Technical Data Sheet

BONDERITE® M-AC ZN

Known as FIXODINE ZN
January 2024

Product description

BONDERITE® M-AC ZN provides the following product characteristics:

Technology	Surface treatment
Product type	Powdered conditioning agent
Application	Surface treatment

BONDERITE® M-AC ZN is especially formulated to prepare iron, steel, aluminum, zinc and zinc alloy surfaces for subsequent phosphate coating applications. These surfaces may be treated individually or in mixed production by either spray or immersion processing. The titanium-containing conditioning pretreatment promotes the formation of a dense, fine grained phosphate coating which is preferred as a paint base for the automotive industry and which offers superior adhesion and durability in corrosive environments.

Direction for use

Preliminary statement:
Prior to use it is necessary to read the **Material Safety Data Sheet** for information about precautionary measures and safety recommendations. Also, for chemical products exempt from compulsory labeling, the relevant precautions should always be observed. Please also refer to the local safety instructions and contact Henkel for analytical support.

Equipment:
The process tank, housing, pumps and piping for use with this solution may be constructed of mild steel. In spray applications, maintenance will be simplified if nozzles are fabricated from 300 series stainless steel. All process circulating pump seals, valve seats, door seals, and other elastomers which come in contact with the working process solution may be Buna-N, EPDM, FKM or PTFE. Note that while CSPE is compatible with the process solution, it is not compatible with acid equipment cleaners which may be used.

Automatic process control equipment, which promotes consistent quality and controlled costs, is available for automatically controlling this process. Auxiliary equipment, which is engineered and specified for this process, include air operated chemical transfer pumps, chemical metering pumps, reliable level controls, solenoid valve assemblies and bulk storage tanks. Chemixers are available in three sizes for preparing solutions of powdered products which then may be metered into the process at a controlled rate. All chemical pump seals, valve seats and other elastomers which come in contact with the concentrated solution can be Buna-N, EPDM, FKM, PTFE or CSPE.

Your local sales representative should be consulted for information on Parker Amchem automatic process control equipment for this process and any additional questions.

Operating data:

Spray:

Total titanium, ppm	7 to 10
Filterable titanium, ppm	3 to 5
pH	8.5 to 9.5
Temperature, °F	<120
Time, seconds	20 minimum

Immersion:

Total titanium, ppm	15 to 20
Filterable titanium, ppm	5 to 10

Bath make-up per 100 gallons

Spray:

BONDERITE® M-AC ZN , pounds	0.85
Soda Ash (Bath will contain 10 ppm total titanium)	to pH 8.5 to 9.5

Immersion:

BONDERITE® M-AC ZN , pounds	1.7

Process description:
All metal to be treated with the conversion coating solution must be properly cleaned and properly conditioned before the treatment. The complete process for surface preparation normally consists of the following steps:

1. Cleaning
2. Water rinsing
3. Treating with the BONDERITE® M-AC ZN solution

Surface preparation:

Cleaning:
All metal to be treated with the conversion coating solution must be free from grease, oil and other foreign matter before the treatment. A complete line of cleaners is available and our representative will recommend the proper one for each installation.

Water rinsing:
After cleaning, the metal must be thoroughly rinsed with water. The rinse should be warm, however the temperature should not exceed 120°F to avoid affecting the conditioning chemical. The rinse should be overflowed continuously at a rate which will keep it clean and free from scum and contamination.

Pretreatment:
BONDERITE® M-AC ZN a conditioning pretreatment, must be added to the water rinse before the conversion coating treatment stage to obtain the proper coating crystal structure.

Preparation of the dispersion:
The proper preparation of the conditioner dispersion will improve both the consumption of chemicals and the effectivenessof the conditioning step. Undispersed material may precipitate and will be unavailable for conditioning. Any remaining particles may be deposited on horizontal surfaces and thus contribute to paint film roughness. The most efficient method of preparing the dispersion uses a correctly sized tank equipped with a mixer. The requisite amount of conditioning chemical should be added slowly to the needed water with stirring. Stirring should be continued until there are no particles visible in the dispersion. In order to achieve complete dispersion in a reasonable time, the temperature of the water shouldbe at least 60°F but not greater than 120°F. A temperature of 80°F is preferred.

Spray application
The preferred method for spray application is to meter a dispersion of BONDERITE® M-AC ZN into the final riser in the rinse stage before the conversion coating treatment solution. The nozzle arrangement in the final riser should provide coverage of all accessible metal surfaces.

