

# BONDERITE M-ZN 952

Known as Granodine 952

April 2019

## PRODUCT DESCRIPTION

BONDERITE M-ZN 952 provides the following product characteristics:

<b>Technology</b>	Metal Pre-Treatment
<b>Product Type</b>	Tricationic
<b>Application</b>	Zinc phosphating Spray process
<b>Accelerator</b>	Nitrite
<b>Process components:</b>	
BONDERITE M-ZN 952 A	Make-up
BONDERITE M-ZN 952	Replenisher
BONDERITE M-AD 132	Accelerator
BONDERITE M-AD 565	Neutralizer

BONDERITE M-ZN 952 is a nitrite accelerated tricationic phosphating process for steel, galvanized and alloy coated (Zn/Ni) steel. It generates a fine crystalline coating of manganese and nickel containing zinc phosphate. The crystalline layer has very good corrosion protection properties and is an excellent foundation for subsequent painting or organic coating. The coating weight is typically 1.8 to 2.8 g/cm<sup>2</sup> (depending on process conditions and/or substrate, the value can deviate).

## Application Areas:

BONDERITE M-ZN 952 is particularly suited for pretreatment for electrocoat application. Suitable for control with Automatic Control Equipment.

## TECHNICAL DATA

Appearance	clear, green liquid
Density	~1.41 g/cm <sup>3</sup>
pH-value (20% solution):	~2.2

## DIRECTIONS 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.

## Application, for 1,000 L:

Fill 3/4 of the bath with cold water and add during continuous pump circulation:

BONDERITE M-ZN 952	43.0 kg = 32.0 l
BONDERITE M-AD 565	14.0 kg = 12.6 l
BONDERITE M-AD 132	0.5 L

Before start up fill the tank to correct work level.

## Operating Data:

Adjusting the following data could be necessary depending on the phosphating process.

Total Acid	16.0 to 24.0 ml
Free Acid	0.6 to 0.9 ml
Accelerator (gas)	1.0 to 2.5 ml
Zinc	2.8 to 3.8 ml
Temperature	48 to 55 °C
Duration of treatment	60 to 180 s
Spray pressure	0.8 to 2.0 bar

## Process Description:

### 1. Cleaning

Cleaning is preferentially done with a suitable alkaline MPT cleaner (e.g. BONDERITE C-AK 1574 plus surfactant BONDERITE C-AD xxxx). For heavily contaminated goods the addition of a BONDERITE cleaning booster may be necessary. For details please refer to the corresponding Technical Data Sheets.

### 2. Rinsing

Cleaning is followed by rinsing with water. A continuous overflow should be maintained to avoid contamination.

### 3. Conditioning

We recommend surface conditioner like BONDERITE M-AC 950 or Prepalene X for this. Conditioning provides homogeneous and fine grained zinc phosphate coatings on steel, galvanized and alloy coated steel. Softened or deionized water is best suited for the activating bath. For details please refer to the corresponding Technical Data Sheets.

### 4. Phosphating with BONDERITE M-ZN 952

Keep parameters in the recommended range. We suggest to add BONDERITE M-ZN 952 and BONDERITE M-AD 132 solution continuously by a dosing pump. At too high temperatures formation of sludge and consumption of accelerator will increase. Sparse coatings and rusting can be the result of working at low temperatures, too high "Free Acid" or with insufficient dosing of BONDERITE M-ZN 952 and BONDERITE M-AD 132.

#### 5. Rinsing

The rinse after the phosphating zone must be continuously overflowed with fresh water.

#### 6. Passivating

Dosing of a passivating product like BONDERITE M-PT 54 NC to the last rinse is recommended. For the make up of this product we recommend soft or deionized water. Depending on the phosphatizing line design, the passivating bath is running at 20 to 55 °C. For details please refer to the corresponding Technical Data Sheets.

#### 7. Rinsing with deionized water

Before starting the electrocoating, rinsing with deionized water is recommended.

#### 8. Drying (Depending on the process, it may be necessary)

We recommend fast and complete drying at temperatures of 100 to 120 °C in ovens with indirect heating. In agreement with the paint supplier, oven drying may be omitted prior to the application of water based paints.

#### Bath Monitoring:

The BONDERITE M-ZN 952 bath solution is controlled by the following analysis.

##### Titration of Total Acid:

- Pipette 10 mL of working bath into a 300 mL flask.
- Add 50 mL deionized water.
- Add 5 drops of indicator phenolphthaleine (0.1 % alcoholic solution).
- Titrate the solution with 0.1 N sodium hydroxide.
- The endpoint will be shown by a colour change from colourless to permanent pink (pH-value: 8.5).
- The consumption of 0.1 N sodium hydroxide in mL is equal to the content of total acid.

Specified range: 16 to 24 mL

##### Replenishing of the bath:

Add per missing mL and per 1,000 L of bath volume:

BONDERITE M-ZN 952 1.8 kg = 1.3 l

##### Remark:

Correcting with BONDERITE M-ZN 952 is meant for normal conditions.  
Special conditions may require an alternative replenisher.

##### Titration of Free Acid:

- Pipette 10 mL of working bath into a 300 mL flask.
- Add 50 mL deionized water.
- Add 5 drops of indicator bromophenolblue (0.04 % alcoholic solution).
- Titrate the solution with 0.1 N sodium hydroxide.
- The endpoint will be shown by a colour change from yellow to blue.
- The consumption of 0.1 N sodium hydroxide in mL is equal to the content of free acid.

