

BONDERITE M-PP 930 MU

April 2019

PRODUCT DESCRIPTION

BONDERITE M-PP 930 MU provides the following product characteristics:

Technology	Coating
Product Type	Autodeposition coating
Application	Organic coating
Process components:	
BONDERITE M-PP 930 MU	
BONDERITE M-PP 930 R	Replenisher
BONDERITE M-AD 300	Starter
BONDERITE M-AD 35	Activator
BONDERITE M-AD 24 OX	Oxidizer

BONDERITE M-PP 930 MU is used to produce a smooth, black organic coating on ferrous metal surfaces.

The water based coating is deposited uniformly on the metal surface and it is able to coat even recessed or partially enclosed surfaces.

The coating, when properly cured, offers good corrosion resistance, adhesion and hardness.

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:

For each 1,000 L bath add:

BONDERITE M-PP 930 MU	122 kg = 117 L
Deionized Water	865 kg = 865 L
Starter	19 kg = 18 L

Note:

The term NV = % non-volatile or the solid portion of the paint.

Operation and Control of BONDERITE M-PP 930 MU bath parameters:

Parameters should be checked and adjusted on a daily basis. ORP and Lineguard 101 should be monitored every two hours and wet coating solids (WCS) should be measured daily.

The following parameters are listed as bath operation ranges:

Redox-value	375 ± 25 mV
Lineguard 101-Meter-Reading	150 to 250 µA

Total Solids	4.0 to 6.0%
Wet Coating Solids	25 to 47%
Starter Titration	9 to 18 mL Initial Starter Titration = 9 to 10 mL* Final Starter Titration = 15 to 18 mL
Temperature	20 to 22°C
Conductivity	1,200 to 4,500 µS
Relative Humidity between Paint to Conditioning Rinse Tanks	50% minimum

The ranges specified are interrelated and subject to change associated with variations in line design, (e.g. bath size, coating time, part type, and substrate). Our representative will recommend the proper target for each processing line and this target value must be maintained as indicated.

The Process:

- Cleaning
- Water rinsing
- Deionized (DI) or Reverse Osmosis (RO) water rinsing
- Treating with BONDERITE M-PP 930 MU Processing bath. The Starter Titration will increase as the metal is processed through the Aqueous bath. In order to stabilize the iron in the bath a portion of the bath can be discarded or the iron can be removed using IEX equipment. The IEX column can be regenerated with BONDERITE M-AD 76, BONDERITE M-AD 86 or BONDERITE M-AD 96. Your Henkel representative will recommend appropriate process control equipment required.
- Water Rinsing
- Treating with BONDERITE M-PT E2 or BONDERITE M-PT E3. BONDERITE M-AD 705 is an optional additive for E2 and E3 as specified by Henkel representative. See TDS for BONDERITE M-PT E2/E3 for details.
- Heated Flash-Off Oven: This section of oven is designed to evaporate most of the water in the wet film. During flash, the parts must reach 50 to 70°C at peak metal temperature (PMT) for duration of 5 to 15 minutes. The air velocity, flash time, air temperature can be adjusted to meet this requirement.
- Oven curing: Complete cure of the target part requires a balance of four properties in the curing oven; time, temperature, air speed and dry air volume (air turnovers). For best general properties of the BONDERITE M-PP 930 MU the part surface must come to minimum temperature of 177°C and maintain target temperature of 177 to 204°C for 30 minutes and should not exceed 204°C peak metal temperature. Other cure schedules will be determined based on customer needs. Air velocity in the oven of 2 to 3 meters per second, as measured across the work package area, is very important in achieving optimal physical properties.