The amount of BONDERITE® M-AC ZN in the dispersion should provide 7 to 10 ppm of total titanium and 3 to 5 ppm of filterable titanium in the solution from the final riser. Since the conditioning chemical loses its effectiveness with aging, the dispersion should be made up fresh each day in a stirred day tank. The method for control of the BONDERITE® M-AC ZN Chemical level is explained in the instructions for the use of the titanium test kit.

An alternate method of application is to meter a dispersion of BONDERITE® M-AC ZN into the main header of the rinse section preceding the conversion coating treatment solution section. It will be necessary to make a daily addition of predispersed BONDERITE® M-AC ZN directly to the rinse tank to provide an initial total titanium concentration in the rinse solution of 5 to 7 ppm (2 to 3 ppm filterable).

The metering rate should provide enough titanium to allow the solution measured at a riser to provide 7 to 10 ppm of total titanium. A starting metering rate which will provide one pound per hour of BONDERITE® M-AC ZN is suggested.

These concentrations are starting recommendations which have been shown to give maximum conditioning results as seen in the crystal size of the resulting coatings and our representative should be consulted for optimization of the parameters.

Immersion application
For immersion application, the conditioning bath is prepared by the addition of the pre-dispersed BONDERITE® M-AC ZN to obtain a total titanium level of 15 to 20 ppm and a filterable titanium level of 5 to 10 ppm. Agitation of an immersion bath is required to prevent settling of the bath. Since the conditioning bath becomes less effective with aging, the working solution must be replenished. A suggested regimen would be to add a concentrated dispersion from a day tank at such a rate that the BONDERITE® M-AC ZN in the bath is turned over in a 5 day period. This will require that the bath tank it self have an overflow rate such that the tank volume remain essentially the same.

In general, once the BONDERITE® M-AC ZN concentration, rinse overflow rate and dump schedule have been established for optimum conditioning, they should be maintained for consistent

Operation:
The cleaned metal is treated with the conditioning pretreatment bath immediately before the conversion coating treatment solution. Either spray or immersion application may be used. pH of the conditioning pretreatment bath must be maintained between 8.5 and 9.5.

Temperature, °F	<120
Time, seconds	20

Bath control
The titanium concentration in the conditioning bath is best maintained using the pocket photometer instructions below. Customers still using the discontinued Henkel Conditioner Test Kit IDH#: 592454 (Color Wheel) should follow the instructions found at the end of this section.

Preparation of Reagent Solution 140:
Prior to use, add exactly 45 ml of Reagent Solution 46 (using supplied graduate) to the quart bottle containing 900 ml of Reagent Solution 140A; mild gassing may occur. Attach the vented cap and mix thoroughly. Discard the shipping cap and attach the supplied label (Reagent Solution 140) over the original label.

Procedure - Total Titanium by pocket photometer:
1. Agitate the bath sample to suspend all particles.
2. Using a 25 ml graduated cylinder, add 25 ml of bath sample to a 150 ml beaker.
3. Using a 10 ml graduated cylinder, add 5 ml of Reagent Solution 140 to the bath sample in the beaker.
4. Swirl the mixture, if titanium is present, a yellow color will develop.
5. Fill a sample cell with water. The solution level should completely fill the lower rectangle of the cell.
6. Turn on the pocket photometer. Place the water cell in the sample holder with its tab facing the user and cover it with the light-shielding cover.
7. Press the Zero button on the photometer to record the zero point.
8. Fill the other sample cell with the yellow mixture from step 4. The solution level should completely fill the lower rectangle of the cell.
9. Place this cell into the sample holder on the photometer with its tab facing the user and cover it with the light- shielding cover.
10. Press the Read button on the photometer to obtain a measurement.
11. Record the Absorbance number obtained. To obtain the Total Titanium in PPM, divide the Absorbance number by 0.0179.

Procedure - Filterable Titanium by pocket photometer:
1. Agitate the bath sample to suspend all particles.
2. Filter the bath sample through Whatman No. 42 Filter Paper or the equivalent. Use gravity filtration.
3. Using a 25 ml graduated cylinder, add 25 ml of filtrate to a 150 ml beaker. The filtrate is the portion of bath sample which passed through the filter paper.
4. Using a 10 ml graduated cylinder, add 5 ml of Reagent Solution 140 to the filtrate.
5. Swirl the mixture, if titanium is present, a yellow color will develop.
6. Fill a sample cell with water. The solution level should completely fill the lower rectangle of the cell.

