PRODUCT INFORMATION

MARTRON INC P O BOX 309, MONROE, NC 28111 PH: (704) 289-1934 FAX: (704) 283-7400

DATE: JANUARY 20, 2011

EMERGENCY - MARTRON 704-289-1934
CHEMTREC 800-424-9300

REF. # MFC-009001

MARTRON 7000SS

BLACK OXIDE FINISH FOR STAINLESS STEEL

Section 1: DESCRIPTION

Martron 7000SS is a free-flowing, dust-free, granular composition used in water at a concentration of 4.75 lbs. per gallon of solution.

The alkaline solution is used at a low boiling temperature of 250 – 260°F to blacken a wide variety of stainless steel. The solution is also capable of blackening cast and malleable irons as well as steel.

Section 2: SOLUTION MAKEUP

Rectangular Tank – Solution level 6" from top.

Martron 7000SS (lbs. salt required for initial make up) =

$$\frac{L" \times W" \times (D" - 6") \times 4.75 \text{ lbs./gal}}{231 \text{ cubic inches per gallon}}$$

1. Compute the amount of salts required by using the above equation.
2. Fill the tank a little less than half full with cold water. Do not apply heat at this time.
3. Start adding the salts to the water with continuous stirring to avoid the formation of lumps.
4. When the required amount of **Martron 7000SS** salts has been added, continue to stir, and fill the tank with water to within 6" from the top.
5. 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.

Note: When the temperature reaches 250 – 260°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 250°F, additional **Martron 7000SS** salts must be added and stirred into the solution.

Martron 7000SS is used as a super-saturated solution, and it should be allowed to boil for at least one hour before additional salt is added to ensure that the true boiling point has been reached with all of the salts thoroughly dissolved.

6. When the **Martron 7000SS** solution is boiling in the range of 250 – 260°F, it is ready for processing work.

Note: 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.

It will also protect against the undesirable and detrimental overheating of the solution.

An automatic controller also relieves the operator of the responsibility for maintaining the temperature, and it ensures consistent, uniform, high-quality finishes.

Section 3: FINISHING PROCEDURE

Stainless steels to be blackened may be processed in baskets, tumbling barrels, hung on racks or hooks, depending upon the shape and weight and production requirements.

1. Thoroughly clean and degrease pieces with alkaline soak cleaners or a heavy duty, low temperature (65 – 160°F) alkaline soak cleaner. A typical cleaning time is 5 to 10 minutes.
2. Rinse in bottom feed, overflowing cold water rinse.
3. Activate the stainless-steel surface with a 5-minute immersion in a 50% by volume Hydrochloric acid solution, used at room temperature.
4. Rinse in bottom feed, overflowing cold water rinse.
5. Immerse in **Martron 7000SS** solution (boiling 250 – 260°F) until a uniform, deep black color is developed. Immersion time usually will be from 2 to 15 minutes, depending upon the mass of parts and the type and condition of the stainless steel.
6. Rinse in bottom feed, overflowing cold water rinse.
7. Seal the finish in an oily finish, dry to touch finish, or dry finish.

Section 4: ADDITIONAL PROCESSING INFORMATION

By nature, stainless steel surfaces are passive, thus in preparing the metal surface prior to blackening, it is necessary to use an acidic pickle. This de-passivates the surface slightly to enable the blackening solution to react with it to produce the black finish.

On occasion, the 50% by volume Hydrochloric Acid solution may not sufficiently activate the metal surface. In this instance, stronger measures are required with the following pickle:

90% by volume Hydrochloric Acid
5% by volume Sulfuric Acid
5% by volume water

This pickle is also used at room temperature, with a minimum immersion time of 5 minutes. Note that in preparing this solution, the sulfuric acid must be slowly added to cold water. This mixture must be allowed to cool before adding the Hydrochloric Acid.

A third, stronger activation procedure consists of the following:

After pickling at room temperature in one of the above Hydrochloric Acid solutions, proceed as follows:

A. Immerse in **Martron SS Activator** to produce the required de-passivation. Used at a concentration of 1 to 2 lbs. of **Martron SS Activator** salts per gallon of water, the solution temperature is maintained between 150 – 160°F, with immersion times of 30 seconds to 3 minutes. A 25% by volume Sulfuric Acid solution can be used as an alternative.
B. Rinse in bottom feed, overflowing cold water rinse and continue with blackening Step #5.

Section 5: OPERATING TIPS

Problems will rarely arise with a properly maintained and controlled solution. Most problems can be traced to insufficient surface reparation of the work or an incorrect boiling temperature. Other tips would include.

1. A glass 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. Maximum loads should not exceed 1 lb. of work per ½ gallon of solution. Optimum loads would be approximately 1 lb. of work to one gallon of solution, including the weight of barrels, baskets and racks.
4. Transfer time from the **Martron 7000SS** bath to the rinse water should be as short as possible to avoid the development of an off-color on the metal surface.
5. A thorough final rinse is important. An immersion time in the **Martron 7000SS** solution of 2 minutes is recommended.

Section 6: EQUIPMENT

The **Martron 7000SS** tank should be constructed of mild steel.

The cleaning and rinse tanks may also be constructed of mild steel.

Acid pickling tank should be plastic, rubber-lined steel or rigid polypropylene. Lead-line tanks may also be used for the hot sulfuric acid and **Martron SS Activator** solutions.

Gas heating units are preferred and should be bottom fired and insulated. Electric immersion units should be constructed of mild steel and also be insulated.

For the hot Sulfuric Acid solution and **Martron SS Activator**, quartz electric immersion heaters are recommended.

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 **Martron 7000SS** solution.

Hot alkaline cleaning, acid pickling and the **Martron 7000SS** 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.

Section 7: SAFETY PRECAUTIONS

Always read the Safety Data Sheet (SDS) for any chemical product to ensure familiarity with the methods of safe handling and the health hazards associated with the product.

Section 8: NON-WARRANTY

The data contained in this bulletin is believed by ***Martron Inc.*** to be true, accurate and complete. Since, however, final methods of use of this product are in the hands of the customer and beyond our control, we cannot guarantee that the customer will obtain the results described in this bulletin, nor can we assume any responsibility for the use of this product by the customer in any process which may infringe the patents of third parties.