Liquid Black Magic® ABM

Liquid Black Magic ABM is a highly concentrated solution of Hubbard-Hall's Activated Black Magic Plus oxidizing salt formulation. This patented formulation, containing a unique blend of activators, rectifiers, catalysts, penetrants, and surfactants, is the standard against which all other black oxide processes are compared for performance and quality. Liquid Black Magic ABM is recommended for black oxide installations where it is desired to automate the replenishment additions of the blackening salt solution 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 our conventional, dust free, powdered Activated Black Magic Plus salts.

Features & Benefits

Meets military specs: MIL C 13924, MIL C 46110, AMS 2485	Conforms to specifications for black finishes
ROHS and REACH compliant	Product good for use in Europe
Wear-in-break-in function	Friction/torque reduction
No dimensional change	High tolerance operations

Operating Conditions

Instructions

The Black Magic ABM solution is operated at a temperature of 285°F, to blacken a wide range of carbon steels, alloy steels and hardened tool steels. It will not blacken stainless steels which are readily blackened with Hubbard-Hall's Black Magic SSL or cast iron which is blackened with Black Magic SS-C.

Bath Makeup

A new bath is started by filling the tank with Liquid Black Magic ABM, as received, to within six inches from the top. Heat is applied and the solution is brought to a gentle rolling boil at approximately 275°F to 280°F. Liquid Black Magic ABM is used as a supersaturated solution and it should be allowed to boil for a while to evaporate some water and reach a boiling temperature of 285°F. Thereafter, the solution must be maintained at 285° to 290°F for blackening steel. Maintain the proper working level in the tank by the addition of Liquid Black Magic ABM preferably by means of a metering pump directly from the shipping container.

If Liquid Black Magic ABM is added manually, care should be taken to avoid too rapid an addition which could lead to spattering or an eruption on the surface. Allow the Liquid Black Magic ABM to slowly run along a corner of the tank. If the temperature of the solution climbs above 290°F, water must be added to replenish evaporated water and reduce the temperature. Extreme care must be taken when adding water at high temperatures to avoid splattering and eruptions. In order to safely add water and control the boiling point of the solution, water should be introduced by a water feed pipe, hung across the backside of the tank, near the top, with 1/8" or 3/16" holes, drilled 2" apart which directs incoming water against the tank wall, allowing water to uniformly cascade down the tank wall into the black oxide solution.

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 needed 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. Hubbard-Hall can recommend a supplier of automated temperature controllers and water inlet valves 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.

Finishing Procedure

Pieces to be blackened may be processed in mild steel baskets, tumbling barrels, or hung on racks or hooks, depending upon the shape, 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 Liquid Black Magic ABM solution (boiling at 285°F to 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, 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 the appropriate Hubbard-Hall Metal Guard to obtain the desired finish and / or corrosion protection.

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 in an 8 ounce to 2 lb/Gal solution of Hubbard-Hall's Acid Salt W, 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.

Operating Tips

Problems will rarely arise with a properly maintained and controlled Liquid Black Magic ABM solution. Its unique rectification eliminates the necessity for frequent sludge clean out, as 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 temperature 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. 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, 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 de-sludged to remove accumulation of sodium carbonate, iron oxide and soils. In addition, the surface of the solution should be periodically skimmed with a dustpan-type tool to remove hydrated iron oxide from the surface.
6. Transfer time from the Liquid Black Magic ABM 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 Liquid Black Magic ABM 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 underfired and insulated. Immersion electric units should be constructed of mild steel or stainless steel. De-rated heaters tend to burn out less frequently. 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 Liquid Black Magic ABM solution.

Hubbard-Hall can recommend suppliers to assist you in selecting and installing the proper controls as well as the complete tanks system required for the process.

Hot alkaline cleaning, acid pickling, and the Liquid Black Magic ABM tanks must exhaust to the outside. 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, be sure to read and understand OSHA Safety Data Sheet for Liquid Black Magic ABM. Specific instructions and precautions should be followed to assure correct use and personal safety.

Caution

- Product will freeze.
- Need to store above 60ºF.

THIS MATERIAL CONTAINS CAUSTIC SODA. CAUSES 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 Liquid Black Magic ABM solutions with any other chemicals or solutions.

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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