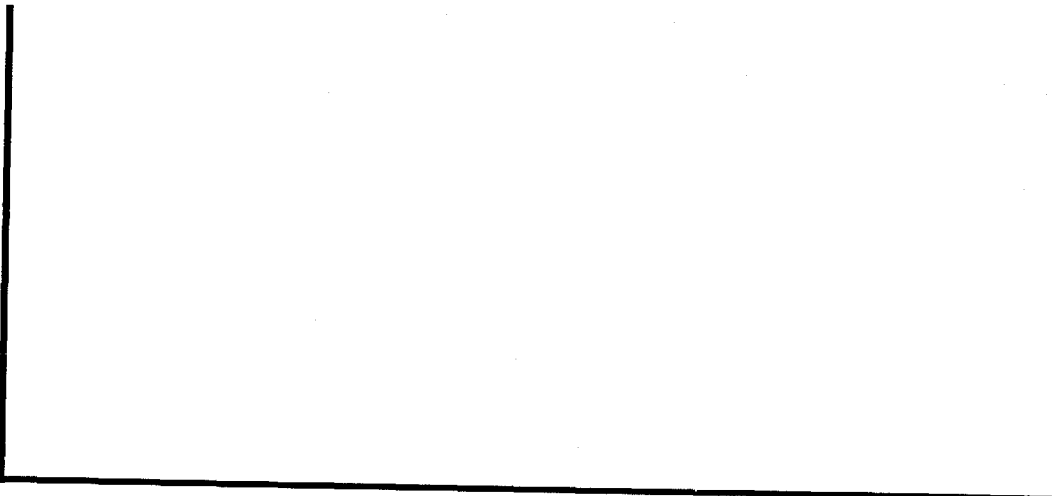




QUALITY PHOSPHATIZING GUIDE



FREMONT INDUSTRIES, INC.
Shakopee, Minnesota

QUALITY PHOSPHATIZING

PREPARATION OF METALS BY PHOSPHATIZING

Phosphate coatings are produced on ferrous and non-ferrous metal surfaces and are composed of tiny crystals of iron, zinc or manganese phosphates. The inorganic coatings produced on metal surfaces retard corrosion and promote better paint bonding. Phosphate coatings are produced after precleaning or formed in a combination bath known as cleaner-phosphate. Phosphate coatings are generally used by the metal finishing industry for the following reasons:

- 1) To provide a base for bonding organic finishes such as paints, lacquers, plastics, rubber, adhesives, etc.
- 2) To provide a base for oils, waxes and rust preventives to reduce metal corrosion.
- 3) To provide a base for lubricant on bearing surfaces to reduce friction.
- 4) To aid in drawing and forming of metals.

However, phosphate coatings are used primarily for the bonding of paint. Coatings produced on metal are not only stable and chemically inert toward organic finishes, but they are also absorptive and bind organic finishes to the metal. The most important aspect for use of a phosphate coating is to prevent or retard the spread of corrosion under paint including the areas near ruptured film.

I. THE CHEMICAL THEORY OF FILM FORMATION

Phosphate coatings consist of crystalline salts of the metal which is being treated and/or crystalline salts of metal ions added to the phosphatizing solution.

When the metal comes in contact with the phosphatizing solution, some pickling occurs which results in a reduction of acid concentration at the liquid-metal interface. At this point iron is dissolved, hydrogen is evolved, and phosphate coating is deposited. Should the solution contain additional metal ions such as zinc or manganese, phosphate coatings of these ions will also be deposited.

Accelerators such as nitrite, nitrate, chlorate, peroxide or special organic chemicals may be added to increase the rate of coating deposition.

In general, iron phosphate coating weights of 25-90 mg/ft² and zinc phosphate coating weights of 100-300 mg/ft² are commonly accepted as bases for paint bonding.

As with any good quality-metal finishing, proper selection of cleaner and phosphatizing compound requires careful consideration. For instance, an automated line and fixed line speed demand good cleaning in the shortest time possible to allow full use of the remaining time for phosphate coating formation. Poor cleaners tend to lessen the quality of phosphate coating and promote flash rusting, streaking, or powdering.

II. TYPES OF PHOSPHATE COATINGS

A. IRON PHOSPHATES

Iron phosphate coatings are usually derived from solutions which contain very little iron. They are produced on ferrous metals through the combined use of acid phosphate salts, free phosphoric acid plus accelerators. For non-ferrous metals such as aluminum or zinc, micro-etched surface is produced in place of iron phosphate coating formation.

