



Better Chemistry. Better Business.

Black-Magic™ Silver Solder

Product Code: 2232024
Revised Date: 3/8/2017

Black-Magic™ Silver Solder

Black-Magic™ Silver Solder is a companion product to our "Activated" Black-Magic™ "Plus". It blackens all silver solder and brazed areas to blend in with the black oxide on steel.

Black-Magic™ Silver Solder is a free-flowing granular product used at a concentration of 2 lbs. per gallon of water solution and at a boiling point of approximately 220°F.

Black-Magic™ Silver Solder blackens all those difficult to blacken areas without affecting the black oxide conversion coating on steel.

SOLUTION MAKEUP

Rectangular Tank - Solution Level 6" from top.

Black-Magic™ Salts = (L" x W" x (D"-6")) x 2 / 231 cubic inches per gal.
Lbs salt required for initial solution

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 Black-Magic™ salts has been added, continue to stir and fill the tank with water to within 6" from the top.

Heat is then 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 approximately 220°F, the solution should begin to boil. If it does not, water should be slowly added until it begins to simmer. If the solution boils before reaching 220°F, additional Black-Magic™ salts must be added and stirred into the solution.

When the Black-Magic™ solution is boiling in the range of 220-225°F, it is ready for processing work. Although the temperature of the solution can be maintained by manually adding water, an automatic indicating temperature controller should 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. An automatic controller also relieves the operator of the responsibility for maintaining the temperature; and it ensures consistent, uniform, high-quality finishes.



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FINISHING PROCEDURE

Since **Black-Magic™ Silver Solder** is normally used in the same line and following "Activated" Black-Magic™ "Plus", the parts are handled in the same tumbling barrels, baskets and racks without transfer or interruption in the processing sequence. The normal procedure is as follows:

1. Thoroughly clean and degrease pieces with Hubbard Hall's Mi-Clean™ 14 or 31 hot (180F) alkaline soak cleaners or with Mi-Clean™ 100, a heavy-duty, low temperature (70-160F) alkaline soak 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 280-285F) 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 condition of the steel.
 4. Rinse in bottom-fed, overflowing cold water rinse.
 5. Immerse in **Black-Magic™ Silver Solder** solution at approximately 220°F to boiling for an immersion time of 2-5 minutes or until the brazed areas are black.
 6. Rinse in bottom-fed, overflowing cold water rinse.
 7. Seal the finish by immersing for 2-3 minutes in Hubbard-Hall's Metal Guard® 410 for an oily finish; Metal Guard® 310 for a drier film; Metal Guard® 600 for a hard, dry film.
- NOTE:** If the pieces to be blackened have scale or rust on the surface, it must be removed in a 50% by volume Muriatic Acid solution or in an 8 oz to 1 lb. per gallon solution Hubbard-Hall Acid Salt W, dry acid salts.

OPERATING TIPS

Problems will be held to a minimum with a properly maintained and controlled Black-Magic™ solution. Most problems can be traced to inadequate cleaning or improper temperature control. The following tips are offered for successful operation of the solution.

1. A glass mercury thermometer should be kept on hand to check the accuracy of the automatic temperature controller.
2. Frequent small additions of replenishment salts 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.
4. A thorough final rinse after blackening will minimize contamination of the sealant solutions.



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EQUIPMENT

The Black-Magic™ tank should be constructed of mild steel along with the cleaning and rinse tanks. Acid pickling tanks should be plastic, rubber-lined steel or rigid polypropylene.

Gas heated units are preferred and should be under fired and insulated. Units heated by electric immersion heaters should also be constructed of mild steel and 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 Black-Magic™ 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.

Titration Control Procedure

1. Pipette a 5 ml sample into 250 ml Erlenmeyer.
2. Add 50 mls DI water plus 5-10 drops Phenolphthalein Indicator.
3. Titrate with 0.5 N Hydrochloric to clear end-point.

Mls of 0.5 N HCL X 0.04 = lbs/gal Black Magic Silver Solder.



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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.