

BONDERITE M-NT 4595

Known as Alodine 4595

January 2017

PRODUCT DESCRIPTION

The BONDERITE M-NT 4595 Process provides the following product characteristics:

Technology	Surface treatment
Product Type	Conversion coating
Application	Aluminium
Process components:	BONDERITE M-NT 4595 BONDERITE M-NT 4595 R1 BONDERITE M-AD 700 BONDERITE M-AD 95B (spray process only) Additive A

BONDERITE M-NT 4595 is able to produce a chromium free conversion layer on Aluminium and its alloys. Spray or immersion application may be used. The process provides an excellent base for organic finishes.

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.

Operating Data:

Concentration, points	4.6 to 22.4
Concentration, %	1 to 6
Fluoride Activity, mV	-120 to -80
Treatment time, sec	60 to 180
pH-value	3.5 to 4.5
Temperature, °C	30 to 55
Drying time, min	10 to 50
Drying temperature, °C	90 to 140

Actual control ranges are application specific and established through application testing.

Bath make-up:

Bath preparation per 1,000 L add:

BONDERITE M-NT 4595 10 to 60 l

BONDERITE M-NT 4595 may be used up to full strength without pH adjustment for Dry-In-Place applications.

Process Description:

1. Cleaning
2. Water rinse
3. Water rinse
4. Deoxidizer
5. Water rinse – D.I. water (recommended)
6. Treatment with BONDERITE M-NT 4595
7. Water rinse – D.I. water (recommended)
8. Drying

Pre Treatment:

Cleaning:

All metal to be treated with the processing 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 overflowed continuously at a rate which will keep it clean and free from scum and contamination. D.I. water is recommended prior to and following the BONDERITE M-NT 4595 tank.

Deoxidizing:

Aluminum with surface corrosion products or heavy surface oxides should be conditioned with a deoxidizer prior to the conversion coating treatment. This deoxidizing step should follow the above water rinse and should itself be followed by a separate water rinse. A complete line of deoxidizers is available and our representative can recommend the correct material to be used.

Treatment with BONDERITE M-NT 4595 processing solution:

- Fill 3/4 of the bath with water (DI-water recommended).
- Add the proper amount of BONDERITE M-NT 4595 and then add sufficient D.I. water to bring the solution up to the working level.
- Mix thoroughly and heat to the operating temperature.
- BONDERITE M-AD 95B must be used in spray applications.
- If bath foams, add 3 mL per 454 L of BONDERITE M-AD 95B until foam subsides.

Operation:

Time, min	1 to 3
Temperature:	30 to 55

The solution concentration may be increased or reduced to meet specific line conditions. Our representative will assist in

establishing the proper concentration.

Replenishing:

BONDERITE M-NT 4595 R1 will be used for replenishment, depending on the surface area of metal and type of work processed (the testing and control for both products are the same).

Our representative will recommend the proper replenisher for your system.

Bath Control:

Concentration:

The concentration of the treatment solution is determined by a simple titration. Since this is a reverse titration, the treatment bath is used to titrate the solution prepared below.

- Pipette (or discharge from a buret) exactly 10 mL of titration solution 15 into a 150 mL beaker, add 50 mL of water, then 5 mL of reagent solution 44.
- The endpoint of this titration is reached when the purple color completely disappears resulting in a clear or slightly brown solution.

The concentration may be determined from the following table:

Titration (mL)	Konzentration Volumenprozent	in
22.4	1.0	
12.5	2.0	
8.6	3.0	
6.1	4.0	
5.6	5.0	
4.6	6.0	

Note:

The greater the concentration, the lower the number of mL (points) of titration.

pH adjustment:

BONDERITE M-NT 4595 is a rinsable coating.

It is necessary to raise the pH of the bath to about 3.5 to prevent the treatment from etching the aluminium.

It is normally required that BONDERITE M-AD 700 be added initially at 500 to 2,500 mL per 454 L of bath volume.

Fluoride activity control:

The method of measuring fluoride activity makes use of standardized Orion Fluoride Ion Electrode and an Orion Meter or an equivalent instrument capable of measuring relative Millivolts.