1. Various Types of Compounds Available

a. Metal Conditioners

There are a number of metal conditioning products available as liquid concentrates. These products consist of phosphoric acid, grease cutting solvents and organic detergents in water. Some products may contain a small amount of acid fluoride or salt to enhance acid activity on aluminum or galvanized steel surfaces. Metal conditioning compounds are applied by wipe-on, dip, or spray with various concentrations at ambient temperature. In addition to use as paint bonding bases, metal conditioning products have the capability to remove rust, scale or weld flux deposits.

b. Iron Phosphate Compounds

There are two types of iron phosphate compounds in use today. First type is an iron phosphate that does not have cleaning capability and is used on previously cleaned metal surfaces. Second type is an iron phosphate that does clean and deposit iron phosphate coating in the same bath and is also known as cleaner-phosphate. Both types of iron phosphates are capable of depositing phosphate coating weights of 25-90 mg/ft².

Iron phosphate compounds are generally used at concentrations varying between 1.5 to 3.0% by volume for liquids or 2 to 4 oz./gal. for powders at temperatures ranging from 90 to 130°F in most spray applications. For immersion iron phosphatizing, 3.0 to 5.0% for liquids or 4 to 6 oz./gal. for powders at temperatures of 120 to 160°F is used. Iron phosphate coatings can be applied with high pressure spray wand equipment with 1.0% by volume of liquid cleaner phosphate for most large parts.

Major advantages of most iron phosphate compounds are that there is a minimum of sludge formation, ease of solution maintenance, no heavy metal disposal problem and economical to operate. Most good iron phosphate compounds meet the Federal Specification TT-C-490, Type II.

2. General Processing Data

Thorough understanding of available water for processing will help to minimize sludge formation in tanks and prolong tank life. Water should be analyzed for its hardness and dissolved solids in micromhos. For extremely hard waters, select alkaline cleaners or phosphate compounds with hard water stabilizers.

It will be especially important for phosphate compounds to have a hard water stabilizer system built in to minimize sludge formation as well as frequent operating pH adjustment for quality phosphate coating formation.

Operating pH will vary widely with type of phosphate compounds and some will favor pH range of 3.5 to 5.0, while others will favor 4.8 to 6.0. It is more economical to use pH adjustment acid concentrate than use of phosphate compound. pH will tend to rise in operation in most instances.

Proper selection of energy conserving alkaline cleaners or phosphate compounds will generate cost savings with BTU consumption, especially with spray washers. There are many fine proven low temperature cleaners, cleaner-phosphates and phosphates in use today.

Additional consideration should be given to handle metals properly. Generally, steels - cold rolled, hot rolled, hot rolled cold pickled and oiled or cast iron will not require special consideration for selection of alkaline cleaners. However, it will be important to select proper alkaline cleaners or phosphates to be able to handle aluminum, zinc, galvanneal, galvanized or terneplated steel to effect good cleaning and paint bonding. For mixed metal processing, the proper selection of cleaners and phosphates become of paramount importance. Likewise, type of paints employed such as high solids or powder coatings demand proper preparation of metal surfaces.

3. Iron Phosphate - Recirculation Spray Process

Three Stages: (Most widely used method.)

- a. Cleaner-Phosphate
1.5-3.0% by vol. (liquid) or
2-4 oz./gal. (powder)
90-130°F
60 sec. or time may vary with line speed
- b. Water Rinse
Overflow recommended
30 sec.
- c. Seal-Rinse
(Maintain suspended and dissolved solids low.)
Chromate - 70 to 130°F, 30 seconds
Non-Chromate - 100 to 160°F, 30 sec.

Force dry or dry-off oven is recommended to get rid of water to prepare them for painting.

Water quality for seal-rinse makeup can play an important role. Softened water is not recommended as it always contains some residual sodium chloride salt (corrosive). Deionized water is helpful to use, however, it is very corrosive to steel tanks, unless used with seal-rinse compounds. Hard waters with low to medium water hardness and dissolved solids are commonly used.

Five Stages: (Most efficient and economical method.)

