

Electroplating Interactive Brochure



AFT provides a wide variety of industrial electroplating applications for both commercial and government sectors. All processes are strictly inspected and performed in accordance per required specifications, with certifications available upon request. AFT has capabilities for high volume barrel plating for the fastener and screw industries, as well as rack plating for the production of most machined parts.

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E-mail us at sales@aft-corp.com or call us at 972-988-1999
with any questions or requests for quotes!



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Industrial Electroplating



Automated Finishing Technology, AFT, was established in 1984. Over the past several years, we have successfully grown to meet the increasing demand for our products and services. We operate one of the premier plating companies in North Texas.

AFT serves the entire spectrum of manufacturing, from small machine shops to large OEMs. We have a strong focus in providing services to the oil field industry, with our 2 E-Nickel high capacity production lines. We also produce Phosphate, Copper and Xylan coated parts which are commonly used in the petroleum industry.

Our products are then tested and spec verified with the latest fluorescent and X-ray equipment.

We operate with the most up to date processes, procedures and chemistries. This quality oriented approach insures that our customers receive the best product possible in the least amount of production turn time - every time.



Processes Available :

- Anodize
- Black Oxide
- Cadmium
- Chemical Film / Alodine / Iridite
- Copper
- Electroless Nickel
- Gold
- Nickel
- Passivate
- Tin
- Tin Matte
- Silver
- Xylan
- Zinc
- Zinc Nickel
- Zinc Phosphate

Production Quality and Capabilities

The manufacturing industry has a need for a wide variety of coatings to meet customers' needs. AFT provides over 16 QUALITY specified plating processes and has the capacity for small to heavy production capacities for a wide range of fulfillment purposes.

Customer service and quality are our highest priorities, and all processes are verified and guaranteed with specification sheets upon request.

Call or email us now for a quote and see how AFT can help you be your best!



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RoHS Directive

This directive was created to define the design phase restricting the use of hazardous materials. The RoHS Directive put forth by the European Union states that effective July 1, 2006 - new electrical and electronic equipment put on the market will not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

Applications

The RoHS Directive applies to most electronic products including:

- Automotive
- Large household appliances
- Lighting equipment
- IT and Telecommunications equipment
- Electrical and electronic tools
- Medical equipment
- Consumer electronics

Capability

AFT has implemented multiple compliant finishes that are now available and compliant with the RoHS Directive. All clear zinc is compliant with no special request required, and we also have the capability to process hex-free clear chemical film on aluminum.

Compliant Finishes

- | | |
|-----------------------|-----------------|
| • Clear zinc - Rack | • Bright nickel |
| • Clear zinc - barrel | • E-nickel |
| • Anodize | • Black oxide |
| • Chemical film | • Silver |
| • Tin | • Copper |
| • Yellow zinc | • Passivation |



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Anodize

Anodizing is an electrolytic passivation process used to increase the thickness of the natural oxide layer on the surface of metal parts. The process is called "anodizing" because the part to be treated forms the anode electrode of an electrical circuit. Anodic films are most commonly applied to protect aluminum alloys, although processes also exist for titanium, zinc, magnesium, niobium, and tantalum.

Anodization changes the microscopic texture of the surface and changes the crystal structure of the metal near the surface. Thick coatings are normally porous, so a sealing process is often needed to achieve corrosion resistance. Anodized aluminum surfaces, for example, are harder than aluminum but have low to moderate wear resistance that can be improved with increasing thickness or by applying suitable sealing substances.

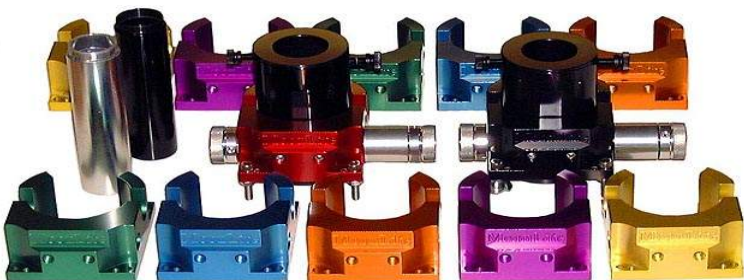
Benefits of Anodization

- Corrosion resistance
- Retains dyes and lubricants well
- Wear resistance
- Adheres well to many metals
- Incredibly hard coated surfaces
- Environmentally friendly

Anodization - Common Uses

- Provides great adhesion for glues and dyes
- Used for a number of cosmetic applications - near endless number of colors can be utilized
- Prevents galling of threaded components
- Commonly used for the enhancement and protection of aluminum

Specifications



- MIL - A - 8625
- Type II & III (Most colors available)
- 14' Tank



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Black Oxide

Black Oxide is a conversion coating created by a chemical reaction with the oxidizers and the metal to form an integral protective surface. Application to ferrous alloys and metals begins by oxidizing salts reacting with iron magnetite, the "black oxide" of iron. This reaction creates a fusion resulting in complete integration with the metal and alloy it protects, adding less than 5 to 10 millionths of an inch to the dimension of the surface. An oil, wax or other coating is applied after treatment to give additional corrosion protection.

