**ENGINEERED SOLUTIONS IN SURFACE FINISHING**

**FINISH** | **METHOD** | **ROHS, ELV & REACH COMPLIANT?** | **APPEARANCE** | **SPECIFICATIONS** | **NOTES**
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Gold, Hard (Type I or II) | ☑️ | ☑️ | YES | Matte to Bright | MIL-6-45204, ASTM B488, AMS 2422, AMS 2425, ISO 27874 Type I (99.7%) or Type II (99.0%) per ASTM B488 and MIL-6-45204. Hard gold offers improved wear resistance for contact and interconnect applications.
Gold, Soft (Type III) | ☑️ | ☑️ | YES | Matte to Semibright | MIL-6-45204, ASTM B488, AMS 2422, AMS 2425, ISO 27874 Type III (99.9%) per ASTM B488 and MIL-6-45204. The highest purity gold for wire bonding, highly corrosive or biocompatibility applications.
Gold, Duplex (Type I or II and Type III) | ☑️ | ☑️ | YES | Matte to Semi-Bright | MIL-6-45204, ASTM B488, AMS 2422, AMS 2425, ISO 27874 An engineered, dual-layer of hard and soft gold used to reduce porosity and improve corrosion performance. Duplex gold can often reduce the overall amount of gold needed to meet porosity & corrosion test requirements.
Silver, Matte (Type I) | ☑️ | ☑️ | YES | Matte | QQ-N-365, ASTM B700, AMS 2140, AMS 2141, AMS 2142 99.9% pure, matte silver available with or without anti-tarnish (chromate) application. Type I silver provides the highest conductivity and purity required for high temperature applications. Type I silver is commonly used as a high temperature lubricant for bearings, bushings or anti-scuff on fasteners.
Silver, Semibright (Type 2) | ☑️ | ☑️ | YES | Semi-Bright | QQ-N-365, ASTM B700 Semibright silver available with or without anti-tarnish (chromate) application. Outstanding solderability, corrosion resistance, electrical & thermal conductivity, high temperature resistance and lubricity/antigalling.
Silver, Bright (Type 3) | ☑️ | ☑️ | YES | Bright | QQ-N-365, ASTM B700 Bright silver (as-plated) available with or without anti-tarnish (chromate) application. Provides the best hardness and wear resistance of silver types. Full bright white appearance with excellent solderability, corrosion resistance, electrical & thermal conductivity, lubricity/antigalling.
Nickel, Bright (Watts, Sulfate) | ☑️ | ☑️ | YES | Bright | ASTM B689, QQ-N-290, ISO 1458, AMS 2043, AMS 2423 Fully bright electrolytic nickel with moderate ductility. Bright nickel offers good corrosion resistance, conductivity, hardness and high temperature resistance. Bright nickel is commonly used as an underplate (diffusion barrier) where a high luster finish is desired.
Ducta-Bright 7™ Nickel | ☑️ | ☑️ | YES | Bright | ASTM B689, QQ-N-290, ISO 1458, AMS 2043, AMS 2423 A proprietary bright nickel system developed by APT for application on shell casings in the ammunition industry. The most ductile bright nickel system available today for any application involving crimping or flanging.
Nickel, Sulfamate | ☑️ | ☑️ | YES | Matte to Semibright | MIL-P-27418, ASTM B689, QQ-N-290, ISO 1458, AMS 2424, AMS 2403, AMS 2423 A high purity, ductile nickel deposit free of organic brighteners. Excellent for brazeing, soldering, welding or spaying bonding. More corrosion resistant than watts formulation. Sulfamate nickel is an outstanding underplate (diffusion barrier) where flanging or bonding is required.
Black Nickel (Tin/Nickel) | ☑️ | ☑️ | YES | Varies | MIL-P-18317 A fully conductive electrolytic black nickel that plates jet black when plated full bright, charcoal gray when plated semi-bright. Surface finish of raw part greatly influences finish color, luster and appearance.
Electroless Nickel (High Phosphorus) | ☑️ | ☑️ | YES | Matte to Semibright | MIL-C-26074E, ASTM B733, ISO 4527, AMS 2404 Excellent corrosion resistance, nonmagnetic, Rm 50-55 (as-plated), 75-67 (with heat treat), heavy build capabilities to 0.005 inches. High phosphorous electroless nickel is the most corrosion resistant all electrolytic or electroless nickels.
Electroless Nickel (Medium Phosphorus) | ☑️ | ☑️ | YES | Semibright to Bright | MIL-C-26074E, ASTM B733, ISO 4527, AMS 2404 Good corrosion performance, magnetic, Rm 55-65 (as-plated), 95-25 (with heat treat), heavy build capabilities to 0.002 inches.
