



Technologies

TECHNICAL BULLETIN

ABN: 82 001 302 996
135-141 Canterbury Road, Kilsyth Victoria 3137
Phone : (613) 9728 7200 Fax : (613) 9761 7179

BONDERITE[®] NT-1

Phosphate-free, Regulated Heavy Metal-Free Pre-treatment

1. INTRODUCTION

BONDERITE NT-1 is a regulated heavy metal and, phosphate-free reactive conversion coating especially formulated for use in the treatment of steel, zinc and aluminium surfaces. The pre-treatment is free of all organic components and increases the corrosion resistance of painted surfaces.

In most cases, its corrosion resistance performance will be equal to an iron phosphate/polymer seal. The pre-treatment solution may be applied by spray or immersion applications under ambient conditions and is followed by a deionized or reverse osmosis water rinse. The **BONDERITE NT-1** pre-treatment is compatible with all types of paint applications.

2. OPERATING SUMMARY

Chemical	Bath Preparation per 1,000 litres
Parco Neutralizer 700	400-530 mL
BONDERITE NT-1	30-70 kg (30-70 Litres)
Deoxidine 2520	optional, as needed

Note: For 20 - 35 second process time, select 70 litres per 1000 litres
For 35 - 60 second process time, select 50 litres per 1000 litres
For > 60 second process time, select 30 litres per 1000 litres.

Operation and Control	
pH	3.8 to 5.5
Concentration	0.27 – 0.49 absorbance @ 500 nm
Time	20 to 120 seconds
Temperature	Ambient

3. THE PROCESS

The following process for conversion coating a metal surface normally consists of the following steps:

- A. Cleaning
- B. City water rinsing
- C. Low conductivity water rinsing
- D. Conversion coating
- D. DI/RO water rinsing
- E. Post treatment – Parcolene seal (optional)
- H. Forced air or oven drying (optional)

4. MATERIALS

BONDERITE NT-1
PARCO® NEUTRALIZER 700
DEOXIDINE® 2520
Testing Reagents and Apparatus.

5. EQUIPMENT

All equipment for use with the process bath should be constructed of 304 or 316 stainless steel. If mild steel is used in construction, it must be appropriately lined. For example, the Henkel Corrosion Engineering group has approved Penncoat 227 for compatibility.

Process piping and pumps should be constructed of 316 or 304 stainless steel alloys. Various formulation of plastic pipe may be used with recommended support spacing, Schedule-80 being generally recommended. CVPC and PP may be used up to a maximum process temperature of 65° centigrade. PVDF may be used for all expected operating temperatures. All process circulation pump seals, valve seats, door seals, etc, which come into contact with the process solution and occasional acid equipment cleaners, can be Buna-N, EPDM, Viton® or Teflon®. Note that while Hypalon® is compatible with the process solution, it is not compatible with acid equipment cleaners that may be used.

Chemical feed pump parts and other elastomers that may come into contact with the concentrated replenishing chemical can be Buna-N, EPDM, Hypalon, Viton or Teflon.

Support equipment available from Henkel Surface Technologies for this process includes: chemical feed pumps, level controls, transfer pumps and bulk storage tanks.

Our sales representative should be consulted for information on Henkel Surface Technologies automatic process control equipment for this process and any additional questions. In addition, the “Henkel Surface Technologies Equipment Design Manual” may be consulted.

6. SURFACE PREPARATION

The pre-treatment follows thorough cleaning and water rinsing. Effort should be given to providing an adequate rinse following the cleaning step to avoid excessive contamination of the pre-treatment.

7. PRE-TREATING WITH BONDERITE NT-1

Buildup:

Fill the tank about three-fourths full with deionized water. Test for pH. It should be below 6.5. Small increments of Deoxidine 2520, no more than 180 ml per 1000 litres, should be added to lower the pH. Repeat the addition if the pH is not below 6.5.

After adjusting the pH, add 30-70 kg (30-70 litres) of **BONDERITE NT-1** for each 1000 litres and then add sufficient deionized water to bring the solution up to the working level. Mix thoroughly. Determine the pH and adjust if required before beginning operation. If necessary, increase pH with addition of small increments of **Parco Neutralizer 700**. Always add **Parco Neutralizer 700** in a turbulent area of the tank so the **Parco Neutralizer 700** can be diluted with bath solution very quickly to prevent active components in the **BONDERITE NT-1** tank from precipitating.

Operation:

The clean metal, wet from the water rinse, is pre-treated with **BONDERITE NT-1**. Either spray or immersion application may be used. Maintain the temperature of rinse water below 50° C to minimise the possibility of flash rusting on clean steel parts. Use water overflow to lower the temperature of rinse water.

Time: 20 to 120 seconds

Temperature: Ambient

If the bath temperature rises to 43-50° C over time due to heat drag-in from the cleaner, this is not detrimental. **BONDERITE NT-1** will react more rapidly with substrates at higher temperatures.

8. TESTING AND CONTROL

pH Determination:

The pH is determined using **fluoride stable pH meter** standardized at pH 4 and pH 7.

Recommended pH Range: 3.8 to 5.5

To reduce pH by 0.1: Add 5.8 litres (5.7 litres) of **BONDERITE NT-1** per 1000 litres.

