


Amchem

Guide to the Surface Treatment of Metals

 **AMCHEM PRODUCTS, INC.**

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a  company

300 Brookside Avenue
Ambler, PA 19002

Form #5000 HP 8/86



Amchem

Pioneer and Leader in the development of corrosion prevention and prepaint metal treatments for industry

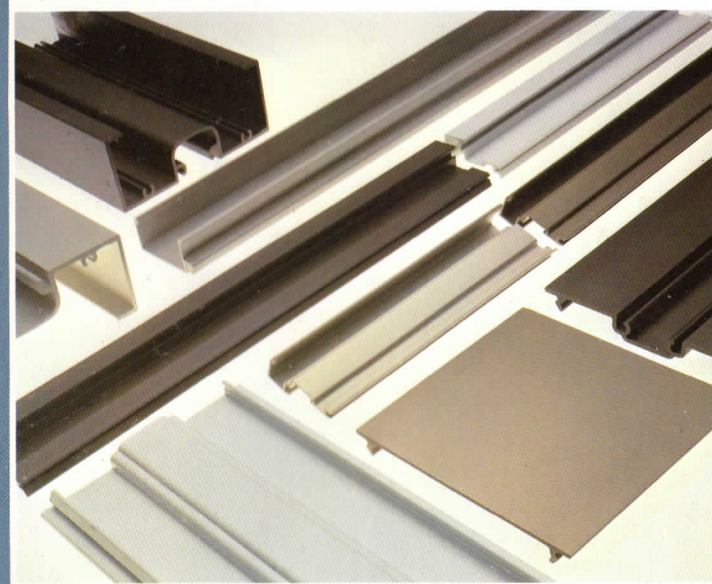


Amchem Products, Inc. was founded in 1914 as American Chemical Paint Co. Since then, Amchem has established a proven record of combining superior technology and customer service to solve problems for the metalworking and metalfinishing industries. Because of Amchem's experience and specialized knowledge in metal preparation, we have been awarded more than 800 different patents worldwide. Thanks to Amchem's innovative chemicals and processes, a wide variety of products have been made possible—from the first all-steel automobile bodies to the modern two-piece aluminum beer and beverage cans.

Today Amchem offers more than 600 products in its complete, practical line of treatments. These treatments will fight rust and corrosion on both painted and unpainted surfaces; control the effect of acids in steel mill pickling and industrial cleaning operations; enhance the cold forming of steel; clean metal surfaces; deposit an organic film on metal surfaces; and more.

Our product line also features the strong technological know-how and support of our parent company—Henkel KGaA of Düsseldorf, West Germany—a major multinational chemical company. With their assistance, Amchem has added Henkel's P3® paint coagulants, porcelain enameling cleaners, in-process cleaners and products for etching, coloring and sealing anodized aluminum to our product lines. Our extensive network of international licensees ensures that Amchem products are used throughout the world, while at the same time making state-of-the-art technology available to Amchem from all over the world.

But our reputation extends beyond pre-treatment chemicals and processes. Our problem-solving scientists and technicians work in modern laboratories that are equipped with the most up-to-date instruments available to assist them in thoroughly studying new products and inventions. And in our new Technical Center they can simulate most production pre-treatment processes; while our Product Testing facilities include all the equipment necessary to evaluate painted and unpainted metal surfaces. These dedicated people take special care to insure that the products and services we provide meet our customers' needs as effectively as possible.



Anodized and painted aluminum extrusions

Amchem scientist using scanning electron microscope



Technicians process aluminum extrusions on pilot anodizing line



Our Field Sales Representatives bring their superior training and knowledge to our customers' plants on a regular basis, providing the best advice and experience available to assist you in producing a quality finish at reasonable cost. Our Container Division sales-service personnel are dedicated to the specialized needs of the two-piece beer and beverage can industry, just as our Automotive Division personnel are dedicated solely to the needs of the automotive, farm implement, and off-road-vehicle industries. Additionally, coil and aluminum extrusion industry specialists in our Diversified Products Division enable Amchem to meet all the needs of its customers no matter where they are located.

Our unique Systems Services Department also provides a wide array of special services to our customers. The Lineguard Department develops, manufactures and services Amchem's own Lineguard® microprocessor-based process control systems to measure and control pre-treatment solutions and rinses; and the Engineering Services Department provides assistance in the design of new pretreatment systems or the modification of existing equipment.