- a. Alkaline Spray Cleaner
1.5-3.0% by vol. (liquid) or
1-2 oz./gal. (powder)
100-130°F
60 sec. or time may vary with line speed
- b. Water Rinse
(Monitor pH of rinse water periodically.)
Good overflow is recommended
30 sec.
- c. Phosphate
90-130°F
60 sec. or time may vary with line speed
- d. Water Rinse
Overflow
30 sec.
- e. Seal-Rinse
(Maintain suspended and dissolved solids low.)
Chromate - 70 to 130°F, 30 sec.
Non-Chromate - 100 to 160°F, 30 sec.

For E-coat system, additional stages to employ deionized water rinse as well as deionized halo mist rinse is required to prevent carryover of unwanted solids into paint tanks.

4. **Iron Phosphate - Immersion Process**

Three Stages:

- a. Cleaner-Phosphate
3.0-5.0% by vol. (liquid) or
4-6 oz./gal. (powder)
120-160°F
3-5 minutes
- b. Water Rinse
Overflow
30-60 sec.
- c. Seal-Rinse
(Maintain suspended and dissolved solids low.)
Chromate - 70 to 160°F, 30 sec.
Non-Chromate - 130 to 160°F, 30 sec.

Five Stages:

- a. Alkaline Soak Cleaner
5.0-7.0% by vol. (liquid) or
6-8 oz./gal. (powder)
130-160°F
5-10 min.
- b. Water Rinse
(Monitor pH of rinse water periodically.)
Good overflow is required
60 sec.
- c. Phosphate
1.5-3.0% by volume
2-5 min.
- d. Water Rinse
Overflow
30-60 sec.
- e. Seal-Rinse
(Maintain suspended and dissolved solids low.)
Chromate - 70 to 160°F, 30 sec.
Non-Chromate - 130 to 160°F, 30 sec.

Most alkaline soak cleaners are capable of removing oily soils, however, they find it difficult to remove particulate inorganic soils in a static water rinse. Employment of some form of spray water rinse will improve the uniformity of phosphate coating deposition drastically.

5. High Pressure Spray Wand Phosphatizing

Iron phosphate can be efficiently deposited with high pressure spray wand equipment with spray pressures ranging from 500-1500 psi at the nozzle by using quality liquid cleaner-phosphates.

Advanced technology in equipment design helped to produce spray wand equipment with a capability to generate instant temperature up to 185°F on demand with energy efficient operation. Use of downstream injector will positively deliver exact phosphatizing concentration to the nozzle and parts being cleaned and phosphatized simultaneously. Generally, 0.5-1.0% by volume of iron phosphate is used to prepare metals for good paint bonding.

B. ZINC PHOSPHATE

Fine grain zinc phosphate coatings are generally used for paint bonding and rust proofing purposes. Carefully controlled fine grain zinc phosphate coatings offer superior corrosion resistance than iron phosphate coatings in general. With ever increasing environmental regulations pertaining to disposal of rinse waters containing heavy metals and sludges, its popularity is confined to those large operations with elaborate waste treatment facilities.

Zinc phosphate coatings are produced on ferrous and non-ferrous metal surfaces in solutions prepared from compounded liquid concentrates. The liquid concentrate contain zinc-bearing salts and free phosphoric acid. They may also contain such accelerators as chlorate, nitrate, or organic compounds. Nitrite or peroxide can be added directly to working solution.

Certain zinc phosphate compounds may contain bivalent metal ions in order to refine the crystalline structure of the phosphate coating. Addition of fluoride or salts may be needed to promote coating deposition on non-ferrous metals.

1. General Processing Data for Zinc Phosphating

Zinc Phosphate - Spray Process

- a. Alkaline Spray Cleaner
1.5-3.0% by vol. (liquid) or
1-2 oz./gal. (powder)
120-140°F
60 sec.
- b. Water Rinse
(Monitor pH of rinse water periodically.)
Good overflow
- c. Zinc Phosphate
1.5-3.0% by volume
100-140°F
60-90 sec.
- d. Water Rinse
Overflow
30 sec.
- e. Seal-Rinse
Chromate - 70-130°F, 30 sec.
Non-Chromate - 100-140°F, 30 sec.

A minimum of 5 stages are used to obtain coating weights of 150-300 mg/ft², however, 7 stages or more are common for larger volume operations or E-coat paint systems.

Use of titanated cleaner or titanium grain refining conditioner is employed to speed up uniform zinc phosphate coating with fine grain structure.