Tacti-Black® Electroless Nickel | ☑️ | ☑️ | YES | Bright Black to Matte Grey | ASTM B734, ASTM B733, ISO 4527, AMS 2404 A proprietary black electrolytic nickel that offers the same engineering properties of electroless nickel with a fully conductive, black appearance. Medium phosphorus variety is Semibright to bright black, high phosphorus variety is Semibright to matte charcoal grey. Surface finish of raw part greatly influences finish color.
Copper | ☑️ | ☑️ | YES | Bright | ASTM B734, AMS 2418, MIL-C-14550 Acid and alkaline cyanide bath formulations. Heavy build capabilities to thicknesses 0.020” or more. Various as-plated deposit hardness available for specific project/budget applications.
Tin, Bright | ☑️ | ☑️ | YES | Bright | MIL-S-545, MIL-T-10727, AMS 2408 & ISO 2093 Good corrosion resistance and excellent deposit ductility commonly used for contact or interconnect conductor applications.
Tin, Matte | ☑️ | ☑️ | YES | Matte | MIL-S-545, MIL-T-10727, AMS 2408 & ISO 2093 A pure tin deposit free of organic brighteners. The best tin for soldering or bonding applications, often referred to as solderable tin.
Tin/Lead | ☑️ | ☑️ | NO | Matte | ASTM B579, MIL-F-81728, ASTM B200 95/5, 10/90, 90/10 & 60/40 formulations invented; custom tin/lead ratios available upon request. Heavy build and plate-to-gauge capabilities for babbitt applications within the bearing industry.
Tin/Copper/Lead | ☑️ | ☑️ | NO | Matte | Company Specific 9/2/90 formulation is an excellent babbitt material for plate-to-gauge bearing applications.
Lead | ☑️ | ☑️ | NO | Matte | MIL-L-13808, AMS 2414, ASTM B200 A pure lead deposit for severely corrosive environments including exposure to strong mineral acids. Battery, energy storage usage as well as heavy build and plate-to-gauge for bearing/bushing applications.
Powder Coating | ☑️ | ☑️ | Varies | MIL-PFR-24712 & Company Specific | APT specialists in demanding selective powder coating (masking) and high cosmetic powder paint applications. Chromating of aluminum/zinc is available to enhance corrosion performance.
Passivation, Commercial | ☑️ | ☑️ | N/A | QQ-P-35, ASTM A967, ASTM A380, AMS 2700 All methods of citric and nitric acid passivation provided at all temperature ranges including nitric formulations with sodium dichromate. Custom passivation solutions to unique company specifications available.
Passivation, AAA | ☑️ | ☑️ | N/A | QQ-P-35, ASTM A967, ASTM A380, AMS 2700 A specialized passivation method developed by CopperTech Technology specifically for the passivation of free machining stainless steels including 303, 416, 420F, 430F and 440F. Produces the most corrosion resistant surface of free machining stainless steel and prevents flash acid attack (rusting) of the passivated surface.
Passivation Precision (Mechcal) | ☑️ | ☑️ | N/A | QQ-P-35, ASTM A967, ASTM A380, AMS 2700 Delicate medium-grade passivation of medium to micro stainless steel, titanium and cobalt-chrome (IMPSN) components utilizing ultrasonic generation throughout the process. Up to five stages of ultrasonic cleaning, passivating and rinsing can be included providing an ultrasonic IPA (iso-propylene) final rinse.
Vapor Degreasing | ☑️ | ☑️ | N/A | N/A N/Pryol Bramde solvent for consistent, non-aqueous cleaning of components. Excellent at removing stamping and cutting oils from parts prior to heat treat to avoid discoloration and/or excessive scale formation.
Ultrasonic Cleaning | ☑️ | ☑️ | N/A | N/A Various frequency ultrasonic generators available with or without sweep. Cleaning in a range of cleaners or solvents including IPA (iso-propylene). Sealed nitrogen-filled packaging available.

**QUALITY SYSTEMS:**
- ISO 13485 & 9001 Certified, ITAR Registered, Type 10 Federal Firearms License, Numerous Corporate Approvals.

**VALUE ADDED SERVICES:**
- Selective plating and powder coating, heavy build plating, plate-to-gauge, PPAP, IQ, OQ & PQ Validations, inventory management, KANBAN, custom packaging, sealed nitrogen packaging (preserves finish), subassembly, and post-plating baking, post-plating corrosion inhibitors and rust preventatives (APT®H™).