



# DATA SHEET

## ZACLON® GALVANIZING FLUXES

A ZACLON® Galvanizing Flux is available from Zaclon, Inc. for every galvanizing operation. Various grades of ZACLON® Flux have been developed based on extensive experience in the manufacture of zinc ammonium chloride fluxes, ammonium chloride fluxes and pickling acids and their application in the galvanizing industry.

ZACLON® Galvanizing Fluxes provide the final cleaning step before the molten zinc kettle, protect steel and zinc against oxidation, reduce dross formation, minimize ammonium chloride fume losses and insure good galvanizing. They are economical and easy to use.

Table 1 summarizes the characteristics and versatility of ZACLON® fluxes. The broad range of flux grades permits galvanizers to optimize flux performance for different galvanizing applications such as:

- ◆ Aqueous preflux solution for hot dip applications.
- ◆ Aqueous preflux solution for continuous strip applications.
- ◆ Aqueous preflux solution for continuous wire line applications.
- ◆ Molten top flux for the galvanizing kettle.

Different levels of flux activity allow the selection of a ZACLON® flux to meet specific operational requirements:

High activity fluxes facilitate high quality galvanizing. These fluxes should be considered especially when base metal surfaces can be given only a minimal amount of surface preparation or are difficult to prepare for galvanizing. They are also more sensitive to excess drying or preheat temperatures.

Intermediate activity fluxes, the most common fluxes, will allow high quality galvanizing in applications where the base metal has been given adequate surface preparation. They are more stable to drying or preheating than high activity fluxes.

Low activity or minimal fuming fluxes will make good quality galvanizing possible after painstaking base metal surface preparation has been provided or when "easy to galvanize" work is processed. They are also much more stable to high preheating temperatures. Please note that when minimal fume galvanizing is required, the galvanizer must provide careful preparation of the base metal surface to compensate for the lower activity of these fluxes.

**NOTICE: ZACLON® GALVANIZING FLUXES CAUSE  
SKIN & EYE BURNS.**

**See PERSONAL SAFETY & FIRST AID**

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TABLE 1

## QUICK REFERENCE FOR ZACLON® GALVANIZING FLUXES

ZACLON FLUX	RECOMMENDED USE	PREHEATING MAXIMUM	ACTIVITY/SMOKE (Scale 0-10, 10 High)	AVAILABLE FORMS
Zaclon K	Preflux	300 °F	6/6	Granular, Solution
Zaclon F	Top Flux	300 °F	6/6	Granular, Rods, Solution
Zaclon CS	Preflux (w/Preheat)	350 °F	4/4	Granular, Solution
Zaclon 2N	Top Flux (adds Activity)	250 °F	8/8	Granular, Rods
Ammonium Chloride Granular	High Purity Activity	210 °F/100 °C	10/10	Granular, Rods, Solution
Zaclon W	Continuous Preflux	400 °F	3/3	Solution Flux
Zaclon W-HT	Continuous Preflux	600 °F	3/3	Solution Flux
High Speed Special	Continuous Terne/Tin Coat	400 °F	3/3	Solution Flux
High Speed Regular	Continuous Terne/Tin Coat	400 °F	3/3	Solution Flux
Zaclon AB	Ash Reduction	N/A	0/0	Fine Granular

The grades of ZACLON Flux offered are based on zinc ammonium chloride but differ in physical form, fluxing activity and additive content. Some grades used as molten top fluxes are available with and without foaming agents and at differing viscosities in use. Foaming top fluxes may offer benefits to the galvanizer such as energy conservation and reduced evolution of fumes or smoke. Also, several grades of ZACLON Flux provide a choice of physical form to accommodate specific needs which require either a small particle size or a larger rod shape.

## **THE GALVANIZING PROCESS**

Clean, oxide-free iron or steel is galvanized by coating it with a thin layer of zinc. This protects the iron or steel by shielding it from the atmosphere, as well as providing cathodic or sacrificial protection. Even if the zinc coating is scratched and the base metal is exposed, the more electronegative zinc is slowly consumed while the iron or steel base is protected.

The most important galvanizing method used is the hot dip process which is adaptable to the galvanizing of nearly all types of fabricated and non-fabricated products such as wire, tanks, sheets, strip, pipes and tubes, fittings, hardware, wire cloth, hollow ware, and structural assemblies.