Zinc Phosphate-Immersion Process

- a. Alkaline Soak Cleaner
6-8 oz./gal.
130-160°F
5-10 min.
- b. Water Rinse
Good overflow
60 sec.
(Monitor pH of rinse water periodically.)
- c. Zinc Phosphate
3.0-5.0% by volume
140-160°F
2-10 min. for paint bonding
15-30 min. for corrosion protection
- d. Water Rinse
Overflow
30 sec.
- e. Seal-Rinse
Chromate - 70-130°F, 30 sec.
Non-Chromate - 100-140°F, 30 sec.

Heavy crystalline zinc phosphate coatings of 1500-3000 mg/ft² can be obtained for use as a wear resistant, corrosion resistant or cold forming aid.

C. MANGANESE PHOSPHATE

Manganese phosphate coatings are produced on ferrous metals from baths which contain manganese bearing salts. The solution may also contain other metal ions as well as nitrate to promote crystal growth. Manganese coatings serve to resist wear and corrosion and are used as a cold forming aid. Manganese phosphate coatings are most commonly applied by immersion for periods ranging from 10-30 minutes.

III. SEALING OF PHOSPHATE COATINGS

A final and important step in the phosphating process is the sealing rinse. It is accomplished by using a dilute chromic acid solution, a chromic-phosphoric acid solution, a blend of chrome solution of hexavalent and trivalent chromium, or proprietary non-chromate compounds of inorganic or organic polymers. Concentrations are kept low as not to dissolve the coating. The primary function of seal-rinse is to passivate or seal areas of porosity around phosphate coating. Additionally, it is absorbed by the phosphate coating to enhance resistance to rusting by the formation of complex coating. Although many claims are made for non-chromate seal-rinse, it is as good as the chromic only on the basis of phosphate or paint coating specifically. Overall, chromic seal rinse cannot be matched for underfilm corrosion protection of paints in corrosive environment by non-chrome seal rinses.

As a good practice, irrespective of what type seal-rinse is used, elimination of corrosive salts or unreacted phosphate salts by using halo mist of clean water or deionized water will further improve corrosion resistance of all paint films, air dry, high solids bake, powder coatings or E-coat finish.

IV. SOLUTION CONTROL

Phosphatizing solution control is done by titration to determine true chemical concentration. Sometimes, additional tests are done to determine free acidity, total acidity, accelerator, activator, or iron concentration. pH of phosphatizing solution is extremely important. Use of automatic monitor/control units will automatically monitor a bath for various constituents and replenish the depleted ones to maintain the bath within the prespecified operating range.

Use of tote bulk-pac will minimize personnel handling of hazardous chemicals and eliminate drum disposal problem.

Record keeping solution chart or automatic solution concentration recorder will maintain uniform working solutions and aid in trouble shooting.

V. COATING QUALITY CONTROL

More or less, phosphate coating weights do not have a direct influence on the degree of corrosion resistance, paint adhesion, or salt spray hours. However, the type of phosphate coating, such as highly accelerated iron phosphate or heavy metal phosphate, has a direct influence over corrosion resistance or salt spray hours.

Some frequently performed tests are as follows:

1. Phosphate Coating Weight Determination per Gov. Spec. TT-C-490A.
2. Cross Hatch Test ASTM D-3359
3. Reverse Impact Test ASTM D-2794
4. Conical Mandrel Bend Test ASTM D-522
5. Relative Humidity Test ASTM D-1748
6. Water Immersion Test ASTM D-870
7. Salt Spray (Fog) Test ASTM B-117

