

BONDERITE M-MN 4901 IT

March 2019

PRODUCT DESCRIPTION

BONDERITE M-MN 4901 IT provides the following product characteristics:

Technology	Metal Pre-Treatment	
Product Type	Phosphating products for metals	
Application	Conversion coating	

BONDERITE M-MN 4901 IT is a liquid one-pack material designed to produce on ferrous material a microcrystalline conversion coating made of Manganese and Iron phosphates whose thickness is ranging from 3 to 10 microns.

The phosphate layer texture is specifically suitable as an excellent anti-wear coating.

The product is thin, compact and highly resistant; it produces a layer with variable thickness depending on the material it is applied to and the pre-treatment conditions.

Due to the high absorbent power of the generated layer to oils and lubricants, BONDERITE M-MN 4901 IT can be used as protective agent against corrosion.

BONDERITE M-MN 4901 IT is in compliance with UNI 4716 and MIL-P- 16232 C regulations.

Application Areas:

BONDERITE M-MN 4901 IT is used in spray- and spray/immersion processes. It must be combined with a suitable cleaning booster.

BONDERITE M-MN 4901 IT s used by immersion at a temperature ranging from 93 to 98°C (without reaching the boiling point).

The treatment time depends on the material to treat and the surface condition and it is normally ranging from 3 to 15 minutes.

The conversion process generates hydrogen bubbles and it is necessary to wait until this phenomenon stops to take out the treated materials from the bath.

In any case the treatment time can't be higher than 15 minutes.

Our Technical Service will define, case by case, the best operating conditions and the best cycle according to the plant and the material to treat.

The phosphate layer quality depends on the correct execution of the pre-treatment cycle.

In fact the steel pieces have to be previously pre-treated to remove every pollutants like oils, rust, dirt etc.

For the cleaning it is advisable to treat the surface with

emulsifiable solvents and then rinse accurately with water.

For the removal of oxides and rust, it is possible to use mechanical means such as blasting or sanding.

The use of alkaline products and pickling solutions requires an activation phase immediately before the phosphatising phase.

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.

Bath Make-up:

- Fill the operating tank with tap water to 4/5 of the final volume and heat up to 90 °C.
- Add 160 kg of BONDERITE M-MN 4901 IT for each 1,000 L tank volume.
- Mix to a complete homogeneity.
- Fill the bath to the final level and heat up to operating temperature.
- Make the controls and (when necessary) the required adjustments.

Bath Control:

Periodically control the bath by determination of Total Acid points, Free Acid points, Ratio TA/FA and Fe++ value as described below.

Total Acid:

- Pipette 10 mL of working bath into a 100 or 250 mL flask and add 30 mL of DI water.
- Add 4 to 6 drops of Phenolphthalein Indicator (0.3% hydro-alcoholic solution).
- Under slight agitation titrate with 0.1 N Sodium Hydroxide (NaOH) solution until the colour turns from colourless to pink stably for at least >20 seconds.

The mL of 0.1 N NaOH solution used for the titration corresponds to Total Acid points.

A standard bath made up at 160 g/L concentration has a TA point value of 60.

Free Acid (periodical control):

- Pipette 10 mL of working bath into a 250 mL flask and add 30 mL of DI water.
- Add 3 to 4 drops of Methylorange Indicator (0.1% hydroalcoholic solution).
- Under slight agitation titrate with 0.1 N Sodium Hydroxide



(NaOH) solution until the colour turns from red to yelloworange.

The mL of 0.1 N NaOH solution used for the titration correspond to Free Acid points.

A standard bath make up at 160 g/L concentration has a FA value of 10.

Ratio TA/FA;

For a standard bath should range from 5 to 6. The optimal ratio has to be chosen case by case, depending on the treated material.

<u>Fe ++</u>

If present, the Fe++ can be titrated as following:

- Pipette 10 ml bath into a 250 mL beaker and dilute with the same amount of DI water.
- Add 10 mL 50 % sol. of Sulphuric Acid (H₂S0₄).
- Titrate with 0.1 N KMnO4 (Potassium Permanganate) until the pink colour is stable for a time >15 seconds.

The mL of 0.1 N KMnO₄ x 0.56 give the Fe++ content in g/L.

Replenishment:

The bath has to be periodically controlled (at least twice a day) and has to be maintained at the concentration value fixed during the start up phase.

Total Acid

In case the Total Acid value decrease add 2.7 kg of BONDERITE M-MN 4901 IT for each missing point and for each 1,000 L bath.

We suggest to make frequent (or possibly continuous) replenishing addition, to keep the initially fixed T.A value more consistent.

Free Acid:

The F.A. value should remain in the fixed values autonomously.

Its trend to increase can be caused by overheating or by maintaining the bath at temperature without treatments.

In this case add small amounts of BONDERITE M-AD 3140 (ie to decrease 1 point the FA value add 0.6 kg of BONDERITE M-AD 3140 for each 1,000 L of bath).

If the F.A. tend to decrease can be due to low working temperature or to an excess of sludge.

Elimination of Fe++

The optimal concentration of Fe^{++} ranges from 2 to 3 g/L. In case of excessive presence of Fe^{++} is necessary to decrease it by its oxidation to Fe^{3+} (for example using air injections during the working stops) which sediment as sludge.

Caution:

1. The phosphatising tank should be made of stainless steel (ie AISI 316).

2. The tank bottom should be cone shaped to get an easier

collection of hydrolytic sludge, which have to be periodically removed.

3. The tank internal heating system has to be set in a vertical lateral position to avoid sludge deposits.

4. Keep the bath clean by periodically removing of the deposited sludge at the bottom of the tank.

5. Keep the bath surface free from any floating pollutant as oil etc.

6. Whenever there are bath losses (ie for de-sludging operations) use BONDERITE M-MN 4901 IT at the make up concentration.

7. The pieces coming out of the phosphatising bath has to be immediately rinsed with plenty of cold water to avoid powdering.

8. BONDERITE M-MN 4901 IT can convert even alloyed steel when the total alloying metal content is lower than 0.5%.

9. Slight differences in the product appearance do not affect its performances.

10. BONDERITE M-MN 4901 IT bath is acidic and can cause irritation and burning of the skin's eyes. Suitable clothing is therefore recommended.

11. The bath and its rinse require a sewage treatment before unloading.

Classification:

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

Hazards identification Transport information Regulatory information

Storage:

Process Component	Recommended Storage Temperature, °C	Shelf life, months (in unopened original packaging)
BONDERITE M-MN 4901 IT	4 - 35	24



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 liability and a strong the version of the strong of the set of the strong of the str

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 of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 0.1

Henkel AG & Co. KGaA 40191 Düsseldorf, Germany Phone: +49-211-797-0

Henkel Corporation USA Madison Heights, MI 48071 Phone: +1-248-583-9300 For more information, please contact us on www.henkel.com Henkel (China) Co. Ltd. 201203 Shanghai, China +86.21.2891.8000