



**Black-Magic™ RT S 30**

**Product Code: 2260013**  
**Revised Date: 4/20/2017**

### **Black-Magic™ RT S 30**

#### **DESCRIPTION**

Room temperature blackening solution for powdered metal and steel with minimal smut generation

#### **FEATURES AND BENEFITS**

- Smut: low to none formed
- Works well with Activation by Black Magic Predip P
- Liquid concentrate use one part to 9 parts water
- Maintains black over time with high Silicon alloys
- 70 to 90 F Temperature range(21 – 32 C)
- RoHS and REACH Compliant

#### **TYPICAL APPLICATIONS**

- Very effective on porous powdered or sintered metal
- Good on carbon steel
- Stampings
- Machined / Ground Steel



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- Spring steel
- Hardened and polished Steel
- High Silicon alloys

**Black-Magic™ RT S30** liquid concentrate is diluted with water and used at room temperature for blackening iron and steel by immersion. **Black-Magic™ RT S30** is recommended for blackening powdered metal, cast and malleable irons and forged steels. It is designed for low smut rather than jet black.

### **EQUIPMENT**

Acid-resistant tanks, tumbling barrels, baskets, hooks and racks must be used with the **RT S30 and Black-Magic™ Predip P** solutions. PVC, plastic lined or rubber lined tanks and plasticcoated hooks and racks are suitable. Mild steel may be used for the cleaning, rinsing and sealant tanks.

### **SURFACE PREPARATION**

Items to be blackened must be thoroughly cleaned and deoxidized. Some experimentation should be done with sample parts to determine the degree of cleaning and activation required to produce a uniform black finish. Parts to be blackened should be protected from rust during fabrication and in-plant storage prior to blackening to minimize surface preparation.

### **CLEANING**

The type and degree of surface soil will determine the length of time required for cleaning and the number or cleaning steps and cleaning temperature. Lightly soiled parts can be cleaned in two to five minutes at room temperature with an 8oz./gallon solution of **Mi-Clean™ 100**. Heavily soiled parts may require a longer immersion time and temperatures upwards of 180° F.



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### **DEOXIDIZING**

50% Muriatic Acid or Deruster 11J can be used for deoxidizing. Surface rust, if present, should be removed with 5 to 20% solution of **Acid Brite 40 for cast iron** at room temperature. Immersion times will normally range from one to five minutes. Muriatic acid should not be used to remove rust from cast iron. **Black-Magic™ RT S 26** performs better on cast iron.

### **ACTIVATION**

Small amounts of 1 oz per gallon of **Black-Magic™ RS 30 Replenisher** may be added to break in the new bath.

**Black-Magic™ RT Predip P** is used as an activator for difficult-to-blacken passive steel surfaces or as a conditioner to enhance the evenness of color between machined and un-machined areas.

**RT Predip P** is normally used at 10% by volume at room temperature. Immersion times will normally range from two to five minutes.

### **BLACKENING**

Prior to charging a production tank, some experimentation should be performed with properly prepared sample parts, using various dilutions of the **RT S30** and different immersion times to determine the conditions required to produce the desired depth of black. As a starting point a 10% by volume is the best concentration. Determine by test, the shortest immersion time necessary to produce the desired depth of black, usually two to three minutes, depending upon the alloy and surface hardness. If the required immersion time exceeds five minutes, the concentration should be raised and the immersion time re-evaluated.

### **FINISHING PROCEDURE**

1. Clean and prepare surface as determined above.
2. Rinse for a minimum of 30 seconds in overflowing cold water to remove residual cleaner.



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3. Immerse parts in the **Black-Magic™ RT S30** solution for the length of time necessary to produce the desired depth of black.
4. Rinse for minimum of 30 seconds in overflowing cold rinse.
5. To displace the rinse water, seal the finish, enhance the depth of black and impart corrosion resistance: immerse parts for one to two minutes in HUBBARD-HALL's **Metal Guard®** sealants. The ultimate depth of black will not develop until the sealant is completely absorbed into the **Black-Magic™ RT S30** surface and this may take several hours. A sealant must be applied before judging the depth of black.

Note: Rotating perforated plastic barrels are recommended for processing large volumes of small parts. If dip baskets or racks are used, the parts should be agitated when first introduced into each solution and water rinse to break air bubbles and to assure uniform solution contact with all surfaces.

### **SOLUTION REPLENISHMENT AND MAINTENANCE**

The blackening solution is gradually depleted through use but may be replenished indefinitely with periodic additions of the **RT S30**. The strength of the solution and the amount of concentrate to be added can be determined by titrating with sodium thiosulfate as outlined in the **Chemical Control Procedure**.

The frequency of additions will depend upon the volume of work processed. For optimum results, the solution should be maintained at 85% of its original strength or better with frequent small additions.