To increase pH by 0.1: Add 95 ml of **PARCO NEUTRALIZER 700** per 1000 litres.

8. Testing and Control (Continued):

Frequent testing of pH and small additions of **BONDERITE NT-1** or **PARCO NEUTRALIZER 700** are preferred. Always avoid large additions of either pH adjustments chemical. If the Hach absorbance reading is in the range of 0.27 – 0.49, a small amount of **Deoxidine 2520** instead of **BONDERITE NT-1** can be added to adjust pH down to below 5.5. Make sure pH meter is standardized. Excessive **Deoxidine 2520** can reduce the bath life of **BONDERITE NT-1**.

Concentration

Take approximately 5 mL bath sample, and filter through size 42 (2.5 microns) filter paper. Pipette **exactly 1.0 mL** of filtrate into a 50 mL beaker including a Teflon stirring bar. Pipette exactly 1.0 mL of DI water as blank solution into a second 50 mL beaker including a Teflon stirring bar. Add 1 mL of Titration Solution 1561 to sample solution and blank. Then add 2 mL Buffer Solution 4.7 each to sample solution and blank, and mix for a least 5 minutes. After mixing, add exactly 1.0 mL Reagent Solution AT each to sample solution and blank. Stir the mixture for 5 minutes each. The resulting solutions should be orange red. Pipette the blank solution into one of the plastic cell (**1-cm path length**) that came with the Hach pocket colourimeter. Pour sample solution into a second plastic cell. Remove the instrument cap from the pocket colorimeter, and insert the cell with the blank solution into the cell compartment with notch-to-notch fit. Use the instrument cap as a light shield during measurements. Press the **Zero** key. The meter should read 0.00. If the meter doesn't read 0.00, press the **Zero** key again. Replace the blank cell with the test cell, and cover the cell compartment with cap. Press the **Read** key. Record the reading as absorbance. This reading represents the concentration of active component in **BONDERITE NT-1** bath. For consistent and accurate results, check battery clean and dry the outside of sample cells before inserting them into the pocket colourimeter.

Concentration range: 0.27-0.49 absorbance (30-70 litre per 1000 litres). Our representative will advise if a specific minimum should be used for your washer line.

In recommended concentration range: To increase absorbance by 0.06 point, add approximately 10 litres of **BONDERITE NT-1** per 1000 litres.

The concentration may be determined from the following table:

Concentration		Absorbance
Kg per 1000 litres	Litres / 1000L	
10	(10 L/1000L)	0.10
20	(20L/1000L)	0.20
30	(30L/1000L)	0.27
40	(40L/1000L)	0.32
50	(50L/1000L)	0.38
60	(60L/1000L)	0.44
70	(70L/1000L)	0.49
80	(80L/1000L)	0.55

9. AFTER TREATMENT:**Deionized or reverse osmosis Water Rinsing:**

A deionized or reverse osmosis water rinse is preferred in order to obtain optimum results from the treatment. A deionized water rinse will most effectively remove any water-soluble salts from the treated surface. The design of the equipment is important for efficient use of deionized water. Our representative should be consulted.

Drying

Treated parts can be oven-dried at temperatures from 105° to 175° C for 10-20 minutes. Our representative will advise if a drying oven should be used.

10. STORAGE REQUIREMENTS:

BONDERITE NT-1 may precipitate if stored at temperatures below 4° or above 43° Centigrade. The product must be stored between 4° and 43° C. If the product freezes or precipitates, do not use.

11. WASTE DISPOSAL INFORMATION

Disposal information for the chemical, in the form as supplied, is given on the Material Safety Data Sheet.

The processing bath is slightly acidic. Neutralization by the addition of caustic soda to the rinse water or processing solution may be required prior to discharge. Please consult with Henkel Sales and Tech, Service Representative on this topic.

The processing bath and sludge that accumulates in the bath can contain ingredients other than those present in the chemical as supplied and analysis of the solution and/or sludge may be required prior to disposal.

12. PRECAUTIONARY INFORMATION

When handling the chemical products used in this process, the first aid and handling recommendations on the Material Safety Data Sheet for each product should be read, understood and followed.

The processing bath is essentially non-irritating and non-toxic.

Quantity	Item
2 *	Beaker, 150 ml
2 *	Beaker 50 mL glass or plastic
500mL	Buffer Solution 7 (Na ₂ HPO ₄ , KH ₂ PO ₄ , Solution)
500mL	Buffer Solution 4 (0.05M potassium acid phthalate, thymol), pH = 4
500mL	Buffer Solution 4.7 (Sodium Acetate), pH = 4.7
2 *	Pipette 1 ml Volumetric
1 box	Whatman 42 filter paper (2.5 micron pore size)
2	25 mm Teflon magnetic stirring bar
500mL	Reagent AT
500mL	Titration Solution 1561
1	Fluoride stable pH Meter
1	Conductivity meter
1 **	Hach 500 nm Pocket Colorimeter II**
***	Magnetic Stirrer

* Includes one more than actually required to allow for possible breakage.

** Hach test kits, Cat. No 5870050 Pocket Colorimeter II
Hach Company, WORLD HEADQUARTERS, P.O Box 389, Loveland,
Colorado 80539-0389. Telephone: (800) 227-4224: www.hach.com

*** Purchase from any standard laboratory supply company

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