Black oxide is commonly used in the aerospace industry for transmission and hydraulic systems, where the finish will be constantly coated with oil, or for other moving parts that cannot tolerate the dimensional change of a more corrosion resistant finish.

Advantages

- **Dimensional Stability** - Black Oxide success is due to its ability to give cosmetic appeal without affecting dimensional properties.
- **Versatility** - This process can be applied to many diverse metals including: carbon, alloy and stainless steels, copper, brass, bronze die cast zinc and cast iron.
- **Durability** - The finish will not chip, craze, peel or rub off. The only way to remove the finish is by mechanical or chemical means.
- **Protection** - Oxidized surfaces have an excellent ability to absorb oils, waxes, and lacquers. This enhances the appearance while protecting the treated metal or alloy.



Production Capacity

- High Volume Rack and Barrel
- Parts up to 7' or 84" in length
- Parts up to 2,000 lbs. in weight
- Available on alloys, stainless steel, copper and brass

Specifications

- MIL - STD - 13924D
- AMS - 2485G
- MIL - F - 495
- Can meet or exceed most private specs



Cadmium

Cadmium plating provides excellent paint adhesion properties and is more resistant to stripping than zinc plating. These properties influence the preference of Cadmium over zinc, particularly in the aerospace industry. Cadmium is also excellent for plating stainless steel for use with aluminum to prevent galvanic corrosion

Cadmium Plating is generally bright silvery-white in appearance. Type II supplemental treatments can produce an iridescent, black, yellow, amber or "olive drab" appearance. The Type II finish provides particularly good corrosion resistance. Certain special finishes, such as green dye or wax, can be applied to Cadmium plated items.

Advantages

- **Corrosion resistance** - Provides great resistance even at relatively low thickness and in salty environments.
- **Functionality** - Provides great lubricity and solder characteristics, often sought after in aerospace parts.
- **Foundation** - Provides an excellent base for paint.

Production Capacity

- High Volume Rack and Barrel
- Tight tolerance for aerospace specifications
- 4 hour and 23 hour baking capabilities
- 20 years of experience plating
- Available on alloys, stainless steel, copper and brass

Specifications

- QQ - P - 416F
- AMS - 2400
- Clear, Black, Yellow or "Olive Drab"
- Can meet or exceed most private specs



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Chemical Film - "Alodine"

Chemical Film or "Alodine" is a widely used plating for the protection of aluminum surfaces and is also known by the brand name Iridite. Chemical Film is a chemical process that produces a corrosion resistant and protective film on aluminum and aluminum alloys - with or without color. Darker coating usually provides the best protection and colors are classified as "clear" or "gold". The Classification per MIL - C - 5541 of the aluminum part is determined by the amount of exposure in the Chemical Film solution.

Qualified under specification MIL - DTL - 81706B, Class 1A, Form II, Method A, B, C; and under Class 3, Form II, Method C. The clear Iridite 14-2 finish also qualifies under Class 3, Form II, Method C of the same specification. Qualifies under Specification MIL - C - 5541E.

RoHS Compliance

AFT offers both traditional hexavalent Chemical Film and RoHS hex-free Chemical Film coatings. The process we use is the Iridite NCP, non chrome Passivate. This process has been developed in response to the ELV, RoHS and WEEE directives. The Iridite NCP does not contain lead, cadmium, chromium (hexavalent or trivalent), mercury or PBB/PBDE compounds. Iridite NCP is an environmentally friendly process that can be used as a final finish on aluminum as well as: paint base, high performance topcoat, powder coat, lacquers, or as a bonding base for rubber. Iridite is always clear.