ALUMINUM

PROCESS	AMCHEM CHEMICALS
Cleaning	Deoxidine, Ridoline, Ridosol
Etching	Aluminum Etchant, P3-almeco
Deoxidizing	Deoxidizer
Desmutting	P3-almeco
Preparation for painting, corrosion resistance or adhesive bonding	Alodine
Coloring anodized coatings	P3-almecolor
Sealing anodized coatings	P3-almeco seal
Lubricating	Accu-Draw
Paint Coagulants	P3-croni
Paint Stripper	Cold Stripper

BRASS, COPPER

PROCESS	AMCHEM CHEMICALS
Cleaning	Deoxidine, Ridoline, Ridosol
Acid cleaning/pickling inhibitor	Rodine

STEEL and GALVANIZED METAL

PROCESS	AMCHEM CHEMICALS
Acid cleaning/pickling inhibitor	Rodine
Cleaning (soil, scale, rust)	Deoxidine
Pre-Wipe	P3-T
Cleaning (soil)	Ridoline, Ridosol, P3-emalan
Surface Conditioner	Fixodine
Clean and phosphate coat	Prep-N-Cote
Phosphate coating (prepaint, prevent rust)	Granodine
Autodeposition	Autophoretic
Phosphate coating (for drawing)	Granodraw
Final Rinse	Deoxylyte
Copper coating (for drawing)	Cuprodine
Phosphate coating (friction)	Thermoil-Granodine
Lubricant (cold forming)	Granolube
Paint Coagulants	P3-croni
Paint Stripper	P3, Sno-Flake

STAINLESS STEEL

PROCESS	AMCHEM CHEMICALS
Cleaning	Deoxidine, Ridoline, Ridosol
Copper coating (drawing)	Cuprodine
Drawing and Extruding	Granodraw SS
Acid cleaning/pickling inhibitor	Rodine

Chemicals and Processes



Phosphophyllite crystals at 3000 x

Amchem cleaners and metal treatments are used to prepare metal surfaces for better corrosion resistance and paint adhesion. Without pretreatment, all metals tend to revert to their natural oxide states in a process commonly known as rusting or corroding. Steel, aluminum and zinc-coated steel are particularly susceptible. When rusting or corrosion occurs under a painted surface, the paint will blister or peel. Rusting and corrosion can also cause creepage under paint, or loss of paint beyond the damaged area.

Amchem pretreatment chemicals are formulated to convert the metal surface, through chemical reactions, into a more inert state that will protect against corrosion and provide improved paint adhesion. Our production-proved RIDOLINE® cleaners, ALODINE® and GRANODINE® conversion coating chemicals, and DEOXYLYTE® final rinses are used in multi-step spray or dip systems, that are correctly sized to prepare the wide variety of metal shapes that are painted.

Economical P3-T® neutral cleaners are used in two-stage in-process washers where cleaning and rust protection are required, as well as in pre-wash equipment or pre-wipe areas prior to a multi-stage pretreatment washer.

RIDOLINE acid and alkaline cleaners and RIDOSOL® solvent-detergent cleaner additives remove soils and lubricants. In fact, there is a RIDOLINE or RIDOSOL for every cleaning need—whether for dip or spray cleaning, heavy duty cleaning, or for etching or non-etching cleaning of aluminum, steel or zinc. Cleaning is critical to subsequent metal preparation steps. All soils must be removed so that a clean, water-break free surface remains to achieve maximum performance in the next step.



Amchem experts provide superior service

Painted panels racked for salt spray exposure



Automobile body being "built-to-last" with Amchem pretreatment

Amchem Deoxidizer effectively removes oxide and smut from aluminum surfaces before conversion coating and adhesive bonding. Amchem supplies specific Deoxidizers for either low or high copper-bearing alloys.

FIXODINE® surface conditioners are used after cleaning steel, and just prior to conversion coating with GRANODINE chemicals to promote uniform, tight and fine-grained zinc phosphate coatings.