- Testing Reagents and Apparatus

Equipment:

The tank for the BONDERITE M-PP 930 MU bath should be of mild steel construction lined with hard-soft-hard rubber or an equivalent protective liner. The tank should be constructed with a solution-leveling weir (skimming trough) along the entire length of the tank. The weir should be deep enough to maintain a continuous overflow. The diaphragm pump should not drain the weir, as this will cause foaming and surging. All piping and filtration equipment for handling either the bath or replenisher should be PVC. All chemical pump seals, valve seats and other elastomers that come into contact with the product or bath should be EPDM, PTFE or FKM. Pumps for pumping either the bath or replenisher should be made of polypropylene, with PTFE diaphragm, balls and seats and capable of 70 to 100 gpm (265 to 378 L per min) flow rate. Provisions need to be made for variable speed agitation and filtration. Filter media needs to be of a non-water-soluble binder type, such as polypropylene. For particulate filtration, a 1/8-inch mesh (~3mm) screen or other pre-filter, followed by a bag filter of 100 micron size is recommended. Alternative recommended filtration other than bag filtration is with the K-Factor type low pressure, high flow. K-Factor must be constructed with all PVC. The filtration system must be designed to provide quarter tank turnover per hour by way of the skimming trough. Failure to maintain coating bath parameters may affect the ability to achieve the desired flow rate. A heating/cooling unit with immersion polypropylene coils will provide temperature control of the bath. Automatic process control equipment, which promotes consistent quality and controlled costs, is available for automatically controlling this process. Our sales representative should be consulted for information about control equipment and auxiliary equipment.

Surface Preparation:Cleaning:

It is essential that every piece is cleaned from any soil, smut, grease, oil, rust and ionic contaminants before coating with BONDERITE M-PP 930 MU. In some cases, an additional stage using an acidic BONDERITE cleaner may be required. Our Representative will recommend the proper type of cleaning product and operating temperature for the processing line. Recirculation and filtration system of the cleaning bath should have a pressure gauge to monitor filter use and lifetime. The gauge should measure the excessive pressure when a filter is plugged and needs maintenance.

Water Rinsing:

After cleaning, the metal must be thoroughly rinsed with warm water. The rinse should be overflowed continuously at a rate, which will keep it clean and free from scum and contamination. A full tank length solution-leveling weir (skimming trough) at the exit end of the tank is ideal for skimming tank surface contamination.

Deionized Water Rinsing:

A final rinse with either DI or RO water just prior to the coating bath is required to remove residual ionic contaminants. The conductivity of the virgin DI or RO water should not exceed 10 μ S. A full tank length solution-leveling weir (skimming trough) at the exit end of the tank is ideal for skimming tank surface contamination. It is extremely important to ensure there is no re-deposition of tank surface contaminants back onto the cleaned part. Clean parts are essential. Work should be examined just prior to the coating bath to ensure it is free of contaminants. The conductivity of the deionized water rinse and water dripping from the work and racks should be examined on a daily basis. The conductivity of the drippings should not exceed 50 μ S.

Treating with BONDERITE M-PP 930 MU:Build-up:

BONDERITE M-PP 930 MU tank should be thoroughly cleaned and rinsed to remove residual dirt.

Leak check the cooling coils with water only.

The tank should be filled to 100% operating capacity with DI or RO water to leak check the system.

Drain the tank to approximately one-third operating volume.

(The DI/RO water removed can be used to make up other stages).

The mixing blades in the tank should be completely immersed.

First add total amount of BONDERITE M-AD 300 to the water and let mix for 30 min.

Under agitation, add required amount of BONDERITE M-PP 930 MU per total bath volume.

Continue to mix bath contents.

Mix contents of BONDERITE M-PP 930 MU material in its shipping container and pump through a 25 micron polypropylene fiber filter bag the required amount to make the bath at certain NV solids.

BONDERITE M-PP 930 MU must be added while maintaining constant agitation in the tank.

Continue with constant agitation in the tank from this point forward.

Check and adjust temperature, 101 and ORP bath parameters. Refrain from required additions of BONDERITE M-AD 35 until bath temperature is within recommended range.

Add a volume of DI/RO water to the bath such that the volume is just below the overflow weir.

After 2 hours of additional mixing, check the bath parameters of %NV, 101, ORP, Starter Titration and Conductivity.

Add BONDERITE M-AD 24 and BONDERITE M-AD 35 as necessary to adjust to within specification range.

Use caution when checking the 101 value and refrain from any additions of BONDERITE M-AD 35 until bath temperature is within recommended range.

