Product Bulletin

Product Name: Mi-Phos Z-112
Product Code: 2202003
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Mi-Phos™ Z-112

Mi-Phos Z-112 is formulated to produce a non-metallic, oil absorptive coating of zinc phosphate on steel and iron surfaces. This coating is an excellent base for the retention of a rust preventive, which will increase the corrosion resistance of the final finished article. Mi-Phos Z-112 is formulated for low temperature operation as well as control of sludge and iron buildup.

Features & Benefits

Base for rust preventative retention	Increased corrosion protection
Low temperature operation	Control of sludge and iron buildup

Operating Conditions

The following procedure is to be used as a guide in setting up the operation of this product:

1. Immerse parts in the appropriate Hubbard-Hall cleaner to remove dirt, soils, oils, and grease.
2. Overflowing Water Rinse
3. Rust Removal (if required)
4. Overflowing Water Rinse (if rust removal is needed)
5. Mi-Phos Black Pre-Dip (if required).
6. Overflowing Water (if Pre-dip required).
7. Mi-Phos Z-112.
8. Overflowing Water Rinse.
9. Mi-Phos Sealer (not always required)
10. Metal Guard

Cleaning: All metals to be treated in Mi-Phos Z-112 solution must be chemically cleaned and free from dirt, soils, oils grease and rust. The proper Hubbard-Hall, Mi-Clean or Aquaease will be recommended.

Water Rinsing: all water rinses must be kept free from contaminates 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 away from the water input.

Rust Removal: If rust or scale is present; it should be removed prior to the application of MI-PHOS Z-112. The proper material will be recommended.

Black Pre-dip: Mi-Phos Black Pre-dip is used when a jet-black zinc phosphate coating is required. See instruction sheet on this product for further information.

Zinc Phosphate: Mi-Phos Z-112 is used as per the following paragraphs and will produce a high-quality zinc phosphate coating that will accept a rust preventive to enhance the final finish.

Sealer: Use of Mi-Phos Sealer is required in some cases to meet Military Specifications. Refer to instruction sheet on these products.

Rust Preventive: Various Metal Guard rust preventives are available from Hubbard-Hal. The selection of the proper Metal Guard will be made to fit the requirement.

The properly cleaned articles are immersed in the Mi-Phos Z-112 solution made up at 2% to 4% by volume for 10 to 30 minutes at 140°F to 200°F. Parts should be agitated to avoid contact marks.

Mi-phos Z-112 buildup
A new Mi-Phos Z-112 bath is made up by adding 3 gallons of Mi-Phos Z-112 concentrate to 97 gallons of water. Heat the solution to 140°F to 150°F. and process one (l) lb. per 100 gallons of solution of clean steel wool or scrap steel. This is to introduce iron into the bath. Processing time for this operation is 30 minutes to one (l) hour. After this time, remove processed steel, heat to processing temperature and check out the bath to be sure it is in proper operating range.

The addition of steel into the bath is to age it as well as introduce iron into the solution so the coating will be complete and fine grained
.
A solution made up at 3% by volume of Mi-Phos Z-112 will result in a bath having a concentration of 30 points. The following method is used to check and control the strength of this solution.

Titration Method

Total acid
1. Pipette a 10 mL sample into a 250 mL Erlenmeyer Flask.
2. Add 5 drops of Phenolphthalein Indicator to flask and swirl to mix.
3. Titrate with 0.1 N Sodium Hydroxide Solution to a pink color.

4. Record the mL of 0.1 N Sodium Hydroxide Solution required to reach the endpoint.

Range: 28 to 35 milliliters

To raise concentration 1.0 milliliter, add 0.1-gallon Mi-Phos Z-112 concentrate per 100 gallons of solution.

Free acid

1. Pipette a 10 mL sample into a 250 mL Erlenmeyer Flask.
2. Add 3-5 drops Bromophenol Blue Indicator and swirl to mix.
3. Titrate with 0.1 N Sodium Hydroxide Solution to a purple color.
4. Record the mL of 0.1 N Sodium Hydroxide Solution required to reach the endpoint.

The free acid control is used to check on the ratio of free acid to total acid.
Ratio = l: 6.0 to l: 7.5

Range: Normally this is not controlled by an outside chemical addition. If needed the addition of Mi-Phos Z FA Neutralizer can be used to lower the free acid. Normally, running parts and iron additions will lower the free acid.

The parameters stated in this product bulletin are suggested ranges. Part alloy and heat treatment may require diversion from the suggested ranges. Operation outside the stated parameters is acceptable when validated by adherence to performance requirements / specifications."

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

First, use the I.T.P. to determine if the bath contains iron dip. Dip a piece of I.T.P. into the solution. If it turns red, iron is present. Then proceed with the following test:

1. Pipette a 10 mL sample into a 250 mL Erlenmeyer Flask.
2. Add 2 mL of 50% Sulfuric Acid and swirl to mix.
3. Titrate with 0.1 N Potassium Permanganate Solution to a pink color lasting 20 seconds.

Range: 0.1 to 6.0 milliliters of 0.2 N KMNO4

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 iron is presently performed by discarding a portion of the bath, replenishing with water and Mi-Phos Z-112.

Equipment

The processing tank, heating coils and pump (to transfer the Mi-Phos Z-112 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 stainless steel. If direct gas-fired heating is used, then mild steel should be used.

Maintenance

When the product is used, an insoluble residue is formed as a by-product. It will normally settle to the bottom of the tank and should be removed periodically. This can be done by allowing the sludge to settle to the bottom of the tank, pump the clear solution to a holding tank, remove the sludge, return the clear solution to the tank and replenish to operating conditions.

Waste Disposal

If maintained within proper operating conditions, zinc phosphate solutions are normally not disposed of. If the disposal is needed, the AQUAPURE team can assist with the proper disposal method.

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