PURPOSE		FORM	USE CONC. & TEMP.
ZINC PHOSPHATE (Meets Gov. Spec. TT-C-490C, Type I.)			
602 E.C. -620	Up-to-date fine textured zinc phosphate coating of controlled coating weight to suit modern paint technology for steel and electrogalvanized steel. 602 E.C. is a makeup and 620 is a replenisher.	Acidic Liquids	1.0-2.0% b.v. 130-140°
602M	602M is a single package calcium modified zinc phosphate that offers varying degrees of coating weights with operating parameters. Best suited for use with powder coatings on electrogalv. steel and steel.	Acidic Liquid	1.5-4.0% b.v. 120-140°F 3.0-5.0% b.v. 140-160°F
605	605 is best suited for dip tank operation for heavier coating weights.	Acidic Liquid	4.0-6.0% b.v. 180-190°F
604	Titanated conditioner promotes sprints for deposition of fine grained zinc phosphate coating uniformly at lower operating temperatures.	Alkaline Powder	1/2 oz./gal. (conditioning) 1-3 oz./gal. (cleaning and conditioning)
603-603L	Accelerators are used to control dissolved iron concentration to speed coating formation as well as suppress coarse crystal formation.	Alkaline Liquids	As needed to control iron.
213	Source of liquid caustic soda - controls free acidity or pH of effluent.	Alkaline Liquid	As needed to adjust free acidity or pH of effluent.
214	Source of soda ash - controls free acidity.	Alkaline Powder	As needed to adjust free acidity.
IRON PHOSPHATE (Meets Gov. Spec. TT-C-490C, Type II.)			
748-758	Improved paint adhesion and superior underfilm corrosion protection can be achieved with this class of super accelerated iron phosphate system. 758 is a bath makeup. Use as a single package or use with 748 pH control aid.	Acidic Liquids	2.0-4.0% b.v. 90-140°F pH 4.8-6.0
607	High tech phosphate that deposits higher phosphate coating weight and improved salt spray resistance.	Acidic Liquid	1.5-3.0% b.v. 90-140°F pH 3.8-4.8
738-738M	Iron phosphate with built in metal surface wetting capability to insure uniform deposition of coating for good paint bonding. 738M is a product with preneutralized free acidity to show proper operating pH.	Acidic Liquid	1.5-3.0% b.v. 90-130°F pH 3.0-4.5
CLEANER PHOSPHATE (Meets Gov. Spec. TT-C-490C, Type II.)			
607-CL	Combination cleaner-phosphate for use with limited number of stages. When used in 3 stages with a proper seal-rinse. 607-CL meets spec.	Acidic Liquid	1.0-2.0% b.v. 120-140°F pH 4.0-4.8

METHOD OF APPLICATION	METALS	COATING WEIGHTS	REMARKS
Spray 5-Stage Washer	Steel, Galv. Steel	100-300 mg/ft ²	Handles large volume of mixed metals predominantly steel and some electrogalvanized steel. Responds to titanated conditioner for developing tight fine grained phosphate coating.
Spray 5-Stage Washer Dip 5-Stage Dip Tank	Steel, Galv. Steel	150-300 mg/ft ²	Used with or without accelerator depending upon metal loads. 602M provides fine grained uniformly deposited coating at lower operating temperatures with 604.
Dip 5-Stage Dip Tank	Steel, Iron	Min. 1000 mg/ft ²	Rust preventive oil, wax, or corrosion specially colored paint can be used.
Spray or Dip	Steel		604 can be used with no precleaner for treating reasonably clean metals.
Spray	Steel		Strong oxidizing chemicals. 603L is concentrated then 603.
Spray or Dip			Caution should be exercised when neutralizing effluent containing zinc as it will precipitate severely in alkaline pH.
Spray or Dip			Slow acting but easier to handle. Avoids sharp ups and downs.
Spray 5-Stage Washer	Steel, Galv. Steel, Aluminum	50-80 mg/ft ²	Suitable for use with E-Coat System or Powder Coating. Use with Fremont chemical strength monitor/control system when combined with alkaline cleaners 765 or 752.
Spray 5-Stage Washer	Steel, Aluminum	40-80 mg/ft ²	Versatile product with wide operating temperatures and pH without sacrificing underfilm corrosion protection.
Spray 5-Stage Washer, Dip 5-Stage Washer	Steel, Zinc, Galv. Steel, Aluminum	25-40 mg/ft ²	General purpose iron phosphate that handles mixed metal loads including zinc and terneplated steel.
Spray 1 or 2-Stage Washer	Steel	30-40 mg/ft ²	Use in limited stages or water rinse . . . shows low level of chemical residues after dry off for good paint adhesion.

