

Metal Finishing Products



MIRALLOY is Industry's Most Cost-effective Alternative to Silver, Palladium, Nickel *Now available in a Cyanide-free Formula*

Miralloy is a family of electroplating processes for the deposition of alloy coatings of copper and tin or copper, tin and zinc. These advanced alloys deposit up to 15 μm with exceptional uniformity. Deposits are fine-grained, mirror-like and exceptionally resistant to abrasion and corrosion. They have excellent solderability, and high hardness value. Miralloy is tarnish-free, RoHS compliant, non-magnetic, non-allergenic and RF-friendly. Layers are ideal as final finishes, or as corrosion-resistant undercoats or intermediate layers.

Miralloy has earned widespread acceptance for use on HF connectors, contact elements, cooling coils and solder pins. Because it is nickel-free, this high-performing silver substitute is also an exceptional finish for jewelry and other decorative applications.



MIRALLOY 2844 is compatible with barrel and rack processing.

MIRALLOY 2851 was designed for rack processing.

MIRALLOY 2852 was designed for barrel processing.

New! Cyanide-free MIRALLOY 4840 was developed for barrel processing.

DIALLOY deposits a tin-zinc alloy in barrel or rack operation. By varying operating parameters, alloys ranging from 50% tin/50% zinc up to 90% tin and 10% zinc are possible.

Dialloy protects iron and iron alloys from corrosion. Deposits have high ductility, low porosity, good sliding properties, and are weldable. Dialloy layers can be lacquered, chromated or passivated using Cr6-free processes.

Electroless Nickels

ANP Electroless Nickel Plating for aluminum provides excellent adhesion through at least six MTOs. The process does not employ a strike and adds no additional steps compared to normal aluminum preparation double zincating. The ANP electroless nickel process combines Uyemura's lead and cadmium-free electroless nickel with proprietary cleaning, etching and zincating technologies.

NIMUDEN™ ANP 1012 electroless nickel plates nickel phosphorus alloys in the range of 10-12 weight percent phosphorus. This non-magnetic nickel finish has excellent wear resistance and low contact friction.

KTY Electroless Nickel is the world's first "heavy metal-free" electroless nickel.

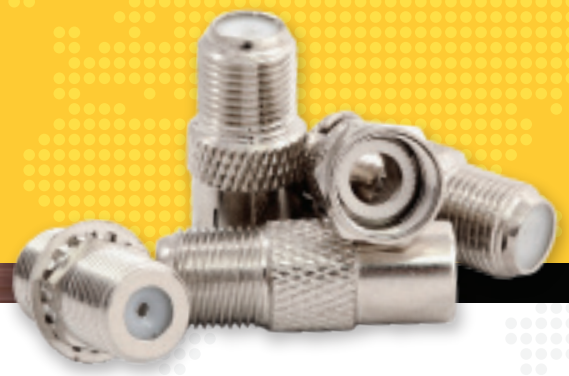
High Performance Decorative Finishes

CL Satin Nickel produces fine crystalline nickel deposits, even on polished base materials. Different color effects can be achieved with chrome, antique nickel, black nickel, black chrome and gold.

Electrolytic Palladium 457 produces high-gloss, low-porosity coatings that are bendable and crack-free, up to 3 μm . Excellent corrosion resistance; stable electrolyte has a wide operating range of current density.

PLATUNA N1 is an electrolytic platinum-ruthenium alloy electrolyte that produces ultra-bright, white deposits up to 1 μm . It is extremely resistant to abrasion and ideal for decorative use. Platuna N1 was designed for rack application and has a wide operating range.

RHODUNA Alloy is a galvanic deposit formulated from rhodium and ruthenium that delivers performance and whiteness equal to the highest quality rhodium coatings, with greater smoothness and durability. It was originally developed for wearable devices, and has exceptional salt spray resistance: the highest of any over-plate. It is ideal for long production runs.



Ruthuna 479 Black produces a deep, dark plated surface that closely resembles fine onyx.

BlackNight produces a deep black finish, with exceptional hardness, and dense topography. This is an entirely new film “shape” with extraordinary micro-uniformity and corrosion resistance.

BlackNight has been adapted to use an electroless nickel rather than an electroplated nickel underlayer and overplate. This allows the plating of complex part geometries with a uniform nickel thickness.

