



PRODUCT INFORMATION

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MFC-009003H

MARTRON BLK10FE

1: DESCRIPTION

A hot black oxide process for steel, **Martron BLK10FE** converts outer micron of steel to black oxide passive phase for corrosion protection acting as a micro layer to hold corrosion inhibitors and oils.

Martron BLK10FE is the new standard against which all other black oxide processes will be compared for performance and quality. This formulation contains a unique blend of activators, rectifiers, catalysts, and penetrates designed to produce the darkest black available.

Martron BLK10FE unique formulation also allows the user to decrease the immersion without a sacrifice in quality. In fact, **Martron BLK10FE** is designed to minimize the common problem of red iron oxide adherence on to the work.

2: FEATURES AND BENEFITS

- Powdered Concentrate dilute to 6 lbs./gal. in water
- Economical dark black appearance
- Temperature 282° to 290°F
- Military Spec MIL C 13924, Mil C 46110 AMS 2485
- RoHS Compliant
- Excellent for paint adhesion
- Wear-in Break-in function
- Forms Magnetite Fe₃O₄
- No dimensional change
- No build up on threaded parts

3: TYPICAL APPLICATIONS

- Sporting Arms Gun Bluing
- Black Body heat absorption
- Optics, non-reflective
- Automotive
- Fasteners
- Hand Tools, Impact Tools

4: INSTRUCTIONS

Martron BLK10FE oxidizing salts are a free-flowing, dust-free granular mixture which is used at a concentration of 5-1/2 to 6 lbs. per gallon of water. The solution is operated at a low temperature of 280°F to 285°F to blacken a wide range of carbon steels, alloy steels and hardened tool steels. It will not blacken stainless steel or cast iron.

5: SOLUTION MAKEUP

Rectangular Tank – solution level 6" from top.

$$\text{Salt required for initial solution} = \frac{\text{L" x W" x (D"-6")} \times 5\text{-}1/2 \text{ lbs. per gallon}}{231 \text{ cubic inches per gallon}}$$

Compute the amount of salts required by using the above equation. Fill the tank a little less than half full with cold water. Do not apply heat at this time. Start adding the salts to the water with continuous stirring to avoid the formation of lumps. When the required amount of **Martron BLK10FE** salts has been added, continue to stir and fill the tank with water to within 6" from the top.

Heat is applied to the solution, and as the temperatures rises, it should be stirred frequently to ensure thorough mixing and a uniform temperature throughout. When the temperature reaches 270° - 280°F, it should begin to boil. If it does not, water should be added slowly until it begins to simmer. **Martron BLK10FE** is used as a supersaturated solution, and it should be allowed to boil for at least one hour before additional salt is added to ensure that the true boiling point has been reached with all of the salts thoroughly dissolved.

When the **Martron BLK10FE** solution is boiling a range of 280° - 285°F., it is ready for processing work. Although the temperature of the solution can be maintained by manually adding water, we recommend that an automatic indicating temperatures controller be used. The only reason for boiling point rise is due to the evaporation of water.

The automatic temperature controller will replenish this water as needed to maintain the correct boiling point and concentration. It will also protect against the undesirable and detrimental overheating of solution. An automatic controller also relieves the operator of the responsibility for maintaining the temperature; and it ensures consistent, uniform, high-quality finishes.

6: BATH MAKEUP

Do not introduce water below the surface of the solution. We recommend that an automatic indicating temperature controller and motor operated water inlet valve be used to safely control the additions of water. The automatic controller will replenish evaporated water as need to maintain the correct boiling temperature and concentration. It will also protect against the undesirable and detrimental overheating of the solution. Automating the water additions will relieve the operator of the responsibility for maintaining the temperature and ensures consistent, uniform, high-quality black finishes. **Martron Inc.** can supply the automated temperature controller and water inlet valve with the preferred drilled piping to introduce the water along the rear wall of the tank above the solution level. Consult us for advice prior to installing a water inlet to a tank.