Qualified under MIL - DTL - 81706B, Type 2B 1A, B&C and MIL - DTL - 5541F

Benefits of Chemical Film

- Conversion coatings are economical
- They are easy to use and offer a variety of valuable properties to extend the service life of parts
- Minimize surface oxidation of aluminum parts
- Very thin coats provide no dimensional change
- Great primer for paint adhesion and other topcoats



Chemistry and Production

- Production process tanks are 10' long x 2' wide x 4' deep
- Chemistry used for traditional hexavalent Chemical Film is MacDermid Iridite 14-2. Chemistry used for the RoHS non-chrome is MacDermid Iridite NCP chemistry.

Cyanide Copper

Copper plating provides good corrosion resistance when used as undercoat for other plated coatings. Copper finishes range from matte to very shiny, and there are several Copper plating processes available. Each process is designed for a specific purpose, ranging from decorative to heat treat stop-off.

Cyanide based bath chemistry produces a matte finish which is favored for its diffusion blocking character. It is also essential for plating on aluminum, steel and zinc - as it adheres well and minimizes immersion deposits. Cyanide Copper has excellent throwing power which leads to less thickness variations.

Aft has extensive experience in plating stainless steel, threaded parts for the petroleum industry - to reduce galling of stainless valves and parts.

Benefits of Copper

- Good diffusion barrier
- Excellent heat conductivity
- Important undercoat
- Outstanding electrical conductivity
- Adheres well to many substrates
- Easily polished
- Malleable

Copper - Common Uses

- Anti-galling on stainless steel threaded oil industry parts
- Underplating to enhance adhesion of deposits on other metals
- Improves electrical properties of products
- Impairs migration of alloying elements
- Improves overall corrosion resistance of products

Specifications

- MIL - C - 14550B



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Electroless Nickel - High Phosphorous

Electroless Nickel is an autocatalytic plating process that results in a reflective layer of nickel phosphorus. "E-Nickel" is chemically deposited, therefore the coating is uniform in thickness, making post machining unnecessary when dimensions are accurate.

Applications

E Nickel provides a corrosion, abrasion and wear resistant surface to protect machine components in many industrial environments.

- **Oil and Gas** - Valve components such as balls, gates, plugs and other components
- **Automation Equipment** - Wear resistant rollers and sorting equipment
- **Automotive Industry** - Heat sinks, shock absorbers, gears, cylinders and break pistons
- **Plastics** - Molds and dies for injecting and "low & blow" molding of plastics components, extruders and machine parts rollers

Advantages

- Excellent abrasion and corrosion resistance
- Uniform plating with no edge build up
- Excellent natural surface lubricity
- Ideal for tight tolerance work



Capabilities

- Rack and Barrel capacity
- 5 plating tanks and 2 plating lines
- Can apply to aluminum, stainless steel, brass, copper and steel
- Post bake operation - buildup capabilities .003 thick
- Masking capabilities

Specifications

Properties	Typical Value
Density	8.3g/cm ³
Phosphorous content	10-12%
Hardness (as plated)	41 - 46 RCH
Hardness (heat treated @750F for 1 hr)	61 - 66 RCH
Water resistance	12-18 TWI*
Water resistance (heat treated)	8-12 TWI*
Magnetic tendency	Non-Magnetic
Nitric Acid Test	Pass
Melting Point	1620 F

*TWI = Taber Wear Index is the weight loss in mg per 1000 cycles against CS10 wheels

- MIL - C - 26074
- AMS - 2404
- AMS - 2405
- ASTM - B - 733
- ISO - 4527
- X-Ray thickness measurement available
- AFT will meet or exceed most private specifications and standards

Nickel

Similar to stainless steel in color, Nickel can be deposited soft or hard, dull or bright, depending on the application process used. Nickel plating is often applied over copper and under cadmium for a decorative finish.

Bright Nickel plating is a highly reflective finish, thus the need for polishing is often eliminated. Bright Nickel is a very hard metal with relatively poor ductility. Therefore, parts should be bent into final shape before bright Nickel plating is applied, whenever possible.

Once the piece has been prepared it is immersed into an electrolyte solution and is used as the cathode. The nickel anode is dissolved into the electrolyte in form of nickel ions. The ions travel through the solution and deposit on the cathode.

Benefits of Nickel

- Decorative finish (bright Nickel)
- Wear resistant
- Tarnish resistant
- Good diffusion barrier
- Magnetic characteristics
- Suitable for either Rack or Barrel plating



Nickel - Common Uses

- Bright Nickel is great for fasteners and small with a decorative finish.
- Hand tools
- Household lighting and plumbing fixtures

Specifications

- QQ - N - 290A



Passivate

Passivation is the removal of exogenous iron or iron compounds from the surface of stainless steel by means of a chemical dissolution. Most typically it is a treatment with an acid solution that removes surface contamination but does not significantly affect the stainless steel itself. In addition, it also describes the chemical treatment of stainless steel with a mild oxidant, such as a nitric or citric acid solution, for the purpose of enhancing the spontaneous formation of the protective passive film.

