGES**

Zaclon LLC ships zinc chloride granular in plastic 55 lb. (25 kg.) bags, palletized 40 per pallet.

Zinc chloride solutions are shipped in tank cars, tank trucks and in non-returnable 30 gallon and 55 gallon polyethylene drums.

Zinc chloride granular is classified a corrosive material (UN 2331) by the Department of Transportation (DOT). Zinc chloride solution is classified a corrosive material (UN 1840) by DOT.

## **CONTACTING ZACLON LLC**

**For placing orders or requesting additional product information, please contact us as shown below.**

### **ON THE INTERNET: [www.zaclon.com](http://www.zaclon.com)**

Email Customer Service: [k.rosati@zaclon.com](mailto:k.rosati@zaclon.com)

### **BY PHONE:**

Toll Free In Continental U.S.: (800) 356-7327

From outside United States: (216) 271-1715

### **BY MAIL:**

Zaclon LLC

Customer Service

2981 Independence Road

Cleveland, Ohio 44115

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regulations, such as Hazardous Classification, Labeling, Food Use Clearances, Worker Exposure Limitations and Waste Disposal Procedures for the up-to-date requirements for the products described in this literature.

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