

KOOL-BLAK[®] 225

Mid Temperature Black Oxide
Finish for Steel

Premium Grade

Deep Rich Black Oxide

Smut Free

No Boiling Caustic
Fumes

EPI[®]

Simply Superior!

KOOL-BLAK[®] 225

What is KOOL-BLAK 225?

KOOL-BLAK 225 is a chemical solution which converts the surface of ferrous metals to black iron oxide, Fe_3O_4 , magnetite. The black oxide penetrates the surface, becomes an integral part of the surface and provides for protection of the surfaces. Blackened parts retain their surface properties and dimensions.

Why Blacken?

Superior Corrosion Protection: Adds years of service life to parts and extends the shelf life of stored parts

Enhanced Durability: Does not chip, craze or peel

Anti-Galling: When it's necessary to break-in mating parts, the anti-galling surface sacrifices the lubricating layer of black during initial contact and abrasion while a work-hardened surface is formed

Reduced Friction: Oil based, post treatments not only protect against corrosion, but provide for smoother running of mating parts

Dimensional Stability: Blackening process produces essentially no dimensional change with only 5 to 10 millionths of an inch added to dimension, which means the blackened parts retain their surface properties with polished surfaces retaining their gloss and heat-treated parts retaining their Rockwell hardness. Tool integrity is preserved and critically sized parts can be finished

Pleasing Esthetic Appeal: Produces a pleasing decorative black finish which enhances the perceived quality of the part, improving the salability of the part

Reduces Annoying Glare: Alleviates painful eye fatigue

Improved Productivity and Economy: KOOL-BLAK 225 is a fast process which saves time and money versus painting or plating processes

Environmentally Friendly: Usually there are no metallic ions in the rinse waters which would require treatment. However, the use of stainless steel baskets or barrels may require monitoring of the chrome concentration. The only by-product of the blackening reaction is harmless soda ash (Sodium Carbonate). Some Sodium Hydroxide will be dragged out of the cleaning tanks and the blackening tanks into the rinse tanks, but the resulting pH is usually within regulated limits. If not, the pH may be reduced economically with dilute acid





Why KOOL-BLAK 225?

Providing Measurable Performance For:

- Saves on Energy Costs—Lower operating temperature than traditional hot black oxides (220-255°F)
- Saves money by using hydrochloric acid as an activator instead of proprietary activators
- Produces no smut on steel like other mid-temperature black oxides
- KOOL-BLAK produces a pleasing anthracite-black finish—the blackest of the black
- Provides safer working environment: No more boiling caustic fumes like traditional hot black oxide that runs at 285°F

Its unique rectifier eliminates the problem of colloidal red iron in the solution by flushing it to the surface where it is removed by being carried out on the work and then washed off in the rinse water. The rectified red iron may also be periodically removed from the solution by skimming.

This eliminates the increased energy consumption and frequent tank clean-out which results from the iron settling to the bottom of the tank. In addition, the rectifier eliminates contamination of the solution with zinc, copper and lead by combining with these metals so they are removed on a continuous basis.

KOOL-BLAK offers many advantages compared to painting, including:

- No dimensional change (paint builds up)
- Reduces handling of parts—many parts can be done in a rotating barrel
- No prime or precoat phosphate required
- No bake oven
- No volatile organic fumes
- Less equipment and less maintenance of equipment
- Less set-up time and less processing time for higher productivity
- Provides a Safer Work Environment – Blackening solution uses odorless, mild water-dilutable chemical. Eliminates boiling and caustic fumes
- Completely Versatile – Blackens a wide range of carbon steels including alloy steels and hardened tool steels
- Offers Dimensional Control – Completely eliminates smutty rub-off
- Meets Chemical Specification – MIL-DTL-13924D Class 1 and AMS 2485H

The Blackening Process

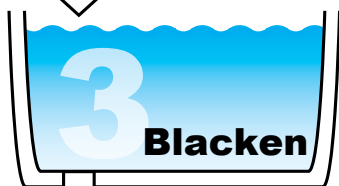
Pieces to be blackened may be processed in polypropylene, or stainless steel tumbling barrels, hung on racks or hooks, depending upon the shape, weight and production requirements.



Thoroughly clean and degrease pieces with E-Kleen SR-140-E hot (140°-150°F) soak cleaners. Typical cleaning time is only 5–10 minutes.



Rinse pieces in bottom-fed, overflowing cold water rinse for 60 seconds



50% by volume or E-Pik 215, 2#/gallon for 5-10 minutes.



Rinse in bottom-fed, overflowing cold water rinse.



Immerse in KOOL-BLAK 225 solution (220-255°F) until a uniform, deep black color is developed. Immersion time: 15-45 minutes, depending upon the mass of parts, type of steel alloy and condition of surface.



Rinse in bottom-fed, overflowing cold water rinse



Immerse for 1 minute in one of the following EPi products for your desired finish:

Oily Finish:	E-Tec 501
Soft Dry Film:	E-Tec 510
Hard, Dry Film:	E-LAQ 525



E-Tec™ Formulations Include:

E-Tec 501: A solvent-based formulation which produces very rapid water displacement to leave an oily, thin, transparent, corrosion-resistant film. It will not gum under high-humidity and high-temperature conditions. It is an excellent lubricant.