In lay terms, the passivation process removes “free” iron contamination on the surface of stainless steel which is left behind after machining or fabrication. These contaminants are potential sites for premature corrosion and ultimately result in the deterioration of the component if not removed. In addition, the passivation process facilitates the formation of a thin, transparent oxide film that protects the stainless steel from selective oxidation (corrosion).

Advantages

- Surface rust removal
- Removes surface iron from machining process
- Enhances protective passive film

Production Capacity

- High volume Rack and Barrel
- Nitric acid passivation
- Citric acid passivation

Specifications

- QQ - P - 35C
- ASTM A380 - 99
- AMS STD - 753
- AFT will meet or exceed most private specifications and standards



Silver

In modern electroplating Silver is primarily used for industrial applications, particularly in electrical connectors.

Silver electroplate can be applied both in rack and barrel plating methods. Silver plating specifications will include matte, semi-bright or bright finishes with or without a chromate post treatment to improve tarnish resistance. Plating specifications also designate the base coating to be applied under the plating, such as copper.

Silver offers good corrosion resistance, depending on the base metal. Tarnishing happens frequently, but hardware can be sealed with an anti-tarnishing agent that will slow the process down noticeably. Silver is the best plating for electrical conductors. Silver also has excellent lubricity and smear characteristics for anti-galling uses on static seals and bushings.

Production Capabilities

- Rack and Barrel plating capacity
- Over 20 years producing high quality plating
- Especially proficient in Silver plating stainless steel parts for fast turn time
- Extremely competitive pricing based upon our experience and proficiency

Average turn time is 2-4 days after receipt of parts.

AFT offers the first minimum lot job *FREE* to new customers!!
Call us for more information on this great offer at 972-988-1999.

Specifications

- MIL - QQ - S - 365
 - Type I Silver plating - Matte
 - Type II Silver plating - Semi-Bright
 - Type III Silver plating - Bright
- Grades:
 - Grade A - with supplementary tarnish-resistant treatment
 - Grade B - without supplementary tarnish-resistant treatment
- Can meet or exceed private specifications
- Base metals to be plated:
 - Mild Steel
 - Stainless Steel
 - Copper
 - Aluminum
 - Brass
 - Bronze
 - Strip and Re-Plate of Electrical Parts



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Tin

Tin electroplating intended for engineering purposes is used for corrosion protection, to facilitate soldering, to improve antigalling characteristics and as a barrier stop in the nitriding of high strength steels. The color is a gray-white matte or a “bright” appearance, depending on the process used. Tin is soft and very ductile, but it is not recommended for low temperature applications.

Tin is RoHS compliant.

Production Capabilities

- High volume Rack finishing process
 - AFT builds custom designed tooling to ensure minimal product damage, resulting in a higher quality product.
 - Internal tooling also allows us to efficiently run high volumes and reduce turn times
- High volume Barrel finishing process
 - AFT also provides bulk processing for a more cost effective plating process.
 - We have had much success plating connectors, springs, stampings, brackets and fasteners in bulk
- AFT finishes are engineered to plate on aluminum, copper, stainless steel, steel, die cast and brass.

Specifications

- MIL - T - 10727C
- AMS 2408
- ASTM B 545





Xylan

Xylan is a waterborne /VOC compliant, resin bonded, thermally cured, single film dry lubricant. It is primarily intended for fasteners to prevent corrosion and facilitate makeup torque. Operating temperature range for continuous service ranges from -40 Degree F (-40 Degree C) to +360 Degree F (+180 Degree C) and can survive up to +450 Degree F (+232 Degree C) intermittently.

Xylan coating prevents leaks past thread - Pressure vessels, valves, pipe unions, storage tanks, reactors pipelines and other fluid containment equipment are often fitted with threaded plugs for inspection, pressure relief, filling or tapping. Coatings on pipe plugs not only improve their performance and reliability but also make them easier to use. A thin film of Xylan eliminates the PTFE tape normally wrapped around the threads to seal them. In addition, the corrosion protection and low-friction properties of the coating greatly reduce breakout torques, enabling users to remove the plugs at a later date without destroying them.

Make-up Torque

AFT's Fluoropolymer coatings have the lowest coefficient of friction of all known fastener coatings, which requires that make-up torque specifications be adjusted to compensate. You may see a reduction of make-up torque from 30 to 70 percent.

