Activated Black-Magic® Plus

Activated Black-Magic Plus produces the ultimate in black oxide finishes with its unique patented combination of activators, rectifiers, catalysts, and wetting agents.

Features & Benefits

Military Spec: MIL C 13924, Mil C 46110, AMS 2485	Conforms to specifications for black finishes
ROHS compliant	Reduction of hazardous chemicals
Wear-in-Break-in function	Friction/torque reduction
No dimensional change	High tolerance operations
Powdered concentrate	Reduced shipping cost

Typical Applications

- Sporting arms gun bluing
- Black body heat absorption
- Optics, non-reflective
- Automotive
- Fasteners
- Hand and impact tools

Operating Conditions

Instructions

Activated Black-Magic Plus oxidizing salts are a free-flowing, dust-free granular mixture which is used at a concentration of 5 1/2 to 6 lbs. of salts per gallon of water. The solution is operated at a boiling temperature of 280°F to 289° F to blacken a wide range of carbon steels, alloy steels and hardened tool steels.

Solution makeup

Rectangular Tank - solution level 6" from top.

$$\text{Activated Black-Magic Plus Salt required for initial solution} = \frac{L'' \times W'' \times (D'' - 6'') \times 5\ 1/2 \text{ lb per gallon}}{231 \text{ cubic inches per gallon}}$$

Compute the amount of salts required by using the above equation. Fill the tank a little less than half full of cold water. Do not apply heat at this time or salt additions will erupt. Addition of salt will generate heat. Start adding the salts to the water with continuous stirring to avoid the formation of lumps. When the required amount of Black-Magic salts has been added, continue to stir and fill the tank with water to within 6" from the top. Solution will have heated up to nearly 200°F with the dissolving of the salts.

Heat is applied to the solution, and as the temperature rises, it should be stirred frequently to ensure thorough mixing and a uniform temperature throughout. When the temperature reaches 280°F to 289°F, it should begin to boil. If it does not, water should be added slowly until it begins to simmer. If the solution boils before reaching 280°F, then additional Black-Magic salts must be added and stirred into the solution. Black-Magic is used as a super-saturated 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 the salts thoroughly dissolved.

When the Black-Magic solution is boiling the optimal boiling range of 285°F to 289°F the tank is ready for processing work. Although the temperature of the solution can be maintained by manually adding water, we recommend that an automatic indicating temperature controller be used. The only reason for the boiling point to 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 the solution. An automatic controller also relieves the operator of the responsibility for maintaining the temperature; and it ensures consistent, uniform, high-quality finishes.

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 the appropriate Hubbard- Hall cleaner. A typical cleaning time is five to ten minutes.
2. Rinse in bottom-fed, overflowing cold water rinse.
3. Immerse in Activated Black-Magic Plus solution (boiling at 285°F - 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 condition of the surface.

4. Rinse in bottom-fed, overflowing cold water rinse.
5. If work being processed requires a non-chrome seal per Mil-DTL-13924E, Class 1, Emerald Seal 303 or Emerald Seal 308 should be used.
6. Seal the finish by immersing for one minute in the appropriate Hubbard-Hall Metal Guard rust preventative to obtain the desired finish and / or corrosion protection.

Note: If 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 in the appropriate Hubbard-Hall dry acid salt. Rinse thoroughly with water following descaling and de-rusting.

Operating tips

Problems will rarely arise with a properly maintained and controlled Activated Black-Magic Plus solution. Its unique rectification eliminates the necessity for periodic sludge clean out 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 kept on hand to check the accuracy of the automatic temperature controller. Accurate Teflon coated alcohol thermometer can be used.

2. Frequent small additions of replenishment salts will produce more uniform results than large amounts added less frequently.

3. A fine mesh basket submerged well below the surface can be used to filter sludge from the boiling solution. Remove and allow the basket to drain and cool and dispose of the sludge.

4. Ideally, the temperature of the solution should not drop below boiling when work is introduced. Enough 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 and racks.

5. 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.

6. Transfer time from the Activated Black-Magic Plus 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.

Equipment

The Activated Black-Magic Plus 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-heating units are preferred and should be under fired and insulated. Immersion electric units should be D-series or De-rated for a lower surface temp, constructed of mild steel and the tank should 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 Black-Magic solution.

Your Hubbard-Hall representative will be pleased to assist you in selecting and installing the proper controls as well as the complete tank system required for the process.

Hot alkaline cleaning, acid pickling and the Activated Black-Magic Plus solutions should be exhausted. The duct work may be of the same materials as recommended above for the tanks. Galvanized steel should not be used.

Caution

THIS MATERIAL CONTAINS CAUSTIC SODA. CAUSES SEVERE BURNS.

Do not get in eyes, skin or clothing. Avoid breathing dusts or mists. Do not take internally. When handling, wear goggles or face shield. While making solutions, add slowly to surface of solution 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.

The Black-Magic bath should be adequately exhausted.

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.

Our people. Your problem solvers.

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