The BlackNight process uses a standard EN underplate followed by a thin mid phos electroless Ni-P deposit layer. This thin 5 micron electroless Ni-P overplate is a lead-free ELV, WEE and RoHS compliant layer that serves as both the seed layer and a topography matrix for the blackening deposit. A hardness of 600-80HV can be achieved.

Improved L values and low reflectance result from two factors: the deposited matrix that has been developed through use of a specific mid phos electroless Ni-P overplate, and a blackening agent electrolyte that uniformly etches, and deposits an Ni₂O₃-enriched surface.

Nickstar deposits a thin, highly uniform over-coat of black nickel-zinc alloy, preserving substrate brightness while producing a rich black nickel finish. The process is exceptionally versatile: A deposit thickness up to 2 micron can be achieved with rack or barrel. If a thicker deposit – or very high corrosion performance – is desired, a heavy nickel undercoat can be used. Greater hardness can be achieved with a salt additive. Color density, from darkest black to softer hues, can be modified using a hull cell.

Nickstar is well-suited for automotive interiors and for upscale sporting goods, where it diminishes glare and improves durability. It is also ideal for hardware, plumbing, architectural and other decorative uses.



Nicostar uses Nickstar chemistry as its base, and adds cobalt for enhanced hardness. Nicostar’s black nickel-cobalt-zinc alloy deposit preserves the brightness of the substrate. A nickel underplate can be used for enhanced corrosion protection.

High Performance Technical Finishes

ARGUNA 621 silver electrolyte deposits bright, very light white coatings without a blue cast. It has excellent throwing power, is carbonate-tolerant, and can be deposited over nickel without a silver strike. Arguna 621 is applicable over a wide current density range, and using both rack and barrel equipment.

ARGUNA 630 GAM is an alkaline hard silver electrolyte. Additives significantly increase wear resistance compared to conventional silver layers, achieving a stable hardness of 120 to 130 HV, even after thermal aging.

ARGUNA 630 GAM is ideal for electromechanical components exposed to high mechanical stress: its higher hardness and wear performance allows significantly more mating cycles. The reliability and durability of the contact systems is also increased. The finish has excellent electrical properties.

ARGUNA 630 is well suited for applications including connectors, high voltage contacts, and plug-in chargers for electric vehicles; it is compatible with continuous and rack and barrel processing.



Soft Gold Electrolytes

AURUNA 550 neutral electrolyte deposits pure gold coatings with a matte yellow appearance. It was engineered for use where lifting of fully aqueous resists is an issue and where excellent bondability and solderability are required.

Deposits exhibit excellent ductility, hardness below 90 HK25, and low contact resistance.

Auruna 550 deposits meet ASTM B488 Type III, Code A.



AURUNA 553 neutral fine gold electrolyte produces silk-matte coatings of exceptional ductility. Deposits are up to 200 µm; hardness is approximately 90 HV 0.01. Auruna 553 has excellent soldering and bonding properties and meets ASTM B488-01, Type III, Code B.

AuBEL Electroless Gold is the most stable electroless gold chemistry known.

AURUNA 5000 neutral electrolyte deposits 99.95 % pure gold coatings using standard rack plating equipment. The gold layers have a fine grained structure, and as-plated hardness of 70-85 HV 0.025. Auruna 5000 has excellent bondability and solderability; deposits meet the requirements of ASTM B-488-01, as type III, code A/B.

Hard Gold Electrolytes

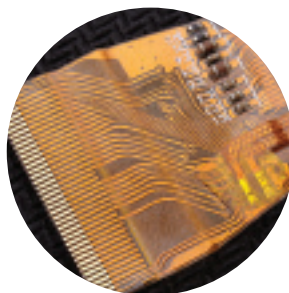
AURUNA 527 hard gold-nickel electrolyte minimizes gold consumption, delivers excellent throwing power in barrel plating operations.

Long-life bath is mildly acidic, highly stable and impurities-tolerant; low deposition speed facilitates good thickness distribution, particularly for hollow parts.

Coatings exhibit excellent abrasion resistance and low contact resistance. Gold content can be reduced from 4 g/to 2 g/l, to further reduce drag-out. Ideal for connector applications where masking is impractical.

AURUNA 528 hard gold-nickel electrolyte provides hardness of 150 HV 0.025. Solution can be run with high current density or reduced gold content; maximum coating thickness is 10 µm. Ideal for connectors, PCBs with sensitive resists, and decorative applications.