Benefits of Xylan

- Excellent Lubrication and controlled friction
- Wear resistant
- Heat resistant
- Excellent non-stick and release properties
- Corrosion protection
- Abundance of color selections for all applications



Specifications

Tensile Strength	-	4,000 - 5,000 psi
Coefficient of Friction	-	.15 - .35 static
Impact Strength	-	13 ft - lb / in
Use Temperature	-	-100°F to 500°F
Salt Spray Resistance	-	Excellent



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Zinc

Zinc plating is a soft decorative, corrosion resistant finish. Zinc protects the substrate by sacrificing itself, corroding before the base metal. This means that the galvanic layer of Zinc will protect even if the layer sustains minor damage, such as minor scratches and punctures.

The level of corrosion resistance of Zinc plating depends on the thickness of the coating layer. To increase this corrosion resistance of Zinc, a “chromate conversion” is usually added to deter the white colored oxidation products of Zinc.

Zinc plated products vary from one industry to another, however, they all share Zinc’s durable finish, pleasant appearance and cost effective processing.

RoHS Compliance

Zinc and Zinc alloy plating will surely become more significant as metals such as cadmium are phased out due to environmental regulations. Such sacrificial metals, such as Zinc, have significant corrosion resistant properties in spite of their apparent softness and propensity to scratching.

Benefits of Zinc Plating

- Zinc coatings are economical
- Protects even if slightly damaged on the surface
- Excellent modern substitute for less environmentally friendly cadmium coatings
- Great ductility and adhesion
- Consistent distribution
- Suitable for either Rack or Barrel plating



Specifications and Processes

- ASTM - B - 633
- Zinc Type I and II - any class
- Zinc Type I and II - stainless
- Chromates - Clear, yellow, black and olive drab

Zinc Nickel (RoHS)

Zinc Nickel plating provides over 1,000 hours of salt spray protection. Our RoHS compliant Zinc Nickel exceeds the protection of zinc and cadmium plating. Today in the industrial finishing industry there are higher standards and requirements for corrosion resistance, and we help you meet or exceed these standards.

These new standards for corrosion exceed the abilities of traditionally used finishes such as zinc and cadmium. AFT offers an alternative: our Zinc Nickel finishing process. This process outperforms conventional zinc plating. By producing a Zinc Nickel alloy, this outcome outlasts traditional zinc in corrosion resistance and protects for a longer period. Chromating produces a Zinc Nickel alloy chromate film that is rich in nickel, which increases the corrosion resistance of Zinc Nickel.

Zinc Nickel provides better corrosion resistance, making AFT's Zinc Nickel a perfect alternative to conventional zinc for any steel part intended for exterior use. Zinc Nickel provides the most economical corrosion protection available today.

Advantages

- WEEE, RoHS and EVL compliant trivalent passivation (Chrome 6 free)
- High thermal resistance (up to 200° C) makes it suitable for high temperature automotive applications.
- Superior Corrosion Resistance - protects the base metal for over 1000 hours to red dust
- Many of these features make Zinc Nickel an environmentally friendly alternative to cadmium plating

Specifications

- ASTM B841 - 99
- AMS - 2417
- Can meet or exceed most private specs



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Zinc Phosphate

In an effort to continually improve our production capabilities, we at AFT have recently brought a new high volume Zinc Phosphate plating system online. We now offer both Rack and bulk Barrel plating processes to meet your volume needs.

Our Zinc Phosphate coatings exceed the American Petroleum Institute specifications for coating weight, and they maintain a fine crystal structure that can hold oils and withstand handling. This ability to hold oils provides excellent corrosion resistant properties that make our coating especially suitable for the harsh environments found in the oil field and drilling industry. Our process also has anti-galling properties that are desirable on threaded products. Zinc Phosphate is very applicable in the automotive and other industries because of its corrosion resistant properties and ability to hold lubricants. It also provides an excellent paint base

Production Capabilities

- Rack parts up to 8' in length
- Six 500 lb rated Barrels enable fast turnaround for your high volume plating needs
- 4,000 lb overhead, semi-automatic electric hoist allows us to handle your heaviest parts

Chemistry

We have selected chemistry from MacDermid (Keykote 36), which is one of the most dependable and respected products in the plating industry

Specifications

- DOD - P - 16232
- MIL - STD - 171
- MIL - DTL - 16232
- TT - C - 490
- Halliburton Spec - 68.00107 Rev Q
- AFT will meet or exceed most private specifications and standards



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