Immerse the Orion Fluoride Ion Electrode and the reference electrode or a Fluoride combination electrode into Standard Solution 120 MC. Using the expanded relative millivolt scale, set the meter to zero.

Remove the electrodes from the activity Standard Solution 120 MC, rinse with distilled water and dry.

After the concentration and the pH of the bath have been adjusted, cool a sample of the bath to the same temperature as the Standard Solution 120 MC used for electrode standardization. Immerse the electrodes into the bath sample and record the relative negative Millivolt.

The bath must be maintained between -80 and -120 millivolts.

Note:

The activity reading is dependent to a large extent on the pH of the solution. The activity reading is also affected by the temperature of the bath. All readings should be taken at room temperature, ~24 °C.

To increase activity by 1,000 millivolts, add approximately 1,000 mL of Additive A to 4,540 L of the working bath in small increments until the reading is in the desired range.

Post Treatment

Drying:

Parts coming from the coating bath should be dried in an indirectly fired oven or by other means which will not contaminate the metal with fumes, oil or partially burned gases.

Products with cavities or pockets which trap moisture should be blown dry with a jet of clean, compressed oil free air.

If handling of the dried, unpainted work is necessary, operators should wear clean cotton gloves.

Detecting coating on the surface by drop test:

After the pre-treatment is finished and before any organic paint, e. g., powder clear coat is applied to the surface, a drop test can be carried out to determine if the coating is properly formed on the aluminium surface.

The procedure of the drop test is as following:

- Put one drop of Reagent Solution 49 (37 % HCl) on the test surface.
- Once the bubbles are formed on the surface, immediately add one drop of 0.05 % Arsenazo III solution (see note in the Testing Reagents and Apparatus section) onto HCl solution on the test surface.
- If the coating is present, the color of the mixed solution will change from purple to green in a few second to minutes depending on the amount of the coating on the surface.
- If coating is not present, the color of the mixed solution will remain purple on the test surface.

Waste Water Treatment:

Applicable regulations covering disposal and discharge of chemicals should be consulted and followed.

Disposal information for BONDERITE M-NT 4595 is given on the Material Safety Data Sheet for each product.

The processing bath is pH 3 to 5 and contains fluorides. Waste treatment and neutralization may be required prior to discharge to sewer.

Equipment:

Process tank, housing, pumps and piping should be fabricated from 316 L or 304 L stainless steel. The 316 L being preferred for maximum tank life. A secondary choice is 316 or 304 stainless steel fabricated with approved welding techniques. In spray applications, nozzles fabricated from 316 stainless steel are preferred.

Heat exchanger plates or other heating devices should be polished 316 L stainless steel. All process circulation pump seals, valve seats, door seals, etc., which come into contact



with the process solution and occasional acid equipment cleaners, should be EPDM, Viton or Teflon.

Chemical feed pump parts and other elastomers which may come into contact with the concentrated replenishing chemical should be EPDM, Viton or Teflon.

Our sales representatives should be consulted for information on Henkel Surface Technologies automatic process control equipment for this process and any additional questions.

All equipment which will be in contact with BONDERITE M-NT 4595 or processing solution should be thoroughly cleaned prior to use with the process. This includes such items as chemical metering pumps, solution tank, spray nozzles, spray zone shields and housings. Our representative will supply a recommended clean-out procedure which may be followed.

Caution:

The processing solution is acidic and may be irritating to skin and may cause burns to eyes.

Avoid contact with skin and eyes. In case of contact follow the recommendations for contact given on the Material Safety Data Sheet for BONDERITE M-NT 4595.

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-NT 4595	0 to 50	12
BONDERITE M-NT 4595 R-1	0 to 50	12
BONDERITE M-AD 95B	< 35	12

BONDERITE M-NT 4595 should be protected from freezing. If the chemical is frozen, it will be irreversibly damaged and should not be used. If exposed to temperatures outside the storage range for short periods, the product should be immediately returned to the proper temperature and stirred.

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.

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Reference 0.1