

Ultra-Blak™ 460

Black Chemical Conversion Finish for Zinc

Ultra-Blak 460 is a non-chromated, dry chemical salt mixture used at 6 to 8 ounces per gallon of water. The mildly acidic solution is used at 150 to 180°F to produce a decorative and durable black finish on plated zinc, die cast zinc and galvanized surfaces.

Solution Make-up

Calculate the volume of the tank, leaving 6 inches free board. Determine the total pounds of salts required using 8 ounces per gallon. Fill the tank half full with cold water. Do not apply heat. **A full face shield, rubber gloves and rubber apron must be worn while mixing the solution.** Slowly add the salts to the water while thoroughly and continuously stirring the solution to avoid the formation of lumps. The salts should be added (sprinkled) over the entire surface of the water while stirring. When the total amount of salts has been added, the tank should be filled with water to within 6 inches of the top while stirring continuously.

Once the tank is filled, heat is applied and the solution is stirred to ensure a thorough mixing and a uniform temperature throughout. When the temperature reaches 150° to 180°F, the solution is ready for blackening work. Small periodic additions of water and replenishment salts to compensate for evaporation, drag-out and solution depletion will provide a continuous, trouble-free operation.

Replenishment salts are added as needed when the blackening reaction slows down. Operating the solution at the maximum recommended concentration (8 oz/gal.) and temperature (180°F) will produce a faster blackening reaction. Frequent small additions of replenishment salts will produce more uniform and more consistent results than large amounts added less frequently. This is also true for water replenishment to compensate for evaporation loss.

The temperature of the solution should be checked frequently with an accurate thermometer. Ideally, the temperature of the solution should not drop below 150°F when work is introduced. Sufficient heat should be maintained to ensure that the temperature of the solution does not drop below 150°F for more than a few minutes, even with the heaviest loads.

Finishing Procedure for Freshly Plated Zinc Surfaces

1. Rinse in bottom-fed, overflowing cold water rinse following plating.
2. Immerse for 10 to 30 seconds in a 0.5% by volume Nitric Acid solution to neutralize residual alkaline plating solution which would contaminate and shorten the working life of the **Ultra-Blak 460** solution.

3. Rinse in bottom-fed, overflowing cold water rinse.
4. Blacken by immersing parts, while still wet from preceding rinse in the **Ultra-Blak 460** solution (150°F to 180°F) until a uniform, deep black color is developed. Immersion times will range from 5 to 10 minutes, depending upon the concentration and temperature of the solution, the mass of the parts and the condition of the zinc surface.
5. Rinse in bottom-fed, overflowing cold water rinse.
6. To displace the rinse water, enhance the depth of black, impart corrosion resistance and seal the finish, immerse parts in **EPI's E-Tec 501** for an oily finish, **E-Tec 504** for a soft "dry to the touch" finish, **E-Tec 522** for a waxy finish or **E-Tec 520** for a hard, clear finish. The ultimate depth of black will not develop until a sealant is completely absorbed into the **Ultra-Blak 460** surface.

Finishing Procedure for Passive Zinc and Zinc Die Cast Surfaces

1. Thoroughly clean and degrease surfaces in a warm (120° to 150°F) solution of **EPI's E-Kleen 153** alkaline soak cleaner. Immersion times will range from 5 to 10 minutes. Zinc die cast surfaces will require longer immersions to ensure removal of surface oxides.
2. Rinse in bottom-fed, overflowing cold water rinse.
3. Activate the zinc surface with a 30 second to 2 minute immersion in a room temperature, 2 to 5% by volume Sulfuric Acid solution.
4. Rinse in bottom-fed, overflowing rinse.
5. Blacken and seal as in Steps 4, 5 and 6.

Solution Maintenance

The **Ultra-Blak 460** solution should be operated at its optimum concentration of 8 oz/gal. of water. Higher concentrations may lead to a build-up of white insoluble by-products.

The pH of the solution should be maintained between 5.5 and 6.5 by additions of Acetic Acid to lower the pH and additions of Ammonium Hydroxide to raise the pH. It is recommended that a gallon sample of the production bath be adjusted for pH to be used as a guide prior adjusting the entire production bath. The production bath will stop blackening at a pH above 7.0 and if the pH drops below 5.0 a non-adherent black finish will develop. A freshly prepared 8 oz/gal. solution of **Ultra-Blak 460** will have a pH of 5.7 whereas a 4 oz/gal. solution will have a pH of 5.62 and 16 oz/gal. solution a pH of 5.90.

The chemical strength of the **Ultra-Blak 460** working solution may be determined with the following titration procedure:

1. Pipette 5 ml sample of the **Ultra-Blak 460** production bath into a 250 ml Erlenmeyer flask.
2. Add 15 ml distilled water.
3. Add 10 ml saturated Potassium Ferrocyanide solution.
4. Add 8 drops Bromcresol Purple Indicator.
5. Add 1 tsp. Mannitol powder.
6. Add 10 to 15 drops Phenolphthalein Indicator. Swirl flask a few times.
7. Titrate with 0.1N Sodium Hydroxide to a bright pink endpoint.

Calculate: oz/gal. of Ultra-Blak 460 = ml of 0.1N NaOH x 0.485

Equipment

Pieces to be blackened may be processed in acid -resistant baskets, or tumbling barrels, hung on racks or hooks.

The **Ultra-Blak 460** tank should be constructed of stainless steel, rigid polypropylene, lined steel or other acid resistant material. Cleaning and rinse tanks may be constructed of mild steel, while acid pickling tanks should be plastic, rubber-lined or rigid polypropylene.

Gas heating units, underfired, may be used for heating solutions contained in stainless steel and mild steel tanks. These tanks should be insulated. Whenever lined steel, polypropylene and other acid resistant tanks are used for the **Ultra-Blak 460** solution, quartz electric immersion heaters are recommended. Non-ferrous metals such as galvanized iron, bronze, copper, tin or aluminum should not be used for racks or baskets as these materials will contaminate or deplete the **Ultra-Blak 460** solution.

Hot alkaline cleaning, acid pickling and the **Ultra-Blak 460** solutions should be exhausted. The duct work may be of the same materials as recommended above for the tanks.

Your **EPI** representative is available to assist you in selecting and installing the proper controls as well as the complete tank system required for the process.

Caution

The **Ultra-Blak 460** salt and solution are mildly acidic. Avoid contact with eyes, skin and clothing. When handling, wear goggles or face shield, protective gloves and aprons. Do not take internally. Do not mix the **Ultra-Blak 460** salts or solutions with alkaline materials or any other chemicals or materials. Do not work with **Ultra-Blak 460**, **E-Kleen** or **E-Tec** or other materials without first reading and understanding the **Safety Data Sheet** furnished by **EPI**.

Packaging

100 pound and 400 pound (net) non-returnable drums.

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The following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: seller's and manufacturer's only obligation shall be to replace such quantity of the product as proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. **Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental or consequential, arising out of the use or the inability to use the product.**

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