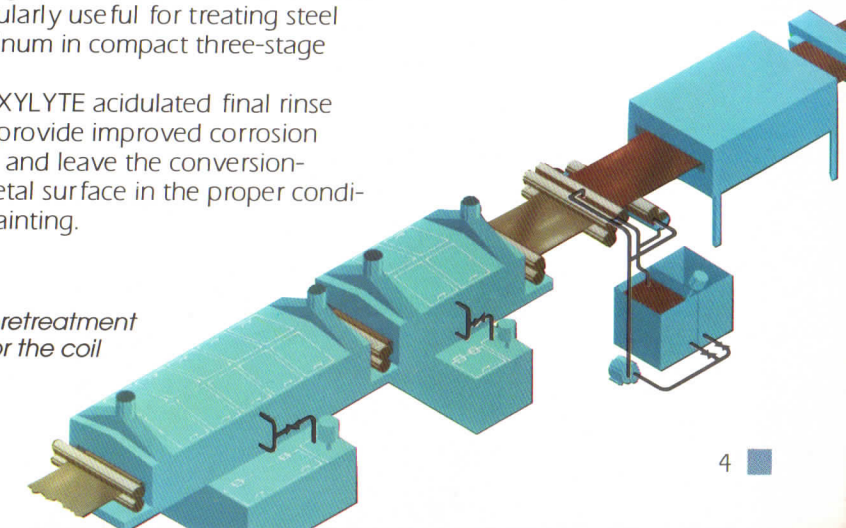
ALODINE chrome and non-chrome chemicals produce an amorphous conversion coating on aluminum which is both very thin and very light in weight. The chemical reaction which occurs between the dilute ALODINE coating chemical solution and the aluminum surface produces this thin, inert coating, which greatly reduces the tendency for corrosion beneath the paint film. Aluminum is easily and economically treated with ALODINE and also exhibits the superior unpainted corrosion resistance required by MIL-C-5541C.

When applied, production-proved GRANODINE zinc phosphate chemicals react with a metal surface to form a crystalline conversion coating on steel and zinc-coated metals. This inert layer is integral with the metal surface and reduces corrosion under paint films while providing an effective "tooth" that improves paint adhesion. There are also other GRANODINE chemicals which form amorphous iron phosphate conversion coatings on steel that meet other corrosion and paint adhesion needs.

Amchem PREP-N-COTE® products combine cleaning and iron phosphating in one package. These dual-action chemicals are particularly useful for treating steel and aluminum in compact three-stage washers.

DEOXYLYTE acidulated final rinse additives provide improved corrosion resistance and leave the conversion-coated metal surface in the proper condition for painting.

No-rinse pretreatment process for the coil industry



Other cost-effective, production-proven,
processing chemicals from Amchem:



Application of
Granodraw coating



GRANODRAW® conversion coating chemicals: Used to produce a heavy (600-2000 milligrams per ft²) zinc phosphate coating used in cold forming, extruding, and wire drawing operations. This heavy, crystalline zinc phosphate coating creates a barrier that prevents metal-to-metal contact between the workpiece and the die, and also provides a "tooth" to hold the forming lubricant in place.

RODINE® acid inhibitors: Used in industrial cleaning to drastically reduce the rate of attack of acid on metal surfaces, without altering the acid's ability to dissolve the undesirable deposits that are to be removed. Used in very small quantities, RODINE limits the attack of acid on base metal in steel mill pickling operations. Thus, both acid and metal are saved, but the proper pickling action is still permitted.

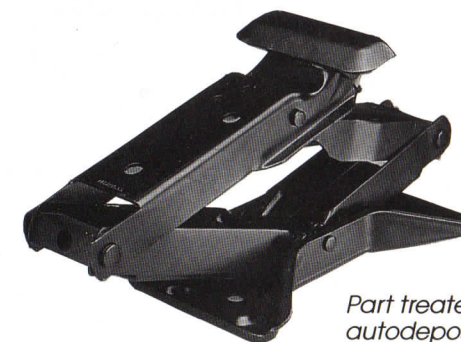
P3-ALMECOLOR® products: The industry standard in the two-step coloring of anodized aluminum. Colors ranging from pale champagne to black can be consistently and economically produced. Loss of ingredients to air oxidation and insolubility are minimized. P3-ALMECO® cleaners, desmutters, etch additives, seals and power supplies complete this extensive product line for the anodizer.

Drums being readied for
truck-load shipment



AUTOPHORETIC® coating chemicals:

These represent the most recent innovation in the long history of new products from Amchem. AUTOPHORETIC coating chemicals combine pretreatment and organic coating in one step and, after curing, produce a durable, attractive, highly corrosion resistant paint finish. The process of autodeposition does not require electric current like electrodeposition, and therefore does not have the throwing power limitations of electrodeposition. This advantage gives AUTOPHORETIC coating chemicals an exceptional ability to coat in crevices, as well as both inside and outside of tubing, even sharp edges—wherever the solution wets. When combined with the simplicity of equipment and ease of operation, AUTOPHORETIC coating chemicals are the painting process of the future.