7: FINISHING PROCEDURE

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

1. Thoroughly clean and degrease pieces with **Martron LT 100** hot (180°F) alkaline soak cleaner or with **Martron BH-PR**, a heavy-duty, low temperature (70° - 160°F) alkaline soak cleaner. A typical cleaning time is five to ten minutes.
2. Rinse in bottom-fed, overflowing cold water rinse.
3. Immerse in **Martron BLK10FE** solution (boiling at 285° - 290°F) until a uniform, deep black color is developed. Immersion time will be from 5 to 20 minutes, depending upon the mass of parts and type of steel alloy and condition of the surface.
4. Rinse in bottom-fed, overflowing cold water rinse.
5. Seal the finish by immersing for one minute in **Martron RP-26** for an oil finish; **Martron 5090-25 Sealer** for a soft, dry film; or **Martron BLK10FE Sealer** for a hard, dry film.

NOTE: If the pieces to be blackened have scale or rust on the surface, it must be removed following cleaning and rinsing (Steps 1 and 2) in a 50% by volume Muriatic Acid Solution or an 8 ounce to 2lb/gal solution of **Martron 926 Acid Salts**, dry acid salts. Rinse thoroughly with water following descaling and de-rusting. When meeting specifications all testing and procedures must be followed usually omitting acid activation.

8: OPERATING TIPS

Problems will rarely arise with a properly maintained and controlled **Martron BLK10FE** solution. Its unique rectification eliminates the necessity for frequent sludge cleanout as is required with conventional formulations. Most problems can be traced to insufficient cleaning of the work or an incorrect boiling temperature. Other tips would include:

1. A glass mercury thermometer should be used to check the accuracy of the automatic temp. control.
2. Frequent small additions of replenishment solution will produce more uniform results than large amounts added less frequently.
3. Ideally, the temperature of the solution should not drop below boiling when work is introduced. Sufficient heat should be maintained to ensure that the solution does not drop below the boiling point for more than a few minutes, even with the heaviest loads. Maximum loads should not exceed one-pound of work per one-half gallon of solution. Optimum loads would be approximately one pound of work to one gallon of solution including the weight of barrels, baskets or racks.
4. Operating the bath at temperatures approaching 300°F or over will cause the buildup of red iron oxide, which can cause a red smut or an off-color on the surface of the blackened parts.
5. The bath should be periodically desludged to remove accumulation of sodium carbonate, iron oxide and soils. In addition, the surface of the solution should be periodically skimmed with a dust pan-type tool to remove hydrated iron oxide from the surface.
6. Transfer time from the **Martron BLK10FE** bath to the rinse water should be as short as possible to avoid the development of an off-color on the metal surface.
7. A thorough final rinse after blackening will minimize contamination of the sealant solutions.

9: EQUIPMENT

The **Martron BLK10FE** tank must be constructed of mild steel. The cleaning and rinse tanks may also be constructed of mild steel. Acid pickling tanks should be plastic or rubber-lined steel or rigid polypropylene.

Gas-heated tanks are preferred and should be under fired and insulated. Immersion electric units should be constructed of mild steel and also be insulated. Racks, hooks and baskets must be constructed of mild steel. 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 the **Martron BLK10FE** solution.

Martron Inc. will be pleased to assist you in selecting and installing the proper controls as well as the complete tanks system required for the process.

Alkaline cleaning, acid pickling and the **Martron BLK10FE** solutions must be exhausted. The duct work may be of the same materials as recommended above for the tanks. Galvanized steel should not be used.

NOTICE: Before using this material, read and understand Safety Data Sheet (SDS) for **Martron BLK10FE**. Specific instructions and precautions should be followed to assure correct use and personal safety.

10: CAUTION

This material contains Caustic Soda and can cause severe burns.

Avoid contact with eyes, skin and clothing. Do not take internally. When handling the solution and working near

the bath, wear goggles or face shield, rubber gloves and rubber apron. While preparing solutions and making additions, take care to avoid violent spattering.

In case of contact, immediately flush skin or eyes with plenty of water for at least fifteen minutes. For eyes, call a physician.

Avoid contact of **Martron BLK10FE** solutions with any other chemicals or solutions.

11: WARRANTY

The quality of this product is guaranteed on shipment from our plant. If the use recommendations are followed, desired results will be obtained. Since the use of our products is beyond our control, no guarantee expressed or implied is made as to the effects of such use, or the results to be obtained.