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Mi-Phos™ Z-10

Product Code: 2202004
Revised Date: 9/12/2012

Mi-Phos™ Z-10

DESCRIPTION

Mi-Phos™ Z-10 is a fine-grained, calcium modified, crystalline zinc phosphate coating for steel. It may be used as a paint base or as a corrosion resistant coating.

FEATURES AND BENEFITS

- Easy additions with Liquid Concentrate
- Temperature 180 to 185 F (82 – 85 C) spray or dip
- Calcium modified tight grain
- TT-C-490 Type I
- Excellent for paint adhesion

TYPICAL APPLICATIONS

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

1.0 SCOPE

Mi-Phos™ Z-10 chemical is formulated to produce a non-metallic, fine-grained, crystalline zinc phosphate coating, regardless of the cleaning method used, on steel and iron surfaces by spray or immersion.

2.0 CHEMICALS REQUIRED

Mi-Clean or **Aquaease** spray or immersion cleaner
Mi-Phos™ Z-10
Emerald Seal 308 or chromic acid to meet military specifications.
Testing Solutions and equipment



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3.0 PROCESSING EQUIPMENT

The process tanks, heating coils, and pump (used to transfer the Mi-Phos™ Z-10 solution) should be constructed of 300-type stainless steel. If mild steel is used, the life of the equipment will normally be shorter than that of stainless steel. If direct gas-fired heating is used, then mild steel should be used.

When **Mi-Phos™ Z-10** is used by spray application, piping, pumps, and spray nozzles should be constructed of stainless steel. The spray chamber (housing) should also be constructed of stainless steel.

4.0 PROCESSING SEQUENCE

The following procedure is to be used as a guide in setting up the operation of these products.

1. **Mi-Clean** or **Aquaease** spray or immersion cleaner.
2. Overflowing water rinse.
3. **Mi-Phos™ Z-10**
4. Overflowing water rinse
5. **Emerald Seal 308** or chromic to meet military specifications.
6. Dry (heat or forced air).
7. Paint or rust preventive.

5.0 OPERATION

Cleaning: all metals to be treated should be clean, i.e. free from soils, dirt, and rust. Your Hubbard-Hall sales representative will guide you in choosing the proper Mi-Clean™ or Aquaease product to use.

Mi-Phos™ Z-10 is formulated to allow for the use of heavy-duty cleaners and rust removers to prepare the metal surface for the phosphate without causing variations in coating thickness, weight, or appearance.

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

Zinc Phosphate: **Mi-Phos™ Z-10** is used as described in section 5.1 and 5.2 below. When used as directed, it will produce a high-quality modified zinc phosphate coating that will enhance the corrosion resistance of the finished part. The 180F temp gives the best



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results for Mil Spec work. Lower temp may be used for lower weights for non-Military specification work. However, the best results are achieved at 180F.

Sealer: Emerald Seal 308 should be used to seal and neutralize the zinc phosphate coating. The use of this material will increase the corrosion resistance of the finished part. Dilute chromic acid should be used as directed by military specification when processing work to meet applicable military specifications.

5.1 Mi-Phos™ Z-10 OPERATION

The properly cleaned articles are brought into contact with the Mi-Phos™ Z-10 solution either by spray or immersion with contact times of one (1) to 5 minutes at 180° to 185°F. Agitation of parts processed in baskets is recommended when the Mi-Phos Z-10 is applied by immersion to prevent “nesting” and contact marks.

Mi-Phos™ Z-10 will meet Specification TT-C-490 only when all criteria listed in the most recent version of that specification are followed. That includes testing of rinse water, temperature, coating weights, salt spray requirements, submission of test specimens, sampling and testing frequency, embrittlement relief, post dips and coatings or any additional tests deemed necessary to comply with that specification and governing body.

5.2 Mi-Phos™ Z-10 BUILDUP

A new **Mi-Phos™ Z-10** solution is made up and operated as per the following chart:

	<u>Immersion</u>	<u>Spray</u>
Make up	4-6-gallon/100-gallon	2-4-gallon/100 gal.
Temperature	180 -185°F.	170 - 180°F.
Operating Time	3 to 15 minutes	60 to 90 seconds
Concentration	4% = 26 points	3% = 19.5 points
Coating Weights	300-900 mg/ft ²	150-300 mg/ft ²

Mi-Phos™ Z-10 when used at 6% by volume will produce a coating offering excellent corrosion resistance when coated (sealed) with a rust preventative such Metal Guard 480, Metal Guard 510, Metal Guard 310, or Metal Guard 350. It may also be used at this concentration over the black coating produced by Mi-Phos Black Solution to yield a black phosphate coating offering outstanding corrosion resistance when seal with the Metal Guards mentioned above.



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It should be noted that new Mi-Phos Z-10 solutions will often produce a slightly coarser grain structure than used (broken in) solutions. The solution will rapidly “break in” as work is processed.

5.3 TESTING AND CONTROL

The following methods are used to maintain the operating strength of the Mi-Phos™ Z-10 solution. The specific range for meeting TT-C-490 can vary with the alloy, abrasive blast and needs to be tested and adjusted for time and concentration to narrow the range to meet the specification. The following is the general starting point for that purpose.

CONCENTRATION: = Total Acid

10-milliliter sample
5 drops phenolphthalein indicator
Add 0.1 N sodium hydroxide until the pink end point is reached.

Range: Immersion: 26 to 40 milliliters
Spray: 13 to 26 milliliters

To raise the concentration 1.0 milliliters, add 0.15 gallons of **Mi-Phos™ Z-10** concentration per 100 gallons of solution.

Free Acid:

10-milliliter sample
3-5 drops bromophenol blue indicator
Add 0.1 N sodium hydroxide until the reddish-purple color end point is reached.

The range will vary with each application and concentration used. Operation of this solution on a free acid/total acid ratio should be used rather than direct free acid reading.

Ratio = Total Acid/Free Acid
Ratio Range: 6.0: 1 to 8.0: 1

To lower the free acid, small additions of soda ash should be used. However, normal operation of this solution will keep the bath within specifications.

The table below shows concentration in % by volume, Total Acid (TA), Free Acid (FA) and TA /FA Ratio.



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Conc	4.0%	4.0%	4.5 %	4.5%	5.0%	5.0%	5.5%	5.5%	6.0%	6.0%
Total Acid	26	26	29	29	33	33	36	36	40	40
Free Acid	3.25	4.3	3.6	4.8	4.1	5.5	4.5	6.0	5.0	6.6
Ratio	1:8	1:6	1:8	1:6	1:8	1:6	1:8	1:6	1:8	1:6

6.0 DISPOSAL OF Mi-Phos™ Z-10 SOLUTION

Normally, zinc phosphate solutions are not disposed of but maintained within proper operating conditions by additions of **Mi-Phos™ Z-10** concentrate. If disposal become necessary the solution should be treated with other metal bearing wastes or package for proper disposal.

7.0 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.

Heating coils will become scaled with the reaction by-product and should be cleaned when it interfered with the heating of the solution. Hubbard-Hall has the proper chemicals for this operation.

8.0 PRECAUTIONARY INFORMATION

DANGER: ACID CAN CAUSE BURNS

Avoid contact with skin, eyes and clothing. Wear a face shield, rubber gloves and rubber apron when handling **Mi-Phos™ Z-10** concentrate.

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

For spillage on 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.

Edited by RWF 9-12-2012