Hot dip galvanizing consists of these fundamental steps:

1.       **Surface Preparation** -- The surface is cleaned, rinsed, pickled in acid, and rinsed to remove dirt, grease, rust and scale.
2.       **Prefluxing** -- The work is immersed in a 15 to 25 Baumé solution of ZACLON® galvanizing flux. It is coated with a layer of flux to dissolve light oxides that may have formed since pickling and also to protect against any further oxidation. This may then be dried and/or preheated in a furnace.
3.       **Galvanizing** -- Clean, oxide-free work is usually immersed through a molten layer of ZACLON galvanizing flux into the molten zinc. A thin coating of zinc is formed on the base metal.
4.       **Finishing** -- Excess zinc is removed; the piece is quenched and inspected.

## **GENERAL PURPOSE FLUXES**

### **ZACLON® K:**

- Is the preferred flux composition for “dry kettle” galvanizing, with the best balance of cleaning power and fuming available.
- Flux film tolerates preheating temperatures up to 300 °F without damage.
- Assures uniform zinc coverage and wetting in the galvanizing kettle.
- Is the highest purity zinc ammonium chloride available, with no additives for wetting or viscosity control.
- Produces a thin fluid top flux cover when added directly to the kettle as top flux.
- Is available in a variety of physical forms, including solution, fine powder, granulated and rod forms.
- Available also as Zaclon K-6, with a slightly lower ratio (0.6) for shops desiring a slightly more active preflux (eg. “Quadraflux” type materials)

### **ZACLON® F:**

- Is the basic galvanizing flux used for “wet kettle” galvanizing, though can be used for almost any galvanizing application.

- Improves prefluxing by faster activation of base metal and better dispersion of contaminants such as oils or lubricants which can nullify preflux action.
- Improves the drainage of preflux solution and promotes faster drying, increased productivity, and reduced flux consumption.
- Can be added directly to kettle top flux.
- Used as a preflux, it assures uniform zinc coverage and continuous activation of kettle top flux through carry over of preflux film on the work.
- Produces a top flux foam blanket which reduces fuming and zinc spatter; prolongs flux life and lowers energy requirements.
- Is available in a variety of physical forms, including fine powder, granular nuggets, and rod-form materials.

## ***LOWER ACTIVITY FLUXES***

### **ZACLON® CS:**

- A lower fuming granular flux originally formulated for use in an aqueous preflux in continuous sheet galvanizing.
- Has improved thermal stability over Zaclon F or K prefluxes—flux film can be dried and heated up to 375 F without damage to the flux layer.
- Improves prefluxing by faster activation of sheet and better dispersion of contaminants such as oils or lubricants which can nullify preflux action.
- Contains a wetting agent to assist with preflux drainage promoting faster drying and reduced flux consumption.
- Is particularly useful for wire and strand galvanizing applications.

### **ZACLON® W SOLUTION:**

- Is specifically formulated as an aqueous solution for use as a preflux in continuous sheet galvanizing.
- Solution form allows bulk storage and handling with automated additions possible.
- Contains a superior wetting system which levels out the coverage of preflux solution, improved drainage as sheet exits preflux bath resulting in faster drying, increased productivity and reduced flux consumption.
- Protects steel against oxidation at the higher preheat temperatures which are required in this process, up to 500 °F.
- Also available—Zaclon W-HT solution, for preheat stability up to 600 °F.

## ***HIGH ACTIVITY FLUXES***

### **ZACLON® 2N:**

- Provides the highest activity level top flux of any ZACLON® Flux.
- Can be used alone as top flux or for maintenance additions to another ZACLON® flux to improve fluxing activity.
- Produces a foam blanket which reduces fuming, zinc spatter and prolongs flux life.
- Is particularly useful in the rod form which melts slowly in the top flux blanket to significantly decrease fume evolution and minimize consumption. Zaclon 2N is also available in the granular and fine forms.
- Is also available in a Non-Foaming grade (2N NF) for certain applications.

#### **AMMONIUM CHLORIDE GRANULAR:**

- High purity ammonium chloride for adjusting activity of fluxes.
- Granulated form gives non-caking product without additives.
- Designed especially for galvanizing operations.

## ***SPECIAL PURPOSE FLUXES***

#### **ZACLON® Sulfate Control Flux:**

- Flux useful for operations with filtered preflux and sulfuric acid pickling.
- Similar activity to Zaclon K, but with additive to precipitate sulfate as it is carried into the tank.
- Will assist in control of sulfate-caused black mark defects.