The reading provided by the 101 meter is temperature sensitive where the reading is lower at low temperature and increases as temperature increases.

Once all bath parameters are met, add DI/RO water to operating level for overflow and circulation through the filter housing.

Operating parameters:

Time	60 to 180 sec
Temperature	~22°C
Application	immersion



Precautions must be taken to insure that the bath temperature is maintained within the specified range. No heat is generated in the coating process. However, lower temperatures can reduce film build on work and higher temperatures can cause irreversible damage to bath ingredients. A heating/cooling unit with immersion polypropylene coils will provide temperature control of the bath and protect against seasonal changes in the temperature of the working environment of the coating line. Continuous filtration of the coating bath is required to maintain the bath free from dust and particulates.

Damage to the coating bath chemistry can also be caused by prolonged high or low redox (ORP) values or low LINEGUARD 101 Meter Readings. Low redox values can lead to bath stability issues and soft, poor rinse-resistant coatings. High redox values can lead to the oxidation of the surface, to poor coating appearance and possible bare areas on the substrate. LINEGUARD 101 Meter Readings outside of the specified range can cause poor film performance properties.

Wet Coating Solids (WCS) below the target value for extended periods of time can cause bath damage. Total bath solids (%NV) and %WCS can be maintained within at the target value by addition of BONDERITE M-PP 930 R or BONDERITE M-PP 930 MU material as directed by your Henkel representative. The consistent measurement and continuous tracking of the %WCS test on the bath material is critical to performance and appearance of the finished product.

Bath Control:

Note: never pipette by mouth, use a pipette filler. The BONDERITE M-PP 930 MU coating chemical bath is controlled in the plant by a Redox Control measurement (ORP), a LINEGUARD 101 Meter measurement, a total solids determination (%NV), Wet Coating Solids (%WCS) determination, conductivity measurement and a Starter Titration.

Redox potential Control:

The Redox Potential of the bath should be constantly monitored with a LINEGUARD 96/97 Controller and ORP electrode.

This reading should also be verified with portable ORP probes hooked up to a multi-meter.

If there is a difference of 30 mV or more between the LINEGUARD 96/97 and portable setup, the probes should be calibrated.

The ORP Meter reading should be recorded every two hours.

The ORP is typically the fastest changing parameter of the bath.

Part production will lower the ORP reading.

The target value is maintained by additions of BONDERITE M-AD 24 OX.

BONDERITE M-AD 24 OX will increase the ORP meter value.

The frequency of additions is dependent on the amount of work being processed per unit time and bath volume.

Should it be necessary to add BONDERITE M-AD 24 OX manually, add 4 L per square meters of metal processed.

BONDERITE M-AD 24 OX should be slowly added to maintain the redox potential within the specified range of operation.

Your Henkel representative will recommend appropriate process control equipment required.

LINEGUARD 101 Meter Reading:

A LINEGUARD 101D Meter reading is made every two hours. The target value is maintained by additions of BONDERITE M-AD 35.

The frequency of additions is dependent on the amount of work being processed per unit time and bath volume.

The LINEGUARD 101 Meter reading should be maintained within the specified limits.

To raise the value by about 100 microamperes, add 4 L of BONDERITE M-AD 35 for each 1,000 L of bath.

Henkel representative should be consulted for appropriate process control equipment recommendations, operating instructions and target value.

Total Solids:

The solids content is measured daily by the following method: On a balance capable of weighing to 0.1 milligrams, weigh an aluminum sample dish. Record the weight of the sample dish (A). Run this test with triplicate aluminum sample dishes.

To the sample dish add about 2 mL of bath sample. Quickly reweigh the sample dish with the bath sample. Record the measurement (B).

Place the sample dish with bath into an oven set at 110°C for 60 minutes. Remove and allow to cool to room temperature.

Weight of dry sample (C – A)

Calculate the % total solids:-----x100
Weight of wet sample (B – A)

A = weight of sample dish

B = weight of wet sample and sample dish

C = weight of dry sample and sample dish

To increase the Total Solids by 0.1%, add 2.9 L of BONDERITE M-PP 930 MU for each 1,000 L of bath volume.