PURPOSE		FORM	USE CONC. & TEMP.
CLEANER PHOSPHATE (Meets Gov. Spec. TT-C-490C, Type II.)			
737-1	High Tech, highly built combination cleaner-phosphate that favorably competes against the powdered cleaner-phosphate. Extremely low sludging, lower operating concentration, and longer tank life is possible with use of 737-1.	Acidic Liquids	2.0-3.0% b.v. 110-130° F pH 3.5-4.8
727	Alternative product of 737-1 for those washers with limited rate of overflow in the inse stages. Lower operating temperature is possible with use of 727.	Acidic Liquid	2.0-4.0% b.v. 100-140° F pH 3.5-4.8
717	Versatile high concentrate liquid product that can be used in 3 or 5 stages and with or without Fremont chemical strength monitor/control system.	Acidic Liquid	2.0-3.0% b.v. 100-140° F pH 3.8-4.8
726	General purpose energy saving low temperature cleaner-phosphate for good cleaning while producing uniform phosphate coating.	Acidic Powder	2-4 oz./gal. 90-130° F pH 3.5-5.0
601	Versatile combination cleaner-phosphate that can be operated at wide temperature ranges of 90 - 160° F and pH of 3.5 - 4.8 while offering high coating weight.	Acidic Powder	2-4 oz./gal. 90-160° F pH 3.5-5.0
601P	Specially formulated product to handle most mixed metals especially aluminum and electrogalvanized steel. Handles extremely hard waters.	Acidic Powder	2-4 oz./gal. 90-130° F pH 3.5-4.8
342	Combination cleaner-phosphate with high cleaning power to handle oils, shop soils and light smuts while developing phosphate coating.	Acidic Powder	4-6 oz./gal. 130-150° F pH 3.5-4.5
342L	Combination cleaner-phosphate with high cleaning power to handle oils, shop soils and light smuts while developing phosphate coating. Suitable for use with Fremont chemical strength monitor/control system.	Acidic Liquid	3.0-5.0% b.v. 140-160° F pH 3.5-5.0
SPRAY WAND PHOSPHATE (Meets Gov. Spec. TT-C-490C, Type II.)			
631	Heavy duty, high active solids with sufficient free acidity to clean and phosphatize metals too large for dip or power washer spray machines. Good paint bonding base is formed with high efficiency spray wand phosphatizing equipment at very low operating cost.	Acidic Liquid	1.0-3.0% b.v. 100-180° F
626TP	High tech combination cleaner-phosphate that can be used on metals with or without water rinse.	Acidic Liquid	1.0-2.0% b.v. 100-180° F
608	True time tested one-step no rinse cleaner-phosphate with no sodium salt deposit when not rinsed for good protection.	Acidic Liquid	1.1-1.5% b.v. 120-180° F

SPRAY WAND EQUIPMENT

System 900	A machine designed from the floor up to meet the rigorous demands of the metal pretreatment industry. Fremont units feature our exclusive all stainless steel custom calibrated fixed orifice injection systems - nonadjustable for dependable and precise chemical metering. A total package source for high performance equipment custom designed for the metal finishing industry and performance matched phosphatizing chemicals.	Equipment	800 psi nozzle up to 180° F
System 1100		Equipment	1000 psi nozzle up to 180° F
System 1600		Equipment	1500 psi nozzle up to 180° F

METHOD OF APPLICATION	METALS	COATING WEIGHTS	REMARKS
Spray 3-Stage Washer	Steel, Zinc, Galv. Steel, Alumimun, Terneplated Steel	30 - 40 mg/ft ²	Exceptionally good degreaser and smut remover for phosphatizing cold rolled steel, hot rolled steel, galvanneal, electrogalvanized steel for powder coatings. Contains almost 50% of active phosphatizing solids.
Spray 3-Stage Washer	Steel, Galv. Steel	30 - 40 mg/ft ²	Good for use on heavy gauge metals at substantially low energy saving operating temperatures.
Spray 3 or 5-Stage Washer	Steel, Galv. Steel	30 - 40 mg/ft ²	When used in 5-stage operation, 717 will provide additional cleaning when the line speed is increased and contact time decreased.
Spray 3-Stage Washer	Steel, Galv. Steel, Terneplated Steel	30 - 45 mg/ft ²	Time tested true low temperature operating combination cleaner-phosphate without sacrificing cleaning power or quality of phosphate coating for good paint bonding on all types of metals.
Spray 3 or 5-Stage Washer	Steel	30 - 50 mg/ft ²	Removes smuts and resists flash rusting when operated at low operating pH and high operating temperature.
Spray 3 or 5-Stage Washer	Steel, Aluminum, Galv. Steel	30 - 50 mg/ft ²	Provides microetched surface for good paint bonding on aluminum. Buffered to resist pH shifts in hard water uses.
Dip 3-Stage Dip Tank	Steel	30 - 50 mg/ft ²	Appearance of coating improves when spray water rinse is employed.
Dip 3-Stage Dip Tank	Steel	30 - 60 mg/ft ²	Appearance of coating improves when spray water rinse is employed.
Spray Wand	Steel, Galv. Steel	25-35 mg/ft ²	Fremont Industries, Inc. has been producing many quality metal finishing chemicals since 1954. Although these products will perform with other trade equipment, they are most suited for use with fine line of Fremont Spray Wand Phosphatizing Equipment. Fremont products are developed from the ground level up through extensive testings...product performance and wet parts compatibility of equipment.
Spray Wand	Steel, Galv. Steel	25-35 mg/ft ²	
Spray Wand	Steel, Galv. Steel	25-35 mg/ft ²	
440,000 B.T.U. Burner Input	4 H.P.	4 G.P.M.	Available for use with natural gas/or liquid propane gas. Quality cleaning and phosphatizing demand instant generation of high heat. This ensures use of less chemicals and energy. Fremont spray wand phosphatizing machines inject chemicals into the heated high pressure stream, after the water has exited the coils through our patent pending injection system. IN-SERVICE DESCALER is available for use with pre-packaged 213-223 for hard water scale removal.
550,000 B.T.U. Burner Input	6 H.P.	5 G.P.M.	
550,000 B.T.U. Burner Input	7 1/2 H.P.	5 G.P.M.	

