



Better Chemistry. **Better Business.**

**Mi-Phos™ Z-2**

Product Code: 2202000  
Revised Date: 01/23/2009

### **Mi-Phos™ Z-2**

#### **DESCRIPTION**

**Mi-Phos™ Z-2** is a heavy zinc phosphate for steel.

#### **FEATURES AND BENEFITS**

- Heavy Zinc Phosphate
- Temperature 190 to 200 F (88 – 93 C)
- Military Spec MIL DTL 16232
- Excellent for paint adhesion
- Dip or Spray

#### **TYPICAL APPLICATIONS**

- Pre-Paint and Powder Coat
- Automotive
- Military DOD
- Hand Tools

**Mi-Phos™ Z-2** chemical is formulated to produce on steel and iron surfaces a non-metallic, oil absorptive coating of zinc phosphate. This coating is an excellent base for the retention of a rust preventative, which will increase the corrosion resistance of the final finished part.



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### CHEMICALS REQUIRED

Aquaease™

**Mi-Phos™ Z-2**

Mi-Phos™ Black Predip (if a black zinc phosphate is required)

Mi-Phos™ CP Sealer (used to meet Mil Spec.)

MetalGuard® (final rust preventive)

### PROCESSING EQUIPMENT

The processing tank, heating coils and pump (used to transfer the **Mi-Phos™ Z-2** solution) should be constructed of 300-type stainless steel. If mild steel is used, then the life of the equipment will be shorter than that of the stainless steel. One comment is that if direct gas heat is used, mild steel tanks should be used. The reason is that the direct heating of the floor of the tank causes expansion and contraction of the metal and stainless steel will have hairline cracks, which will cause the tank to leak.

### PROCESSING SEQUENCE

The following system is to be used as a guide for the operation of this process.

1. Aquaease™, alkaline soak cleaner
2. Water rinse, overflowing
3. Mi-Phos™ Black Predip (if black coating is required)
4. Water rinse, overflowing (if black coating is required)
5. **Mi-Phos™ Z-2**
6. Water rinse, overflowing
7. Mi-Phos™ Sealer (not always required)
8. MetalGuard®, rust preventive

### OPERATION

**Cleaning:** all metals to be treated in **Mi-Phos™ Z-2** solution must be chemically cleaned and free from dirt, oil grease, etc. The proper Hubbard-Hall cleaner will be determined when the soil conditions are known.



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**Water rinsing:** all water rinses must be kept free from contaminants from prior solutions by overflowing them when in use. Best type of water additions is by a bottom feed line while the overflow should be in the back of the solution away from the water input.

**Rust removal:** if rust is present on work, it should be removed by either an acid or alkaline product.

**Black Predip:** if a black zinc phosphate coating is required, then Mi-Phos™ Black Predip is used. Please refer to the Product Bulletin for this product.

**Zinc phosphate:** Mi-Phos™ Z-2 is used as stated in the following paragraphs and will produce a quality coating that will enhance the corrosion resistance of the final finish.

**Sealer:** use of Mi-Phos™ Sealer is required in some cases to meet military specifications. Refer to Product Bulletin for these products.

**Rust Preventive:** various rust preventives are available from Hubbard-Hall and are called MetalGuard®. The selection of this material will depend on the individual requirement.

### **OPERATION OF Mi-Phos™ Z-2**

The properly cleaned articles are immersed into the **Mi-Phos™ Z-2** solution made up at 3 to 4 percent by volume for 15 to 30 minutes at 190° to 200°F. Parts should be agitated so there will not be any contact marks.

### **Mi-Phos™ Z-2 BUILD-UP**

A new **Mi-Phos® Z-2** solution is made up by adding 3 1/2 gallons of **Mi-Phos® Z-2** concentrate to 97 gallons of water. Heat solution to 150°F, then add 2 pounds of steel wool or clean scrap iron per 100 gallons of solution. Leave in solution for 2-3 hours, then remove steel wool from bath, add water to operating level, check bath for proper strength, heat to operating temperature, then begin to process work.

The addition of steel wool is to age the bath as well as introduce iron so the coating will be complete and fine grained.

### **Mi-Phos™ TESTING AND CONTROL**

A solution made up at 3% by volume of **Mi-Phos™ Z-2** will result in a bath having a strength of 33 points. To check out the strength, use the following method:



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### **CONCENTRATION:**

10 milliliter sample  
5 drops of phenolphthalein indicator  
Add 0.1N sodium hydroxide to a pink color

**RANGE:** 31 TO 35 milliliters of 0.1N NaOH

To raise concentration 1.0 point, add 0.1 gallon of **Mi-Phos™ Z-2** concentrate per 100 gallons of solution.

### **FREE ACID:**

10 milliliter sample  
3-5 drops of brom phenol blue indicator  
Add 0.1N sodium hydroxide to a purple color

**RANGE:** Normally this is not controlled except by operating the bath with production.

The use of Free Acid control is to determine the operating ratio of Free Acid to concentration. The range should be between 6.0 to 1 and 7.5 to 1.

### **IRON CONTROL:**

As the solution is used, iron is built up in the solution and it must be removed before it interferes with the coatings being obtained. Iron is controlled by the following method.

First check out the bath to determine if it contains iron by dipping a piece of I.T.P. into the solution. If it changes to a red color then it contains iron and proceed with the following test.

Add a 10 milliliter sample of bath to a beaker  
Add 2 milliliters of 50% sulfuric acid  
Add 0.2N potassium permanganate solution to a permanent pink color (20 seconds).

**RANGE:** 0.1 to 6.0 milliliters of 0.2 N KMnO<sub>4</sub>.

Normally iron will not be lost from an operating solution, but rather build up to a point that it will interfere with the coatings being obtained. Reduction of the iron is performed by the following:



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a) Discard a portion of the operating solution, add water, then raise concentration to proper operating range by **Mi-Phos™ Z-2** concentrate.

### **DISPOSAL OF Mi-Phos™ Z-2 SOLUTION**

Normally zinc phosphating solutions are maintained in the operating ranges by the control methods stated in this operating sheet. However, if the bath must be discarded, reference should be made to Waste Treatment Procedure for disposal of acidic phosphate solutions.

### **MAINTENANCE**

When the product is used, an insoluble residue is formed as a by-product of the chemical reaction and will normally settle to the bottom of the tank and should be removed periodically. This can be done by letting the sludge settle to the bottom of the tank, pump the clear solution to a holding tank, remove the sludge, then return the solution to the tank. Add water and bring solution up to strength.

Heating coils will become scaled with the reaction material and should be removed and cleaned so they will not interfere with the heating of the solution.

### **WASTE TREATMENT PROCEDURE FOR Mi-Phos™ Z-2**

The **Mi-Phos™ Z-2** is an acidic solution. Adjust the pH from 8 1/2 to 9 using caustic soda or lime to precipitate out all the metals. Discharge the liquid according to local regulations.

The sludge is considered a hazardous waste and should be accumulated and hauled off by a reputable waste hauler.

### **PRECAUTIONARY INFORMATION**

#### **DANGER...ACID CAN CAUSE BURNS**

Avoid contact with skin, eyes and clothing. Wear a face shield, rubber gloves and apron when handling **Mi-Phos™ Z-2** concentrate.

In case of contact with skin, FLUSH with large quantity of water. For eyes, FLUSH with large quantities of water for at least 15 minutes and obtain medical attention at once.

For spillage on the floor, rinse with water.



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### **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.