

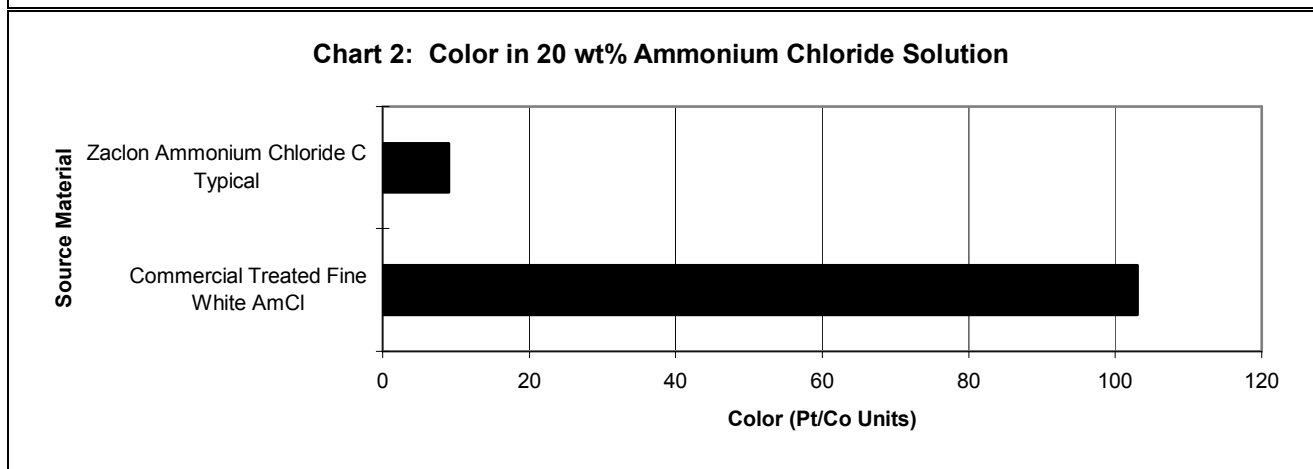
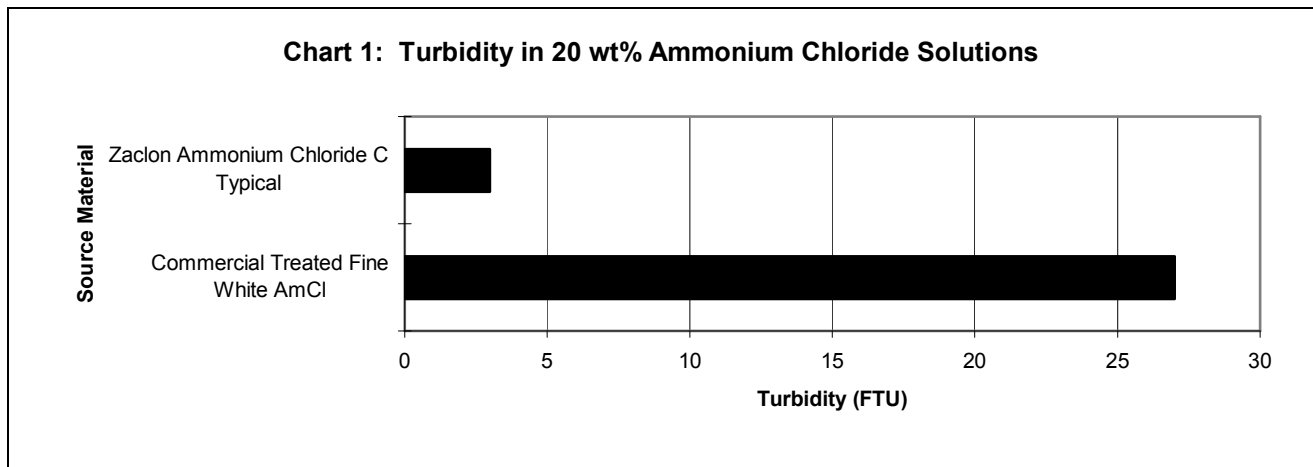
ZACLON LLC

AMMONIUM CHLORIDE, TECHNICAL

Ammonium chloride, (sal ammoniac, NH_4Cl) is available from Zaclon in two grades:

AMMONIUM CHLORIDE GRANULAR “C” is a high purity product which is naturally non-caking because of its unique particle size. These particles are 0.25 inch irregular nuggets, similar in size to rock salt. Because of the natural anti-caking properties of this size of granules, the product is chemically pure and is not treated with any anti-caking agent. Fine white ammonium chloride, with a particle size similar to table salt, requires treatment with anti-cakes to prevent rapid formation of hard-to-process chunks of caked material.

