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TECHNICAL DATA

Insta-Blak® SS-370

Room Temperature Blackening Solution for Stainless Steel

Insta-Blak SS-370 is an acidic liquid concentrate which is used full-strength or diluted with water to blacken stainless steels by immersion or swab on (see Page 2 for procedure).

Equipment Required

Acid-resistant tanks, tumbling barrels, baskets, hooks and racks must be used with the **Insta-Blak SS-370** solution. Polypropylene, polyethylene or PVC dipping baskets, polypropylene rotating barrels, plastic lined tanks and plastic coated hooks and racks are suitable for use in **Insta-Blak SS-370** solutions. Stainless steel cannot be used. However, mild steel, stainless steel and the above mentioned tank materials can be used to contain the cleaning solutions, water rinses and sealants used in the process. The Muriatic Acid and **E-Pik** solutions may be contained in acid resistant materials such as stainless steel, polypropylene, or rubber lined mild steel tanks.

Mild steel electric immersion heating elements may be used with the **E-Kleen** solutions. Quartz or stainless steel electric immersion heaters are recommended for the acidic **E-Pik 211** solution.

The hot alkaline cleaning and acidic deoxidizing solutions must be exhausted. The duct work can be mild steel, stainless steel or plastic.

Insta-Blak SS-370 meets the standard of the Living Building Challenge Red List: An international sustainable building certification program.

Immersion Finishing Procedure

1. **Clean:** Parts must be thoroughly cleaned and degreased for 5 to 10 minutes in a hot (145°F) solution of **EPI's E-Kleen 148-E** (alkaline soak cleaner at 10% by volume in water).
2. **Rinse:** Using a bottom-fed, overflowing cold water rinse tank.
3. **Activate:** All stainless steel surfaces are passive by nature due to the chromium oxide present on the surface. This oxide must be removed prior to blackening by deoxidizing/activating the surface in one of the following solutions.
   a.) For the 300 series alloys, immerse parts for 2 to 5 minutes in a 50% by volume Muriatic Acid solution used at room temperature.
   b.) With 400 series alloys, immerse the parts for 5 minutes in a 65°F to 125°F solution of 2 lb of **EPI's E-Pik 211** acid salts per gallon of water.
4. **Rinse:** Using a bottom-fed, overflowing cold water rinse tank.

5. **Blacken:** Some experimentation should be done with properly prepared parts to determine the optimum concentration of the **Insta-Blak SS-370** solution and length of immersion required to produce the desired depth of black. As a starting point, with 300 series alloys, try a 50% by volume solution.

   A 33% or 25% by volume solution should be evaluated with the 400 series alloys. Difficult to blacken surfaces may require the use of **Insta-Blak SS-370** at full strength. Immersion times should be varied from 2 to 5 minutes. Very passive surfaces may require further activation to initiate the blackening reaction by having plain steel in contact with the stainless steel parts while immersed in the **Insta-Blak SS-370** solution. This can be accomplished by using plain steel hooks or racks to suspend the stainless steel parts in the solution or by including some plain steel wire in the plastic dip baskets or rotating barrels used to contain the stainless steel parts.
6. **Rinse:** Using a bottom-fed, overflowing cold water rinse tank.
7. **Seal:** While still wet from the preceding rinse, immerse parts in **EPI's** water displacing **E-Tec 501** for an oily finish, **E-Tec 504** or **E-Tec 505** for a "dry-to-the-touch" non-tacky finish, or **E-Tec 520** for a hard, dry, clear finish. For architectural finishes use **E-Tec 520**, **E-Tec 521** or **RENWAX**.

Instructions for making up, using and maintaining solutions of **E-Kleen 101, E-Kleen 110, E-Pik 211, E-Tec 501, E-Tec 504, E-Tec 505** and **E-Tec 520** will be found in the individual technical data bulletins for these **EPI** products.

Swab-on Procedure

Products such as **Insta-Blak SS-370** can be used to meet **AMS 2484A**. However, **EPI** does not perform testing on these products to verify conformance to this specification.

When first trying to use Insta-Blak SS-370, use some scrap stainless steel parts for experimentation.

Note: Rubber gloves/apron and eye protection must be worn while applying all of the chemical solutions used in the process.

1. Degrease the area to be finished with a solution of **EPI**'s **E-Kleen 163** neutral spray bottle cleaner. Let cleaner work 1-3 minutes. Do not use petroleum solvents as a replacement.
2. Rinse with running water, a damp sponge or damp cloth. Apply the damp sponge or cloth for several applications to thoroughly remove residual cleaning solution. If water breaks during rinsing occurs, try using E-Kleen 163 again.
3. Apply full strength **Insta-Blak SS-370** solution generously with a sponge, or cloth saturated with the solution and use a light rubbing action. Use care to insure a smooth and even coverage. Allow the chemicals to react for 1 to 3 minutes. The depth of blackness is controlled by the length of time the solution is left in contact with the steel surface. Repeated applications may be required. The **Insta-Blak SS-370** concentrated solution may

be diluted with 2 to 4 parts water to slow down the blackening reaction when finishing large areas.