#### **ZACLON® AB:**

- Can be used as an aqueous preflux, molten salt bath preflux, or top flux.
- Particularly useful for working of “ash” to remove zinc metal from the oxides.
- Provides a thin fluid top flux cover; useful for sealing and insulating kettle during extended downtime during the work day.
- Contains zinc chloride and potassium chloride, but no zinc ammonium chloride.

#### **ZACLON® Start Up Flux:**

- Is specially formulated to permit building an active zinc ammonium chloride top flux without generating excessive smoke.
- Produces a foam blanket which effectively suppresses fuming while a new top flux is being formed.
- Other foaming fluxes with more activity can be used for maintenance of the top flux after the blanket is first formed with Start-Up.

## PERSONAL SAFETY AND FIRST AID

### HEALTH HAZARDS

ZACLON® AB, Start-Up, and W Solution galvanizing fluxes are acidic materials and can cause severe skin or eye injury. The principal hazard is to the eye since even brief contact with the undiluted product may produce permanent damage. ZACLON® CS, F, K and 2N galvanizing fluxes cause skin and eye burns.

When ZACLON® fluxes are heated to high temperatures, irritating zinc chloride fumes and gaseous hydrogen chloride may be released. Severe exposures may cause pulmonary edema. Heating may also release zinc oxide fumes which may cause metal fume fever.

The U.S. Department of Labor (OSHA) has rules that an employee's exposure to zinc chloride fumes in any 8-hour shift of a 40-hour work week shall not exceed the 8-hour time-weighted average of 1 mg/m<sup>3</sup>. (29 CFR 1910.1000, Air Contaminants.)\* The limit for zinc oxide is 5 mg/m<sup>3</sup> and for hydrogen chloride, it is 5 PPM or 7mg/kg (ceiling).

### SAFETY PRECAUTIONS

All persons handling ZACLON® fluxes should avoid contact with the solid materials or solutions. Do not get in eyes, on skin or on clothing. Avoid breathing dusts, mists or fumes. Wash thoroughly after handling. Contaminated clothing should be washed before reuse. Adequate ventilation should be provided.

### FIRST AID

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

If dust, mists or fumes are inhaled, remove person to fresh air immediately and call a physician.

If ingested, administer large quantities of water or milk. Do not induce vomiting. Never give anything by mouth to an unconscious person.

### PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate equipment to prevent any possibility of eye contact or reasonable probability of skin contact, such as: chemical splash goggles, rubber gloves, boots and apron, long sleeve shirt and pants. If considerable contact is likely, wear impervious (rubber) clothing or acid suit. Neoprene or PVC are recommended for the rubber items and accessories. If air concentrations exceed exposure limits, use OSHA permissible respiratory equipment.

**IMPORTANT NOTE:** Due to changing governmental regulations, such as those of the Department of Transportation, Department of Labor and U.S. Environmental Protection Agency, references herein to governmental requirements may be superseded. You should consult and follow the current governmental regulations, such as Hazard Classification, Labeling, Worker Exposure Limitations, and Waste Disposal Procedures for the up-to-date requirements for the products described in this literature.

### SITE FACILITIES

The following safety facilities should be readily accessible in all areas where ZACLON® galvanizing fluxes are handled or stored.

Safety showers -- or water hoses connected to spigots with quick-opening valves which stay open.

Eye wash fountains -- or other means of washing the eyes with a gentle flow of filtered, tepid tap water.

### **STORAGE AND HANDLING**

All solid grades of ZACLON® galvanizing flux should be stored so as to avoid moisture pickup. The grades containing higher amounts of zinc chloride, such as ZACLON® AB and Start Up Flux should be stored in tightly closed containers in a dry place. An inventory turnover rate of 2-3 months is recommended to minimize caking.

Unheated solutions of ZACLON® flux slowly corrode steel. Rubber-lined steel tanks or fiber glass reinforced polyester tanks are recommended for storage.

### **SHIPPING CONTAINERS**

Zaclon Inc. ships ZACLON® CS, F, K, and 2N grades in 50 lb. (net) paper bags; ZACLON® F and K are also available in 55 gallon fiber drums. ZACLON® AB is shipped in 55 gallon steel drums and Start-Up in 35 or 55 gallon steel drums. Bulk solution shipments of certain grades are available. ZACLON® W solution is shipped in tank cars, tank trucks, 30 gallon and 55 gallon drums, as well as semi-bulk 250 gallon tote tanks.

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