Liquid Black Magic® Concentrate

Liquid Black Magic Concentrate is a product that is mixed with 50% by wt. Sodium Hydroxide (caustic soda) to yield a premium hot black oxide solution that exceeds the requirements of MIL-C-13924 Class I.

Features & Benefits

Liquid concentrate	Easier bath make-ups
Liquid concentrate	Ideal for exports
Military spec MIL C 13924, MIL C 46110, AMS 2485	Can be used in military applications
ROHS and REACH compliant	Reduction of hazardous chemicals

Typical Applications

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

Operating Conditions

Liquid Black Magic Concentrate should be thoroughly mixed prior to the addition of sodium hydroxide. The Sodium Hydroxide solution should be added slowly and cautiously to avoid spilling or splashing. Once properly mixed the solution can be added to the process tank and heated with constant agitation to 285°F for the blackening of steel alloys.

Component	Weight %	Volume %
Black-Magic CBL Concentrate	23	25.5
50% Sodium Hydroxide	77	74.5

Instructions

The black oxide 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 SS or cast iron, which is blackened with Black Magic SS-C.

Bath operation

Heat is applied and the solution is brought to a gentle rolling boil at approximately 275°F to 280°F. The black oxide solution is supersaturated, and it should be allowed to boil to evaporate water and reach a boiling temperature of 285°F. Thereafter, the solution must be maintained at 285°F to 290°F for blackening steel.

Maintain the proper working level in the tank by the addition of black oxide solution is added preferably by means of a metering pump directly from the shipping container. If the black oxide solution 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 black oxide solution to slowly run along a corner of the tank. If temperature of 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 safety add water and control the boiling point of the solution, water should be introduced by 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 supply the automated temperature controller and water inlet valve 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, hung on racks or hooks, depending upon the shape and weight and production requirements.

1. Thoroughly clean with the alkaline cleaner recommended by your Hubbard-Hall representative. Typical cleaning time is 5 to 10 minutes.
2. Rinse in bottom-fed, overflowing cold water rinse.
3. Immerse in the black oxide solution (boiling at 285°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 in a Metal Guard rust preventive oil as recommended by your Hubbard-Hall representative.

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.

Operating tips

Problems will rarely arise with a properly maintained and controlled black oxide 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. Frequency 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 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 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 sludge to remove accumulation of sodium carbonate, iron oxide, which can cause a red smut or an off-color on the surface of the blackened parts.
6. Transfer time from the black oxide solution 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 black oxide 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 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 oxide solution.

Your Hubbard-Hall representative will be pleased to assist you in selecting and installing the proper controls 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.

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 solution and making additions, take care to avoid 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 black oxide solution with any other chemicals or solutions.

Before using this material, read and understand OSHA SAFETY DATA SHEET for Liquid Black Magic Concentrate. Specific instructions and precautions should be followed to assure correct use and personal safety.

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.

For more information on this process please call us at
1-800-648-3412
or techservice@hubbardhall.com