PURPOSE		FORM	USE CONC. & TEMP.
CHROMATE SEAL-RINSE			
343	Chromated seal-rinse for corrosion protection on painted parts for outdoor use. Filiorm corrosion protection can be best accomplished with use of chrome seal also.	Acidic Liquid	10 - 12 oz. / 100 gallons room temp. to 130° F
344	Chromate seal-rinse, especially suited for use on electrogalvanized steel after zinc phosphatizing.	Acidic	0.16% b.v.
RECYCLE-SEAL™			
	U.S. patented Fremont Recycle Seal™ System afford the use of chromated seal-rinse for best corrosion protection without generating hazardous waste for disposal.	Equipment	
NON-CHROMATE SEAL-RINSE			
745	Non-chromated seal-rinse to prevent flash rusting following phosphatizing.	Acidic Liquid	1-3 qt./100 gallons 130° F
719	Acidulated rinse to remove hard water residues and unreacted phosphatizing chemicals.	Acidic Liquid	Maintain pH 5.5-6.0 room temp. to 130° F
739	Non-chromated seal-rinse especially suited for use on non-ferrous metals to insure good paint adhesion.	Acidic Liquid	1-2 pt./100 gallons 130-160° F
742	Non-chromated seal-rinse to prevent flash rusting while removing unreacted phosphatizing chemicals with spray wand.	Acidic Liquid	1-4 pt./100 gallons 100-160° F
METAL PREP PRODUCTS			
71-72	Removes light rust and oxides, heat scale and oils from iron and steel while providing good paint bonding base.	Acidic Liquids	1 part product to 3-5 parts water unheated
329	Removes oxides and white rust - provides microetched surface on aluminum and galvanized steel for good paint adhesion.	Acidic Liquid	1 part product to 7-10 parts water unheated
ADDITIVES (PHOSPHATIZING)			
764	Added cleaning power is provided with addition of a small amount of super concentrated low foam organic detergent rather than increase of chemical concentration.	Neutral Liquid	0.1-1.0% b.v.90-160° F
3077	Maintenance of pH provides more uniform cleaning or powder free phosphate coating formation. Other benefits include better paint adhesion on non-ferrous metals, less sludge formation and longer tank solution life.	Acidic Liquid	

METHOD OF APPLICATION	METALS	COATING WEIGHTS	REMARKS
Spray, Dip	Steel, Galv. Steel, Aluminum		Predominantly made of hexavalent chromium that is best suited for use with patented Fremont Recycle Seal™ System.
Spray	Galv. Steel, Steel		Predominantly made of trivalent chromium that is very effective on zinc phosphatized galvanized steel.
A completely self-contained equipment supported with full analytical services and startup assistance for EPA compliance.			
Spray, Dip	Steel, Galv. Steel, Aluminum		Purpose of use of seal-rinse is to seal off bare spots in between phosphate coating while removing hard water salts and unreacted water soluble phosphatizing chemicals. Seal-rinse provides added corrosion protection to painted parts in most cases. Most paints favors slightly acidic or neutral surface for good dry paint adhesion.
Spray	Steel, Galv. Steel		
Spray	Iron Zinc, Galv. Steel, Aluminum		
Spray Wand	Steel, Galv. Steel		
Manual Swab or Dip	Steel	10-25 mg/ft ²	Good replacement approach to solvent degreasing for painting. Suited for treatment of small volume production.
Manual Swab or Dip	Aluminum, Galv. Steel, Stainless Steel	None, Micro-etch	Excellent choice for cold cleaning and micro-etching of aluminum sheet stocks and extrusions for chromate conversion coating with 3008.
Spray	All metals		Periodic addition of organic detergent restores depleted cleaning surface active agents especially for processing heavy work loads and varying soil conditions.
Spray, Dip	Steel, Galv. Steel Zinc, Aluminum, Terneplated Steel		Stabilizes varying source of water quality and conserves use of phosphatizing chemicals.