4. Rinse with running water, a damp cloth or damp sponge several times to remove residual blackening solution. Adding a small amount of baking soda to the rinse water will help insure the complete removal of the residual acidic **Insta-Blak SS-370** solution. If the residual solution is not completely removed, it may cause rusting of the surface as it dries.
5. Wipe the area dry with a clean cloth and rub the area with soft cloths to remove any non-adherent layer of spent chemicals.
6. Repeat steps 4, 5, and 6 if a darker finish is desired.
7. To enhance the depth of blackness and impart corrosion resistance, the finish must be sealed with **EPI**'s **E-Tec 522** satin sealer. This product is applied by spraying on or with a sponge or cloth saturated with the solution. Two or three applications may be required. A satin clear spray lacquer may also be applied if the finish has been thoroughly dried prior to application.

Rusty Steel Beam Application

Note: Rubber gloves/apron and eye protection must be worn while applying all of the chemical solutions used in the process.

1. Apply **Insta-Blak SS-370** full strength, scrub with Scotch Brite green or purple pad to loosen rust.
2. Relieve it with damp towels – paper or cotton.
3. Apply a second coat of **Insta-Blak SS-370** and the "steel" turns uniform black.
4. Relieve it with a damp towel.
5. Dry with dry cloth.
6. Apply two coats of lacquer to your appropriate gloss.

Solution Replenishment and Maintenance

The **Insta-Blak SS-370** solution is gradually depleted through use, but may be replenished indefinitely with periodic additions of **Insta-Blak SS-370** concentrate. The strength of the solution and the amount of concentrate to be added can be determined by titrating the solution per buret titration control procedure CP-1, available from **EPI** or with a simple dropping bottle test as outlined below.

The strength of the solution can also be fairly accurately maintained by the immersion time required to produce the desired depth of black. As the time increases, add sufficient concentrate to reduce the time to your established standard. A sample of a freshly prepared bath should always be retained as a control.

The frequency of additions will depend upon the volume of work processed through the solution. For optimum results, the strength of the solution should be maintained at 85% of its original strength or greater at all times and frequent small additions are recommended. With automatic

lines a bath history should be established while running the first several (15 to 25) racks or barrels, and by titrating the strength after every 5 loads to determine the point at which the solution is depleted approximately 10-15% - and replenishment is necessary.

Timed metering pumps, triggered by the load, are recommended for replenishing the solution and maintaining a consistent strength. If the ambient temperature in the plant varies considerably, Electric heaters may be used to maintain a consistent solution temperature between 65° and 75°F.

The life of the solution and coverage will be increased by continuous circulation and filtration through a 50 micron filter. An alternative with smaller baths is to allow the solid by-products of the reaction to settle to the bottom of the tank and transfer the solution to a plastic holding drum to be retained for recharging the tank after the solids have been removed.

Dropping Bottle 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 of **Insta-Blak SS-370** may be used as the control solution. Titration of this "new" solution will provide the figure for $\mathbf{D_1}$.

1. Transfer a 5 ml sample of the production bath into a 125 ml Erlenmeyer flask.
2. Dilute with water to the 50 ml mark.
3. Add 2 ml 6N(1:1) 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 SodiumThiosulfate solution should not be added. **The first end point is correct.**

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

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

$\mathbf{C_2}$ **= Insta-Blak SS-370** concentrate in gallons to be added to the bath.
$\mathbf{D_1}$ **=** Number of drops of Sodium Thiosulfate used to titrate the new production bath.
$\mathbf{D_2}$ **=** Number of drops of Sodium Thiosulfate used to titrate the used production bath.
$\mathbf{C_1}$ **=** Volume of **Insta-Blak SS-370** concentrate in gallons used to make up the original "new" bath.

A test kit for the above procedure is available from **EPI.**

Caution

The **Insta-Blak** solutions are mildly acidic. Avoid contact with eyes, skin and clothing. Wear eye protection (glasses, goggles, or face shield), protective gloves and aprons when preparing solutions and while working with the solutions. Do not mix the **Insta-Blak SS-370** concentrate or solutions with cyanide or alkaline materials, or any other chemical substances. **The Insta-Blak solutions are toxic if taken internally.**

Do not work with the **Insta-Blak SS-370** or other products without first reading and understanding the **Material Safety Data Sheet** furnished by **EPI**.

Packaging

One (1), 5, and 55 gallon non-returnable containers.

IMPORTANT NOTICE! For Industrial Use Only

The following is made in lieu of all warranties, expressed or implied, including the implied warranties of merchantability and fitness for purpose: seller's and manufacturer's only obligation shall be to replace such quantity of the product as proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. **Neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage, direct, incidental or consequential, arising out of the use or the inability to use the product.**

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