Part treated by
autodeposition

Locations

HEADQUARTERS

Amchem Products, Inc.
300 Brookside Avenue
Ambler, PA 19002
Phone: 215/628-1000

SALES OFFICES

CANADIAN REGION

5955 Airport Road, Suite #322
Mississauga, ON L4V 1R9
Phone: 416/678-6115

MID-ATLANTIC REGION

300 Brookside Avenue
Ambler, PA 19002
Phone: 215/628-1125

MID-WEST REGION

475 A. R. Shuman Road, Suite #270
Naperville, IL 60566
Phone: 312/357-5894



*Amchem headquarters,
Ambler, PA*

PLAINS REGION

Brookhaven Office Park
2925 LBJ Freeway, Suite #240
Dallas, TX 75234
Phone: 214/247-6811

SOUTHERN REGION

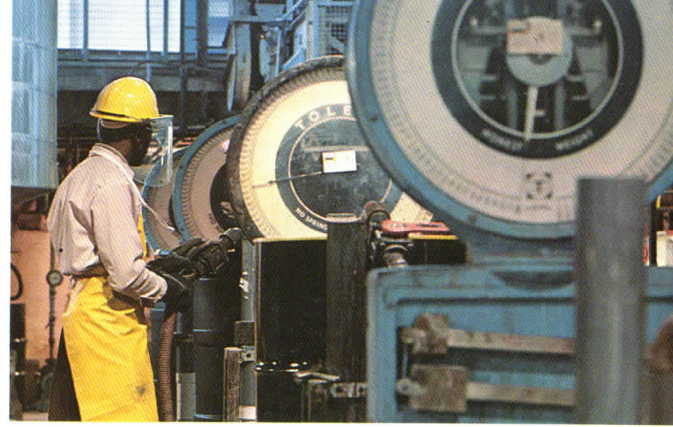
2187 LaVista Perimeter Office Park
Suite #17
Tucker, GA 30084
Phone: 404/939-7624

WESTERN REGION

37899 Niles Boulevard
P.O. Box 2698
Fremont, CA 94536
Phone: 415/797-1430

AUTOMOTIVE DIVISION

24175 Northwestern Highway
Suite #1
Southfield, MI 48075
Phone: 313/354-1711



MANUFACTURING FACILITIES

AMBLER PLANT

300 Brookside Avenue
Ambler, PA 19002
Phone: 215/628-1000

WARREN PLANT

23343 Sherwood
Warren, MI 48091
Phone: 313/759-5555

WINDSOR PLANT (CANADA)

2224 Walker Road
P.O. Box 2097
Windsor, ON N8Y 4R5
Phone: 313/965-2440

FREMONT PLANT

37899 Niles Boulevard
P.O. Box 2698
Fremont, CA 94536
Phone: 415/797-1430

WAREHOUSES

Atlanta, GA
Phone: 404/355-8805

Dallas, TX
Phone: 214/247-0373

Davenport, IA
Phone: 319/323-5423

Denver, CO
Phone: 303/371-8322

St. Louis, MO
Phone: 314/522-6270

Tampa, FL
Phone: 813/623-2646

Edmonton, AL
Phone: 403/425-1910

Vancouver, BC
Phone: 604/435-5531

WORLDWIDE LICENSEES:

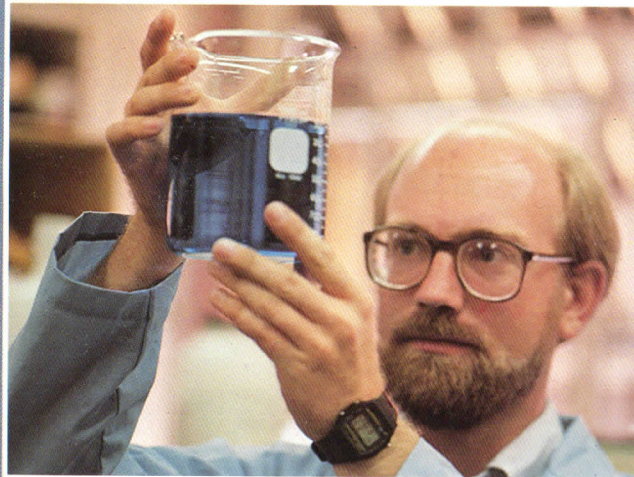
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Norway
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Switzerland
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Thailand
Turkey
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Venezuela



DISTRIBUTORS:

Chile
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Costa Rica
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Equador
Hong Kong
Panama
Peru
Puerto Rico