PURPOSE**FORM****USE CONC. & TEMP.****FREMONT PRODUCT STRENGTH MONITOR/CONTROL SYSTEMS**

Fremont automatic metering system is suitable for use with most all alkaline cleaners and liquid phosphating compounds that are used in 3 to 5 stage spray washers.

Fremont provides titration kits at no charge. No guess work or down time is possible with Fremont approach.

TOTE BULK-PAC PROGRAM

Another convenient way to avoid headache created by drum disposal. Provides better material handling.

Available in D.O.T. Approved 330 gallon capacity.

WASTE CONTROL

7067	Oil separation in spent phosphatizing solutions can be expedited by using 7067 clarifer. Pretesting is required per steam.	Liquid	Waste stream should be pretested via "Jar Mixer Tester."
212-216	pH adjuster-chrome reducer, 212-216 are fast acting chemicals for the treatment of chromate seal rinse and zinc in phosphatizing solutions. Works best when they are treated together in batch process.	Liquid Powder	Predetermine as per chrome concentration to be treated.
261-262	Coagulating aids for treated chrome and zinc.	Liquids	Predetermine as per chrome and zinc concentration to be coagulated.

CHROMATE CONVERSION COATING (3008-Approved under MIL-C-81706, Class IA, Form II. and Method C.)

3008	Excellent chromate conversion coating for use on aluminum and aluminum alloys for paint adhesion and corrosion protection to decorative finish. Listed in current QPL-81706-13.	Acidic Powder	1 oz./gal. with 1/4 - 1/2 oz./gal. Nitric Acid 70-90° F pH 1.60-2.10
3006-3007	Chromate phosphate conversion coating for use on aluminum extrusions as paint adhesion base. Chromic phosphate shows olive drab finish.	Acidic Liquids	2%b.v. 3007 and 1%b.v. 3006 in 1 gal. water. 100-110° F
369-1	Chromate conversion coating for magnesium alloys or zinc die castings. Works exceptionally good on Zamak #3.	Acidic Liquid	0.5%b.v. Unheated

TECHNICAL ASSISTANCE PROGRAM

Fremont commitment to quality products and service start immediately before and after installations.

Field Service	Technical sales representative works hand in hand with our metal finishing specialists, tech support groups, to keep you abreast with technical advancement in metal finishing field.		
Lab Service	Technical evaluation of phosphatized panels, unpainted or painted, are provided at no charge to our customers with minimum delay.		No long waiting period is required. Minimum delay is encouraged.
Training	Technical application seminars are provided upon special requests.		Training includes safe handling of chemicals, OSH, SARA, and other related topics.

**METHOD OF
APPLICATION****METALS****COATING
WEIGHTS****REMARKS**

Fremont Product Strength Monitor/Control Systems are capable of checking concentration and pH. Chemical metering systems restore previously set operating parameters automatically.

Waste Treatment
Tank

Waste Treatment
Tank

Each waste stream has to be pretested to determine suitability of Fremont chemicals. Fremont combination treatment is very simple and fast, not requiring heavy capital investment.

Waste Treatment
Tank

Dip Aluminum, Aluminum 40-60 mg/ft²
Alloys

3008 and MIL-C-81706 is applicable for use under MIL-C-5541D process specification.

Spray, Dip Aluminum Extrusions

Phosphate coatings or non-chromated conversion coatings cannot provide the comparable corrosion protection quality of chromate conversion coatings in most cases.

Dip Zinc, Zamak #3,
Magnesium

369-1 is an alternative process to Dow recommended process on magnesium alloys for paint adhesion.

Fremont metal finish testing laboratory is fully equipped to apply powder coatings, E-Coat (Electrodeposition coating) and wet paints as per specifications.

Laboratory service includes coating weight determinations, salt spray test or humidity test as per ASTM or others. Standard Q-panels and customer production stocks are used for the testing. (ACT panels are available upon request.)

Application training includes video, slides, or physical demonstration of parts treatment.