##### Titration of Free Acid with pH-meter:

- Pipette 10 mL of working bath into a 300 mL flask.
- Add 50 mL deionized water.
- Dip in the electrode.
- Titrate drop by drop with 0.1 N sodium hydroxide solution until the pH-value 3.6 is reached.
- The consumption of 0.1 N sodium hydroxide in mL is equal to the content of free acid.

Specified range: 0.6 to 0.9 mL

##### Remark:

The specified free acid range refers to the measurement with pH-meter. The measurement with indicator bromophenolblue shows 0.3 to 0.7 mL higher results, depending on the fluoride content in the bath.

##### Correction of Free Acid content:

If the free acid content is too high, correct it with diluted BONDERITE M-AD 565 with running circulating pump.

Add per 0.1 mL of excessed free acid and per 1,000 L bath volume:

BONDERITE M-AD 565 0.4 kg = 0.36 l

Under normal conditions a too low content of free acid will not occur therefore a correction would not be necessary.

##### Accelerator measurement:

- Fill the gas evolution apparatus (Sacharometer) with BONDERITE M-ZN 952 bath solution.
- Tilt the apparatus to release entrapped air from the calibrated closed end and add sufficient BONDERITE M-ZN 952 bath solution to fill the tube again.
- Add about 2 g of sulfamic acid and immediately invert the tube so that most of the sulfamic acid falls into the calibrated closed end of the tube. The open end is closed with the thumb and kept in this position for 1 to 2sec.
- Rapidly place the tube in an upright position and leave for one minute. The volume of gas evolved is the accelerator content in mL. At the end of gas development there should be some crystals remaining. If not, repeat the experiment using more crystals.

Specified range: 1.0 to 2.5 mL

##### Remark:

The open end of the apparatus must not be closed during the reading. The small quantity that escapes is negligible.

##### Replenishing of the bath:

Add per missing ml and per 1,000 L bath volume 0.3 L of



BONDERITE M-AD 132 solution.

#### Titration of Total Cations:

- Pipette 2 mL of a filtered bath solution into a clean 300 mL Erlenmeyer-flask.
- Add 50 mL deionized water.
- Pipette 20 mL of ammonia buffer solution pH 10 and 20 mL of 0.01 m Titriplex III (EDTA).
- Add little Eriochrome black T.
- Titrate drop by drop with 0.01 m magnesium sulfate solution.
- The endpoint will be shown by a colour change from blue to light red.
- Calculation:  
20 mL - consumption of magnesium sulfate solution in mL is the total cations pointage.

#### Titration of Zinc Content:

Continue with the same solution used for titration of total cations.

- Add 10 drops of dimercaptopropanole solution.
- The solution turns blue again.
- Titrate drop by drop with 0.01 m magnesium sulfate solution.
- The endpoint will be shown by a colour change from blue to light red.
- The added mL of 0.01 m magnesium sulfate multiplied by the factor TF 0.327 is equal to zinc in g/L.

Specified range: 0.9 to 1.2 g/L  $\text{Zn}^{2+}$

#### **Desludging:**

The sludge formed in the BONDERITE M-ZN 952 bath must be removed regularly. We recommend working continuously with filter press, or better nowadays direct filtration with filter press.

#### **Filling-up:**

After desludging or a partial loss of solution fill up with water, mix thoroughly and recheck the bath parameters.

Add per missing mL of total acid and per 1,000 L of bath volume:

BONDERITE M-ZN 952 A	2.4 kg = 1.8 l
BONDERITE M-AD 565	0.75 kg = 0.68 l

Add per missing ml of accelerator measurement:

BONDERITE M-AD 132 0.3 L

#### **General Remarks:**

As material for containers, pumps, spraying systems and pipes in the phosphating zone we recommend stainless steel, e.g. materials no. 1.4401, 1.4541, 1.4571. For heating equipment material no. 1.4571 is suited. Normal steel after DIN 17100-2 is applicable only for containers under certain conditions. For waste water treatment, please follow the local regulations.

#### **Classification:**

Please refer to the corresponding **Material Safety Data Sheets** for details on:  
**Hazards identification**  
**Transport information**  
**Regulatory information**

#### **Materials for analysis:**

Free acid and total acid:  
pipette 10 mL  
Erlenmeyer-flask 300 mL  
burette 25 mL  
deionized water  
bromophenolblue (0.04% alcoholic solution)  
phenolphthaleine (0.1% alcoholic solution)  
0.1 N sodium hydroxide  
dropping bottle 25 mL  
pH-meter

#### Total cations / zinc content:

glass funnel, diameter 80 mm  
folded filter, half diameter 18.5 cm  
Beaker 250 mL  
Pipette 2 mL  
Pipette 20 mL  
Erlenmeyer-flask 300 mL  
Burette 25 mL  
Dropping bottle 25 mL  
Spatula  
0.01 m Titriplex III (EDTA)  
0.01 m magnesium sulfate  
ammonia buffer solution pH 10 for complexometric analysis  
Eriochrome black T (mixture with sodium chloride 1 : 99)  
20 % alcoholic 2.3-dimercaptopropanole-solution (store below 5 °C)

#### Accelerator measurement:

azotometer  
sulfamic acid  
Spatula

Two pieces of the glass equipment is recommended because of the risk of cracking.

#### **Storage:**

Recommended Storage Temperature, °C	5 to 40
Shelf-life, months	30
(in original packaging, in a covered area)	



**ADDITIONAL INFORMATION****Disclaimer****Note:**

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.

**In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:**

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

**In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:**

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. 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.

**In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:**

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

**Trademark usage:** [Except as otherwise noted] All trademarks in this document are trademarks and/or registered trademarks of Henkel and its affiliates in the U.S. and elsewhere.

Reference 0.1