AURUNA 530 hard gold-cobalt electrolyte was developed for electrical contacts. Process provides high current efficiency, hardness of 170 HV 0.01. Bath is mildly acidic. Coating offers excellent abrasion resistance, with a maximum thickness of 5 µm.



AURUNA 539 LC mildly acidic electrolyte deposits bright hard gold at high speeds. Deposits have good corrosion and abrasion resistance and low, stable contact resistance. Bath maintenance is simplified. Primarily used as a gold strike electrolyte, or for barrel plating.

Nickel-Phos Electrolytes

The newest Niphos electrolyte generates a huge energy savings an EN replacement, and exhibits low internal stress.

NIPHOS® 968 for barrel plating was developed to plate steel rods in hydraulics and shock absorbers; nickel-phosphorus layers are combined with chromium as a final layer. This combination allows lower thicknesses of the chromium and dramatically improves wear properties of the complete system.

Connectors and High Corrosion-Resistant Alloys

PALLUNA ACF-100 palladium nickel electrolyte produces ductile, crack-free deposits that resist abrasion. With contact properties comparable to hard gold, it is a cost-effective option; the electrolyte deposits alloy coatings of approximately 80% Pd; hardness is 500-550 HV. ACF-100 is ideal for electrical contacts.

PALLUNA ACF-800 neutral pure palladium electrolyte plates directly on nickel or copper within a wide operating window. Most important, it solves the issue of palladium cracking.

ACF-800 is a certified crack-free, ammonia and chloride-free palladium electrolyte. Without ammonia, off-gassing ceases to be an issue, stability is high, and odor is non-existent. Ductile, ultra-bright deposits have a hardness of 280 HV. It is ideal for PCBs, contacts on plug-in cards, and smartcards.

KHW-NC is a neutral pH, semi-bright alkaline copper that plates directly onto aluminum, and aluminum alloys with less than 1% silicon. It eliminates the necessity of zincating prior to plating, and replaces the cyanide copper strike used prior to zinc die cast plating. Bond strength on all these substrates is sufficient to pass the standard Heat-Quench Test, ASTM B571. Its small grain size means deposits are dense, highly corrosion-resistant, and resistant to thermal shock.



KHW-NC is exceptionally versatile: deposit thickness will build with simple process adjustments. Making up the copper and conductivity salts at the low end of the range boosts throwing power and deposit uniformity. Making up the copper at the high end can reduce process time.

KHW-NC is an ideal under-plate for bright nickel / microcrack / chrome finishing. When used with a nickel barrier, it is also an excellent base for gold. Applications include bumpers, door handles, grills, and connectors; aircraft and other military applications.



Anti-tarnish Technology and Sealing

Sealing 691 is an aqueous nanotechnology process that preserves the brightness of gold, silver, copper and tin indefinitely, and allows substantial reductions in precious metal use. It also seals thin gold's inherent porosity more effectively than alternatives.

Engineered nanopolymers absorb on the metal surface, crosslinking to form an undetectable layer. By penetrating the grain structure, it prevents oxidation of the underlying nickel or copper, so when gold is applied, plated parts exhibit high levels of corrosion resistance.

691's proprietary organic molecule has a dwell time as short as 4 seconds. It is RoHS compliant, hypoallergenic, and well suited for high-end jewelry, handles, rivets and other decorative metal components. And while a layer of protection a few nanometers thick is what's most often specified, the use of current allows the building of a layer many molecules thick where desirable.

Sealing 691 leaves technical characteristics unaffected, so it has substantial advantages for electronic applications such as plug connectors.

Sealing 692 is a new, lower-cost anti-tarnish, with properties and performance similar to Sealing 691. The difference is it can be processed with straight immersion, with or without electrolytic deposition.

Anodes

MMO anodes have an electrocatalyst of precious and nonprecious metal oxide in sandwiched layers. They are dimensionally stable, with a low oxygen overvoltage. This results in lower consumption rates for both organic additives and energy. High current densities are achievable. MMO anodes have a long service life free of both anode sludge, and anode maintenance. They are suitable for a wide range of applications.

Platinized Titanium Anodes are manufactured using the world's most advanced anode manufacturing process.

The single-layer platinum electrocatalyst is plated in a molten bath for a service life for physicochemical, rather than mechanical, adhesion, and a service life substantially longer than clad anodes (which are prone to cracking) or traditional plated anodes (which are often plagued by microporosity).

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