E-Tec 502: Same as 501 but leaves a lighter oil film.

E-Tec 503: Same as 501 but leaves a very slightly oily film.

E-Tec 504: Same as 501 but leaves a dry to the touch film.

E-Tec 505: A solvent-based water-displacing formulation which leaves a “dry-to-the-touch” ultra-thin film.

E-Tec 505+: An extra-heavy-duty version of E-Tec 505 which deposits a thicker film for maximum corrosion resistance.

E-Tec 510: A rust-preventive oil concentrate formulated with emulsifiers enabling it to be diluted with water to form a 2% to 20% oil-in-water emulsion—commonly called a “water-soluble oil.” The characteristics of the

deposited corrosion-inhibiting film can be varied from oily (20% by volume), slightly oily (10% by volume) to “dry-to-the-touch” non-tacky film at 2-5% by volume.

E-Tec 512: A “dry-to-the-touch,” extremely thin, waxy, water-soluble oil that provides superior corrosion resistance—80-150 hours salt spray over black oxide.

E-Tec 515: Same as 510 with a higher degree of corrosion resistance.

E-Tec 520: A clear acrylic lacquer.

E-Tec 521: A gloss wax emulsion used to deposit a semi-hard, clear, dry wax finish. Also available as **E-Tec 521-B** for a black finish.

E-Tec 522: A clear satin wax finish. Also available as **E-Tec 522-B** for a black finish.

E-LAQ 525: An acrylic lacquer designed to provide exceptional benefits for coating metal surfaces or blackened metals.

Other Black Oxide Formulations

Ultra-Blak 400-L (available in powder and liquid):

Ultra-Blak 400 is recommended for installations where the replenishment of blackening salt solutions is automated through a pump and liquid level- control system. It is also ideal for the initial charging of black oxide baths which will be replenished with the powdered Ultra-Blak 400. Liquid Ultra-Blak 400-L is dust-free and eliminates handling dry powder.

Ultra-Blak 404: The preferred oxidizing salt mixture for blackening cast iron and malleable iron, as well as some mild low-carbon steels. Concentration of 4.75 pounds per gallon of water at temperatures of 250° to 260°F.

Ultra-Blak 407 (available in powder and liquid):

Black oxide finish for stainless steels. Oxidizing salts used at 4.75 pounds per gallon of water at temperatures of 250° to 260°F. The finishes comply with military specification MIL-C-13924C, Class 4. The versatile solution may also be used to blacken malleable and cast iron, as well as some mild low-carbon steels.

Ultra-Blak 420: Oxidizing liquid is mixed together with 50% Sodium Hydroxide and water. The alkaline solution is used at a temperature of 140 - 200°F to blacken a wide range of copper, copper plated and copper alloyed surfaces.

Ultra-Blak 455: Black finish for cadmium and zinc. Liquid concentrate used at 25% by volume in water at temperatures of 120° to 160°F.

Ultra-Blak 460: A non-chromated black chemical conversion finish for diecast and plated zinc surfaces. Salts used at 6 to 8 ounces per gallon of water and temperatures of 150° to 170°F.

Ultra-Blak 466: Black chemical-conversion finish for nickel-plated surfaces. Liquid concentrate used at 25% by volume in water at temperatures of 160° to 180°F.

Ultra-Blak Rectifier: Additive for black oxide solutions to control the buildup of excessive red iron oxide and copper which cause off-colored reddish finishes. Liquid concentrate used at 0.5 to one ounce per gallon of oxide solution.

Insta-Blak 333: For blackening cold and hot rolled carbon steels, alloy steels, tool steels, as well as cast iron, forged steels and powdered metal. Used 10% by volume.

Insta-Blak SS-370: Acidic liquid concentrate which is used full-strength or diluted with water to blacken stainless steels by immersion or swab on.

Insta-Blak Z-360: Liquid concentrate is diluted with water and used at room temperature as a blackening solution for plated zinc and cadmium, zinc diecast and galvanized surfaces. Used 10% by volume.

The Brightest Name In The World Of Finishing

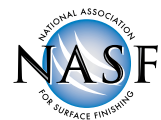
Founded in 1954, EPI is a name that is synonymous with plating and finishing excellence.

Our strides-ahead track record includes:

- **Insta-Blak 333**, a giant step forward in the room-temperature (cold) blackening for iron, steel and powdered metal. It produces a super-deep rich blackness and corrosion resistance equal to hot oxide blackening without smutty rub-off problems of ordinary room-temperature formulations.
- First with **E-Brite 30/30** alkaline non-cyanide copper, single-additive process for plating directly on steel, stainless steel, brass, zincated aluminum and high-quality zinc diecasting.
- **E-Brite 50/50**, a non-cyanide alkaline silver plating process.
- Development of **E-Brite 23-11R**, the first single-additive brightener for cyanide copper, in 1960.
- First with **E-Brite 767**, a bright, leveling single-additive nickel process, in 1960.
- First with a single-additive brass process in 1965 using the now famous **E-Brite B-150** brightener.
- Developed **Electrosolv™**, the finest addition agent on the market today for anode corrosion and bath stabilization in cyanide copper and brass.
- Developed **UltraBlak®**, the ultimate black oxide process.



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