With automatic lines, a bath history should be established immediately after charging the tank by keeping a record of the processed verses the titrated strength to determine the point at which the bath is depleted approximately 6% to 7% and replenishment is necessary. Timed metering pumps, triggered by the load are recommended for maintaining a consistent strength. The life and the coverage of the solution will be increased by continuous circulation and filtration.

For more complete operation instructions for the **Mi-Clean™**, **Metal Guard®**, and **Acid Salt** products, please see the individual instruction sheets.



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### BURET CHEMICAL CONTROL PROCEDURE

#### EQUIPMENT REQUIRED      CHEMICALS REQUIRED

225 ml Erlenmeyer Flask	6N (1:1) Hydrochloric Acid
10 ml Graduate Cylinder	Potassium Iodide - 15% Solution (by weight)
50 ml ml Buret	0.1N Sodium Thiosulfate pH meter
0.2% Soluble Starch Solution	0.1 N sodium hydroxide solution

### CONTROL PROCEDURE

A sample of a freshly prepared production bath should always be taken as a control solution prior to running any parts through the bath. If a sample was not taken, a laboratory prepared solution at the same concentration may be used as the control solution. Titration of this "new" solution will provide a standard .

1. Transfer a 15 ml sample of the production bath into the 225 ml Erlenmeyer flask.
2. Dilute with water to the 50 ml mark.
3. Add 10 ml 6N (1:1) Hydrochloric Acid to the flask.
4. Add 10 ml of the 15% by weight Potassium Iodide solution.
5. Add 15 ml of starch solution. The solution will become a dark blue to almost black color.
6. Titrate using the 0.1N Sodium Thiosulfate solution, from the buret while swirling the flask.
7. The end point is marked by a sudden change in color from dark black to light brown.

**NOTE:** Upon standing, the light brown color will turn dark again, but additional Sodium Thiosulfate solution should not be added. The first end point is correct.

8. Calculate the amount of concentrate to be added as follows:



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**% by Volume RTS 30 = \_\_\_\_\_ ml 0.1N sodium thiosulfate X .0.7**

A 100 gallon bath made up at 10% by volume of concentrate (i.e. 10 gallons of concentrate in 90 gallons of water) is titrated and the additions to the bath calculated according to the acid and metals titrations and should result in 14.3ml Sodium Thiosulfate.

**NOTE:** The volumes used in the above equation may be metric or English (i.e. liters, quarts, gallons).

### Acid Titration

1. Transfer a 30 ml sample of the production bath into the 225 ml Erlenmeyer flask.
2. Dilute with water to the 50 ml mark.
3. Use a pH meter and titrate to pH7.0
4. Titrate using 0.1N sodium hydroxide solution

**NOTE:** Upon standing, the light brown color will turn dark again, but additional Sodium Thiosulfate solution should not be added. The first end point is correct.

5. Calculate the amount of concentrate to be added as follows:

**% by Volume RTS 30 = \_\_\_\_\_ ml 0.1N sodium hydroxide X 0.56**  
(10 % solution uses 17.7ml of 0.1N Sodium Hydroxide)

### DROPPING BOTTLE CHEMICAL CONTROL PROCEDURE

1. Transfer a 5 ml sample of the production bath into the mixing bottle.
2. Dilute with 30 mL water.
3. Add 2 mls 6N (l:l) Hydrochloric Acid to the flask.

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4. Add 4 mls of the 15% by weight Potassium Iodide solution.
5. Add 2 mls of starch solution. The solution will become a dark blue to almost black color.
6. While swirling the mixing bottle, add the 0.5 N Sodium Thiosulfate solution dropwise.
7. The end point is marked by a sudden change in color from dark black to light brown.

NOTE: Upon standing, the light brown color will turn dark again, but additional Sodium Thiosulfate solution should not be added. The first end point is correct.

8. Calculate the concentration as follows:

$$\% \text{ by Volume RTS 30} = \frac{\text{_____ drops 0.5N sodium thiosulfate} \times 0.33}{10\% = 30 \text{ drops}}$$

**Dropping Bottle Control for Acid Content**

1. Transfer a 10 ml sample of the production bath into the mixing bottle.
2. Dilute with water to the 30 ml mark.
3. Use a phenolphthalein indicator
4. Titrate using 1.0N sodium hydroxide dropping bottle to a pink endpoint
5. Calculate the amount of BM RTS 30 as follows:

$$\% \text{ by Volume RTS 30} = \frac{\text{_____ Drops of 1.0N sodium hydroxide} \times 0.56}{(10\% \text{ solution uses 17 to 18 drops of 1N Sodium Hydroxide})}$$

**CAUTION**



Better Chemistry. **Better Business.**

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The **RT S30** solution is mildly acidic. Avoid contact with eyes, skin and clothing. Wear eye shields, protective gloves and apron. The solutions are toxic if taken internally. 10% solution uses 17.7ml.

### **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.