7. Turn on the pocket photometer. Place the water cell in the sample holder with its tab facing the user and cover it with the light-shielding cover.
8. Press the Zero button on the photometer to record the zero point.
9. Fill the other sample cell with the yellow mixture from step 5. The solution level should completely fill the lower rectangle of the cell.
10. Place this cell into the sample holder on the photometer with its tab facing the user and cover it with the light- shielding cover.
11. Press the Read button on the photometer to obtain a measurement.
12. Record the Absorbance number obtained. To obtain the Total Titanium in PPM, divide the Absorbance number by 0.0179.

Additional notes:

1. Clean and dry the sample cells after each sample for best results.
2. This test method tolerates some turbidity. If the sample remains excessively cloudy after the Reagent Solution 140 is added, your Henkel representative should be notified.

Procedure - Total Titanium by (Color Wheel):

1. Insert the titanium disc into the comparator box.
2. Agitate the bath sample to suspend all particles.
3. Using a 25 ml graduated cylinder, add 25 ml of bath sample to a 150 ml beaker.
4. Using a 10 ml graduated cylinder, add 5 ml of Reagent Solution 140 to the bath sample in the beaker.
5. Swirl the mixture, if titanium is present, a yellow color will develop.
6. Place the mixture into one of the viewing tubes provided with the titanium disc. The solution level should be at or above the mark on the tube.
7. Fill a second viewing tube with water. The solution level should be at or above the mark on the tube.
8. Insert the 2 viewing tubes into the comparator box. The tube containing the titanium solution should be placed in the hole closer to the center of the box.
9. Hold the comparator box in front of a white background and view the two solutions through the windows in the side of the box. The box should be several inches from the white background so that the windows receive equal lighting with a minimum of shadowing.
10. Rotate the color disc until the colors seen through the windows match as closely as possible.
11. Record the number found in the window which is located below the solution windows. The number represents parts per million (PPM) total titanium in the conditioner bath.

Procedure - Filterable Titanium by (Color Wheel):

1. Insert the titanium disc into the comparator box.
2. Agitate the bath sample to suspend all particles.
3. Filter the bath sample through Whatman No. 42 Filter Paper or the equivalent. Use gravity filtration.
4. Using a 25 ml graduated cylinder, add 25 ml of filtrate to a 150 ml beaker. The filtrate is the portion of bath sample which passed through the filter paper.
5. Using a 10 ml graduated cylinder, add 5 ml of Reagent Solution 140 to the filtrate.
6. Swirl the mixture, if titanium is present, a yellow color will develop.
7. Place the mixture into the viewing tubes provided with the titanium disc. The solution level should be at or above the mark on the tube.
8. Fill the second viewing tube with water. The solution level should be at or above the mark on the tube.
9. Insert the 2 viewing tubes into the comparator box. The tube containing the titanium solution should be placed in the hole closer to the center of the box.
10. Hold the comparator box in front of a white background and view the two solutions through the windows in the side of the box. The box should be several inches from the white background so that the windows receive equal lighting with a minimum of shadowing.
11. Rotate the color disc until the colors seen through the windows match as closely as possible.
12. Record the number found in the window which is located below the solution windows. The number represents parts per million (PPM) total titanium in the conditioner bath.

Notes:

1. The titanium color disc will fade if exposed to direct sunlight for long periods of time. When not in use, the disc should be stored in the comparator box or in the opaque plastic bag provided with the Comparator Test Kit.
2. This test method tolerates some turbidity. If the sample remains excessively cloudy after the Reagent Solution 140 is added, Henkel Surface Technologies representative should be notified.

After treatment:
The surface is now ready for application of the conversion coating solution. No further surface preparation treatment is needed.

Waste disposal information:
Applicable regulations covering disposal and discharge of chemicals should be consulted and followed. Disposal information for the chemicals in the form as supplied, is given on the Material Safety Data Sheet for each product. The pretreatment bath is slightly alkaline and contains phosphate and heavy metal based on the chemicals as supplied. Waste treatment and neutralization may be required prior to discharge to the sewer. (Refer to Waste Treatment Information Bulletin WT1002, available on request.)

Precautions:
When handling the chemical product used in this process, the first aid and handling recommendations on the Safety Data Sheet for the product should be read, understood and followed. The processing bath is alkaline and can cause irritation of the skin and eyes.

Do not get in eyes, on skin or on clothing. In case of contact, follow the recommendations on the Material Safety Data Sheet for BONDERITE® M-AC ZN .

Classification:
Please refer to the corresponding **Material Safety Data Sheets** for details on:

Transport Regulations
Hazardous Information
Safety Regulations

Storage:
BONDERITE® M-AC ZN is a powdered product and does not require special protection in cold weather or special storage conditions.

Additional information

Disclaimer
The information provided in this Technical data sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product. Any liability in respect of the information in the Technical data sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

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