Black-Magic® RT-S20/25 Replenisher XC

Room Temperature Blackening Solution For Iron And Steel . Black-Magic™ RT-S20/25 Replenisher XC liquid concentrate is used for replenishment and maintenance of both Black-Magic™ RT-S20 and Black-Magic™ RT-S25 baths that have a high metals consumption and low drag-out.

Solution Replenishment and Maintenance

The blackening solution is gradually depleted through use, but may be replenished indefinitely with periodic additions of the RT-S20/25 Replenisher XC and/or the starting make up concentrate.

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

The life and the coverage of the solution will be increased by continuous circulation and filtration.

Buret Control Procedure

EQUIPMENT REQUIRED	CHEMICALS REQUIRED
250 ml Erlenmeyer Flask	6N (1:1) Hydrochloric Acid
25 ml Graduate Cylinder	Potassium Iodide - 15% Solution (by weight)
50 ml Burette	0.1N Sodium Thiosulfate
Burette Clamp	0.2% Soluble Starch Solution
Ring Stand	

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 sample at the same concentration may be used as the control solution. Titration of this "new" solution will provide the figure for V_1.

1. Transfer a 25 ml sample of the production bath into the 250 ml Erlenmeyer flask.

2. Dilute with water to the 100 ml mark.

3. Add 10 ml 6N (1:1) Hydrochloric Acid to the flask.

4. Add 20 ml of the 15% by weight Potassium Iodide solution.

5. Swirl the solution once, stopper and store in the dark for 10 minutes.

NOTE: Only glass or aluminum foil covered stoppers should be used.

6. Add 10 ml of starch solution. The solution will become a dark blue-green to almost black color. Titrate with the 0.1N Sodium Thiosulfate solution until the dark black color changes to a light brown.

PLEASE 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.

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

$$C_2 = \frac{V_1 - V_2}{V_1} \times (C_1)$$

C_2 = Concentrate in gallons to be added to bath

V_1 = Milliliters of Sodium Thiosulfate used to titrate the new production bath.

V_2 = Milliliters of Sodium Thiosulfate used to titrate the used production bath.

C_1 = Volume of concentrate in gallons used to make up the original RT-S20 or RT-S25 "new" bath.

EXAMPLE

Black-Magic™ RT-S20, "new" solution, 9 to 1 dilution V_1 = 27.5

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 as follows:

$V_1 = 27.5$

$V_2 = 25.44$

$C_1 = 10$ gallons

$C_2 = \frac{27.5 - 25.44}{27.5} \times \frac{(10)}{2}$

$C_2 = \frac{2.06}{27.5} (5)$ or $\frac{10.3}{27.5}$

$C_2 = 0.375$ gallons RT-S20/25 Replenisher XC to be added to production bath.

Dropping Bottle Chemical Control Procedure

EQUIPMENT REQUIRED	CHEMICALS REQUIRED
125 ml Erlenmeyer Flask	6N (1:1) Hydrochloric Acid
10 ml Graduate Cylinder	Potassium Iodide - 15% Solution (by weight)
125 ml Dropping Bottle	0.5N Sodium Thiosulfate
	0.2% Soluble Starch 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 the figure for D_1.

1. Transfer a 5 ml sample of the production bath into the 125 ml Erlenmeyer flask.
2. Dilute with water to the 50 ml mark.
3. Add 2 ml 6N (l:l) Hydrochloric Acid to the flask.
4. Add 4 ml of the 15% by weight Potassium Iodide solution.
5. Add 2 ml of starch solution. The solution will become a dark blue to almost black color.

6. Add the 0.5N Sodium Thiosulfate solution, from the dropping bottle - drop by drop - counting the drops 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:

$$C_2 = \frac{D_1 - D_2}{D_1} \times \frac{(C_1)}{2}$$

C_2 = Concentration in gallons to be added to the bath.

D_1 = Number of drops of Sodium Thiosulfate used to titrate the new production bath.

D_2 = Number of drops of Sodium Thiosulfate used to titrate with used production bath.

C_1 = Volume of concentrate in gallons used to make up the original "new bath".

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 as follows:

D_1 = 27

D_2 = 24

C_1 = 10 gallons

$$C_2 = \frac{27 - 24}{27} \times \frac{10}{2}$$

$$C_2 = \frac{3}{27} (5) \text{ or } \frac{15}{27}$$

C_2 = 0.55 gal of concentrate to be added to the production bath.

NOTE

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

Caution

The RT-S20/25 Replenisher XC 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.

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Our People. Your Problem Solvers.

For more information on this process,
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