Unfortunately, anti-caking agents introduce unnecessary contaminants to galvanizing, plating, and other applications sensitive to impurities. These additives may cause difficulties in either performance and/or solution appearance and clarity. For example, the charts below show the clarity and color of solutions made up to 20% by weight with Zaclon Ammonium Chloride Granular “C” and a commercially available treated fine white Ammonium Chloride material.



As is clearly shown above, the turbidity and color of a solution made with commercially available fine white ammonium chloride are 10 times that of Zaclon’s Ammonium Chloride C. Clearer solutions have the advantage of appearing to be purer, and the lack of interference from the anti-cake agents will provide a larger variety formulation options and product applications, from fluxing agents and electroplating solutions to cleaner and sanitizer formulations.

The typical physical properties of Ammonium Chloride are listed below.

TABLE 1:**SPECIFICATIONS AND TYPICAL PROPERTIES ZAACLON AMMONIUM CHLORIDE "C"**

Property	Specification	Typical Analysis*
Ammonium Chloride (%)	99.0 minimum	99.6
Sulfates as SO ₃ (%)	0.10 maximum	0.04
Total Iron as Fe (%)	0.005 maximum	0.003
Moisture (%)	0.20 maximum	0.07

*This column gives typical properties based on historical production performance. Zaclon does not give any express or implied warranty that this product will continue to have these typical properties.

TABLE 2:**PHYSICAL PROPERTIES OF AMMONIUM CHLORIDE**

Appearance	White granular
Formula Weight	53.49
Specific Gravity at 20 °C	1.526
Melting Point	220 °C/428 °F
Sublimation Temperature	338 °C/640 °F
Solubility in Water (0 °C/32 °F)	29.7 g/100 ml
Solubility in Water (100 °C/212 °F)	75.8 g/100 ml

Due to the physical form of the Zaclon Ammonium Chloride Granular "C", dissolution in water is slightly slower than for an untreated material. Dissolution vs. treated material, however, is essentially the same.

TABLE 3:**DISSOLUTION TIMES OF AMMONIUM CHLORIDES**

Material	Time to Dissolve (minutes)
Commercial treated fine white Ammonium Chloride	21
Zaclon Ammonium Chloride Granular "C"	25

AMMONIUM CHLORIDE R TECHNICAL is a grade that consists of rough, large rod-shaped particles having a cross sectional diameter of 1/2 to 3/4 inch (1.2-1.9cm) and a length of 3/4 to 2 inches (1.9-5.1cm). When added to a top flux in a molten zinc bath, the rod-shaped particles immediately sink beneath the flux surface, thus reducing fuming. These large particles of ammonium chloride dissolve slowly and act as a reserve to keep the flux active for longer periods between additions. This results in better value-in-use versus finely divided ammonium chloride.

USES

The uses of ammonium chloride are many. Listed here are a very few applications.

A principal use of ammonium chloride from Zaclon has been as a fluxing agent for hot dip galvanizing of steel and in the refining of zinc. Ammonium chloride provides fluxing action by reacting with molten zinc to form a stable melt containing zinc chloride and ammonium chloride. The C and R grades are often used instead of formulated fluxes for their low cost and fast action. These grades are also used to rejuvenate flux blankets prepared with Zaclon* Galvanizing Fluxes. Unfortunately this will also generate higher levels of fume.

Other applications for ammonium chloride include electrolyte for plating baths and/or batteries; fertilizer, personal care product formulations, pharmaceuticals, and other applications where the anticaking agent can cause problems.

PERSONAL SAFETY AND FIRST AID

HEALTH HAZARDS

For normal industrial uses and with good hygienic practices, there are no known hazards with ammonium chloride. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends an 8-hour TLV®-TWA of 10 mg/m³ ammonium chloride fumes in air to prevent irritation of respiratory passages.

SAFETY PRECAUTIONS

Wash thoroughly after handling. The use of impervious or rubber gloves and chemical safety goggles are recommended.

FIRST AID

In case of eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

STORAGE AND HANDLING

Ammonium chloride granular is a dry, crystalline solid and presents no unusual handling problems. It should be stored in a clean, dry place away from strong alkalis or strong oxidants.

SHIPPING CONTAINERS

Zaclon ships ammonium chloride in 50 lb. (22.7 kg) plastic-lined, heat sealed paper bags. Ammonium chloride is not regulated as a hazardous material by the Department of Transportation.

CONTACTING ZACLON LLC

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

ON THE INTERNET: www.zaclon.com

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BY PHONE:

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

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Due to changing governmental regulations, such as those of the Department of Transportation, Department of Labor, U.S. Environmental Protection Agency and the Food and Drug Administration, references herein to governmental regulations may be superseded. You should consult and follow the current governmental 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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