Specification Chemicals



Inhibitors, Pickling Acid

SPEC NO.	AMCHEM SPEC. CHEMICALS
MIL-I-17433	Rodine
O-1-501A	Rodine

Aeronautical Material Specifications

SPEC NO.	AMCHEM SPEC. CHEMICALS
AMS-2473 (SAE)	Alodine 1200, 1200S
AMS-2474 (SAE)	Alodine 600
AMS-2480A (SAE)	Granodine
AMS-2481B (SAE)	Thermoil-Granodine

Rust Removing and Metal Conditioning Chemicals

SPEC NO.	AMCHEM SPEC. CHEMICALS
MIL-M-10578	
Type I (Wash-off)	Special Deoxidine, Type I
TT-C-490	
Cleaning Method VI	Deoxidine

Metal Cleaning Chemicals

SPEC NO.	AMCHEM SPEC. CHEMICALS
MIL-C-490	(see TT-C-490)
P-C-436b	Ridoline 53
TT-C-490	
Method III	Ridoline/Ridosol
Method IV	Ridoline/Ridosol
Method VI	Deoxidine
USA 3-192	Ridoline 53

Phosphatizing, Rust-Proofing, Corrosion-Preventing and Paint-Bonding Chemicals

SPEC NO.	AMCHEM SPEC. CHEMICALS
MIL-C-490	(see TT-C-490)
MIL-C-5541	Alodine 600, 1000, 1200 Series, 1500
MIL-C-12968	(see MIL-P-16132)
MIL-C-17711	Granodine 90, 99, 108
MIL-C-46487	Granodine (Iron Phosphate)
MIL-P-16232	
Type M	Thermoil-Granodine
Type Z	Granodine 313
MIL-P-50002	
Type M	Thermoil-Granodine
Type Z	Granodine 313
MIL-S-5002	Alodine, Granodine, Thermoil-Granodine
MIL-STD-171	Alodine, Deoxidine, Granodine, Ridoline, Rodine, Thermoil-Granodine
MIL-STD-186	Alodine, Deoxidine, Granodine, Ridoline
MIL-STD-193	Alodine, Deoxidine, Granodine
MIL-STD-808	Alodine, Deoxidine, Granodine, Ridoline, Thermoil-Granodine
MIL-T-12879	
Type I (Pre-paint)	Granodine
Type II (Final Chromate)	Granodine 90, 99, 108
QQ-P-416	
Type II	Granodine 90, 99, 108
Type III	Granodine (Zinc Phosphate)
QQ-Z-325	
Type II	Granodine 90, 99, 108
Type III	Granodine (Zinc Phosphate)
TT-C-490	
Type I	Granodine (Zinc Phosphate)
Type II	Granodine (Iron Phosphate)
	Duridine, Durisol, Prep-N-Cote
USA 57-0-2	(see TT-C-490, MIL-P-16232)

ALODINE®
GRANODINE®
P3-CRONI®

ALUMINIUM ETCHANT
P3-T®

DEOXYLYTE®

final rinse additives

CUPRODINE®

RIDOSOL®

AUTOPHORETIC®

organic coating chemicals

Autophoretic Coating Chemicals

Liquid series of products for immersion application that uniformly build an organic film on steel surfaces. Time of immersion primarily controls film build without the use of electrical current. Coats all wetted parts including interior box sections and tubes. Provides superior physical performance and corrosion resistant properties including cut edges. Operate at extremely low

Autophoretic 700 Product Series

Cure at 160°-180°C with a VOC of 1.6 lbs./gal. Provides corrosion protection in excess of 500 hours salt spray exposure. Compatible with a variety of top coats. Has good UV and heat resistance. Excellent solvent resistance. Normal useful coating range 0.5 to 1.0 mils.

Autophoretic 800 Product Series

Cure at 100-115°C with zero VOC. Provides corrosion protection in excess of 1000 hours salt spray exposure. Compatible with a variety of low curing top coats. Low cure temperature permits processing of composite assemblies containing plastic/rubber components. Extremely hard film 5 to 6 H pencil hardness. Good solvent resistance. Normal useful coating range 0.4

RIDOLINE®

RIDOLINE®/FIXODINE®

P3-EMALAN®/P3-RIK®

P3-ALMECO®/P3-ALMECOLOR®

SNO-FLAKE™/SNO-SOL®

PREP-N-COTE®

GRANODRAW®

RODINE®

ACCU-DRAW™