Black-Magic® PJL/RT

Room Temperature Blackening Solution For Iron And Steel

Black-Magic™ PJL/RT is the very latest improvement in room temperature blackening solutions for steel. Its formulation is a departure from the conventional formulas used today and addresses the problems of excessive insoluble formation as well as complex solution control. Retarding or preventing excessive insoluble formation either limits or eliminates filtering and solution control is accomplished with just one titration.

Black-Magic™ PJL/RT is a liquid concentrate used as a water dilution, at room temperature, to blacken all types of steel.

Operating Conditions

EQUIPMENT

Acid-resistant tanks, tumbling barrels, baskets, hooks and racks must be used with the Black-Magic™ PJL/RT and Quick Pik solutions. Polyproplyene, PVC, plastic lined or rubber lined tanks and plastic-coated 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 proper dwell times and concentrations of Black-Magic™ PJL/RT and activator solutions required to produce a uniform black finish. Parts to be finished with Black-Magic™ PJL/RT 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 of cleaning steps and cleaning temperature. Lightly soiled parts can be thoroughly cleaned in two to five minutes at room temperature with an 8 oz/gallon solution of HUBBARD-HALL's Mi-Clean™ 100. Mi-Clean™ 100 may also be used at elevated temperatures of 90-160ºF. on heavily soiled parts. As a general rule, parts processed in a rotating perforated barrel will require only room temperature cleaning with a solution of Mi-Clean™ 100. Racked parts or parts processed in baskets may require using Mi-Clean™ 100 at elevated temperatures.

DEOXIDIZING

Surface rust, if present, should be removed following the cleaning cycle. Generally, lightly rusted surfaces should be immersed in a 8 oz to 32 oz/gallon room temperature solution of HUBBARD-HALL's Quick Pik dry acid salts. Heavily rusted surfaces may require derusting in either a 50% by volume muriatic acid pickle or in a heated solution of HUBBARD-HALL's Alkaline Deruster 2, used at 32 oz/gallon. Immersion times in each instance will normally range from one to five minutes. Muriatic Acid should not be used to remove rust from cast iron. Use Hubbard-Hall's Acid Salt W only.

ACTIVATION

Difficult-to-blacken surfaces such as heat treated, work-hardened or micro-finished steels may be too passive to react properly with the Black-Magic™ PJL/RT solution. With these surfaces, a room temperature activator such as Acid Salt W, 50% muriatic acid, Black Magic RT Predip S, may be required to produce a more uniform black finish. These activators are used following the cleaning cycle and may also be used to simultaneously deoxidize the steel surfaces if rust is present.

Prior to charging a production tank, some experimentation should be performed with properly prepared sample parts, using various dilutions of Black-Magic™ PJL/RT concentrate and different immersion times to determine the conditions required to produce the desired depth of black. As a starting point, dilute one (1) part Black-Magic™ PJL/RT with nine (9) parts water for a 10% by volume solution. Determine by test, the shortest immersion time necessary to produce the desired depth of black, usually two to five minutes, depending upon the alloy and surface hardness. If the required immersion time exceeds five minutes, the dilution should be increased to twelve (12) parts water and the immersion time re-evaluated.

On occasion, the steel surface may be too reactive with the 9 to 1 or 12 to 1 dilution, resulting in a slight rub off of the black finish. If this happens, use a 6 to 1 dilution.

FINISHING PROCEDURE

Items to be blackened may be processed in acid-resistant baskets or hung on coated racks or hooks, depending upon the shape, weight and production requirements. 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 to break air bubbles and to assure uniform solution contact with all surfaces. Overflowing water rinse tanks must be bottom-fed.

1. Clean and prepare surface as determined above.
2. Rinse for a minimum of 30 seconds in overflowing cold water to remove residual cleaner.
3. Immerse pieces in the Black-Magic™ PJL/RT solution for the length of time necessary to produce the desired depth of black (usually not exceeding five minutes).
4. Rinse for a minimum of 30 seconds in overflowing cold water.
5. To displace the rinse water, seal the finish, enhance the depth of black and impart corrosion resistance, immerse the parts for one to two minutes in HUBBARD-HALL's Metal Guard® 410 for a slightly oily finish; Metal Guard® 450 for a soft-dry finish; Metal Guard® 911 or 600 for a hard-to-dry finish. The ultimate depth of black will not be developed until the sealant is completely absorbed into the Black-Magic™ PJL/RT surface. This may take several hours

depending upon the surface roughness. A sealant must be applied before judging the depth of black.

SOLUTION REPLENISHMENT AND MAINTENANCE

The blackening solution is gradually depleted through use but may be replenished indefinitely with periodic additions of concentrate. The amount of concentrate to be added can be determined by titrating with sodium thiosulfate as outlined in the Chemical Control Procedure or the strength can be maintained by noting the time of immersion. When the time required to produce the desired color increases, add sufficient concentrate to reduce the time to your established standard.

The frequency of additions will depend upon the volume of work processed. For optimum results, the solution should be maintained within 85% of its original strength. Frequent small additions are recommended.

With automatic lines, a bath history should be established immediately after charging the tank by keeping a record of the number of loads processed versus the titrated strength to determine the point at which the bath is depleted approximately 10% to 15% and replenishment is necessary. Timed metering pumps triggered by the load, are recommended for maintaining a consistent strength.

NOTE: The Black-Magic™ PJL/RT solution will not blacken stainless steels. HUBBARD-HALL's Black-Magic™ RT-SS4 is recommended for blackening stainless steels.

Caution

The Black-Magic™ PJL/RT solution is mildly acidic. Avoid contact with eyes, skin and clothing. Wear eye shield, protective gloves and apron. The solutions are toxic if taken internally.

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