

# BONDERITE M-MN 117 MU

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## PRODUCT DESCRIPTION

BONDERITE M-MN 117 MU provides the following product characteristics:

<b>Technology</b>	Metal Pretreatment
<b>Product Type</b>	Manganese Phosphating
<b>Application</b>	Immersion Application

BONDERITE M-MN 117 MU is a chemical composition intended to form a coating of complex phosphates of iron and manganese on ferrous surfaces with very fine crystallography.

### Application Areas:

In mechanics, the parts have relative movements with respect to each other composed of sliding and rolling, pivoting, skating, etc., under relatively high pressures.

The treatment with BONDERITE M-MN 117 MU avoids metal-to-metal contact and considerably lowers the friction coefficient of the parts.

The anti-seize, anti-weld and anti-corrosion properties of BONDERITE M-MN 117 MU are outstanding.

### Benefits:

- Improvement of the frictional qualities of mechanical steel parts.
- Low temperature operation: energy saving; reduction of scaling.
- Excellent bath stability: Practically no drift of the TAC/FAC ratio in production; Reduction in the amount of sludge formed; No or little etching caused by the attack of the base metal.
- Does not contain nickel salts.

## TECHNICAL DATA

Appearance	light pink liquid
Density at 20°C, g/mL	1.35

## 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.

### Process Description:

The complete process for the BONDERITE M-MN 117 MU treatment normally consists of the following steps:

- Cleaning
- Water rinsing
- Pickling
  - \* only if necessary
- Cold rinse in running water
- Surface conditioning
- Phosphating with BONDERITE M-MN 117 MU
- Water rinsing
- Drying

### Equipment:

- 1 pipette of 5 mL
- 1 pipette of 10 mL
- 1 x 100 mL beaker
- 1 beaker of 250 mL
- 1 graduated burette of 50 mL

### Phosphating with BONDERITE M-MN 117 MU :

Please observe the specified technical data. It is important not to fall below the specified bath temperature. Too low temperatures will cause non-compact (permeable) coatings. In the other hand, avoid heating the BONDERITE M-MN 117 MU processing solution above the recommended range or for extended periods of time when idle since these conditions result in raising the Free Acid. Free Acid values above the desired range can etch steel surfaces and could fail to produce complete coatings within the normal processing time. The anticorrosive effect of the manganese iron phosphate layers is distinctly decreased if the iron content in the phosphating bath exceeds 4g/L. Optimum results are achieved with an iron concentration under 1g/L. The coating weight obtained with this treatment depends on the method of cleaning, the type of metal and the hardness and surface finish.

### Bath make-up, for 1,000 L:

For each 1,000 litres of bath add 3 litres of BONDERITE M-AD 40110 and 90 of BONDERITE M-MN 117 MU with stirring.

Titrate the acids and adjust the parameters.



**Operating Data:**

Total Acid, points	30 to 60
Free Acid, points	10 to 20
Iron, g/L	<4
Temperature, °C	78 to 82
Treatment time, minutes	5 to 15

**Bath Monitoring:**

BONDERITE M-MN 117 MU system can be controlled by determination of the "Total Acid" points, the "Free Acid" points, the Acid Ratio as well as the iron(II) content.

Determination of the "Total Acid" points:

- Pipet a 5mL sample of the cooled bath solution into a 100 mL beaker.
- Dilute with 50mL of distilled water or osmoses water.
- Add 8 to 10 drops of O-Crezolphtalein.
- Titrate with 0.1 N Sodium Hydroxide (NaOH) until the colour changes from colourless to a permanent pink.
- The consumed mL of the 0.1N NaOH solution, multiplied by a factor of 2 correspond to the "Total Acid" points.

Specified range, points: 46

**Bath replenishment:**

For 1,000 L of phosphating solution the following amount is added for each missing "Total Acid" point:

BONDERITE M-MN 117 MU 1.9 L

Determination of the "Free Acid" points:

- Pipet a 10mL sample of the cooled bath solution into a 100 mL beaker.
- Dilute with ~50mL of distilled water.
- Add 2 to 3 drops of bromophenol blue. The sample turns to a yellow color.
- Titrate with 0.1 N Sodium Hydroxide (NaOH) until the colour changes from yellow to blue.
- The consumed mL of the 0.1N NaOH solution correspond to the "Free Acid" points.

Specified range, points: 3 to 6

**Bath replenishment:**

For 1,000L of phosphating solution the following amount is added to decrease "Free Acid" value 0.1 points during operation:

BONDERITE M-AD MN-4 67g

Calculation of the Acid Ratio:

The Acid Ratio is calculated using the following equation:

$$\text{Acid Ratio} = \frac{(\text{"Total Acid" points})}{(\text{"Free Acid" points})}$$

If the Acid Ratio is too low in the BONDERITE M-MN 117 MU bath, BONDERITE M-AD MN-4 must be added to reduce the "Free Acid".

This ratio should generally be between 10 to 20.

Determination of the iron (II) content:

- Pipet a 10mL sample of the cooled bath solution into a 250 mL beaker.
- Add approx. 100 ml distilled water and 5 mL 50% sulfuric acid.
- Immediately afterwards titrate with a 0.18N KMnO4 solution till a persistent (15seconds) faint pink end point.
- The consumed mL of the 0.1N KMnO4, multiplied by a factor of 0.18 correspond to the iron (II) content of the bath in g/L.

Specified range, g/L: <4

The iron (II) content should be maintained under 4g/L; however, satisfactory coatings may be obtained outside this range depending on the particular type of steel or alloy being processed.

Reduction of the iron (II) content:

In order to reduce the iron content of the bath, partial draining or bubbling with compressed air is carried out, followed by replenishment with BONDERITE M-MN 117 MU .

Excessively high iron contents are detrimental to a good coating. (Loss of adhesion, light grey color).

Removal of ferrous iron is not necessary if the bath is not abnormally stressed.

In principle, if the bath load is 1 sqm treated per hour and 75 liters of bath, the ferrous iron content remains constant.

Operations	ACL	ACT	Iron Level	Raport AT/AL
Addition of BONDERITE M-MN 117 MU	Increase	Increase	No Effect	Decrease
Work stopping	Increase	No Effect	Decrease Slightly	No Effect
Addition of BONDERITE M-AD 4	Decrease	Decrease	No Effect	Increase
Addition of BONDERITE C-MC 181	Increase	Increase	No Effect	Decrease

**Operational Recommendations:**

During the working period, a small volume of sludge is formed. This sludge is periodically removed by decantation off the bath.

A too low total acidity/free acidity ratio result in heterogeneous and reddish coatings. This too low value



results in a persistent gas release in the absence of charges in the bath.

When the bath is topped up with water, regeneration is carried out with all the products used for the assembly.

*Note: The information provided above is valid in the majority of cases. However, during initial commissioning, our technicians will provide all of the necessary information on how to maintain baths, taking into account the local conditions.*

#### Classification:

Please refer to the corresponding **Material Safety Data**

**Sheets** for details on:

**Hazards identification**

**Transport information**

**Regulatory information**

#### Storage:

Recommended Storage Temperature, °C 0 to 50

Shelf life, months 24

(in unopened original packaging)

## 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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Reference 1.0