The BONDERITE M-PP 930 R should be added to the bath under agitation.

It is recommended to add Replenisher or Make up in an amount to increase the total solids by 0.2% increments maximum.

Avoid additions of BONDERITE M-PP 930 R to the bath in increments greater than 0.2% total solid adjustment. Excessive Replenisher additions will lead to high rinse off.

Percent Wet Coating Solids (% WCS) Test:

%WCS tests should be run 2 to 5 times per week based on production volume. In order for the test to be controlled and reproducible, it must run consistently after Replenisher or make up addition. There may be differences between the results from different operators. Consistent testing time periods and practices will reduce those variations. Henkel recommends that operators to use the following method:

- Clean 3"x 4" (7.62 cm x 10.16 cm) ACT Cold Rolled Steel (CRS) panel with a hole punched in the 3" (7.62 cm) side with acetone wipe or in Alkaline Cleaner with water rinse to remove residual oil.
- Completely dry the panel after this cleaning.
- On a balance capable of weighing to 0.1 milligrams, weigh the clean/dry panel on a sample dish (100 mm watch



- glass) and record the weight (A).
- Pull a 1.5 L side bucket of the BONDERITE M-PP 930 MU coating bath from the main tank and set this sample close to the analytical balance.
 - Set a 10 to 20 L bucket in a sink next to the 1.5 L bath and balance. Overflow the bucket with tap water.
 - Remove the clean panel from the watch glass and process panel through hot alkaline cleaning and water rinsing sequence on the coating line.
 - Once it is determined the panel is water break free, place a small steel hook (paper clip) through the hole in the panel, and immerse the sample panel in the 1.5 L side bucket of the BONDERITE M-PP 930 MU coating bath for 90 seconds. (Important Note: The method of agitation must be consistent from test to test. The operator should make one back and forth cycle per second.)
 - After the 90 seconds, slowly remove panel from bath and dwell above the bath for 30 seconds.
 - Rinse panel for 1 minute in the overflowing immersion tap water bath. All un-reacted paint should be rinsed off.
 - After 1 minute immersion, remove the panels from tap water, and within 10 seconds from removal, blot the bottom edge of the sample panel on a paper towel to remove excess water and quickly place sample panel on the same pre-weighed dish and record the weight (B).
 - Place the sample panel and dish into a lab oven set at 185°C for 40 minutes.
 - Remove sample panel and dish from oven, and allow the sample to cool for 10 minutes.
 - Check the balance zero and weigh the cured sample panel and dish. Record weight (C).
 - The operator must conduct the test in the same manner each time to ensure consistent results. It is very important that the %WCS be measured at a constant time after adding paint to the bath.

Calculate and record the Percent Wet Coating Solids (% WCS) using the following equation:

$$\frac{\text{Weight of dry sample} = (C-A) \times 100}{\text{Weight of wet sample} (B-A)}$$

A = weight of the watch glass (dish) + weight of the dry, clean, uncoated panel

B = weight of the watch glass (dish) + weight of the wet, coated panel

C = weight of the watch glass (dish) + weight of the dry coated panel

The %WCS is maintained at the target value (see table below) by the addition of BONDERITE M-PP 930 R. It is critical to maintain %WCS within target value to avoid damage to the BONDERITE M-PP 930 MU bath. The %WCS can be increased by the addition of BONDERITE M-PP 930 R or by addition BONDERITE M-PP 930 MU and allowed to decrease by normal production. If the %WCS value is below the target value, repeat the test to verify results. If the %WCS value is determined to be below the target value, replenish the bath solids with BONDERITE M-PP 930 R and contact Henkel representative. If the %WCS value is above the target value, repeat the test to verify. If the %WCS value is determined to be above the target value, replenish the bath solids with BONDERITE M-PP 930 MU until the value falls between the target value. Fresh bath builds will typically have initial %WCS above the target value, this is normal. It is important to track the %WCS over time to understand the trends of the bath.

Table – Percent Wet Coating Solids (% WCS)

Nominal Coat Time 90 Seconds	Nominal Coat Time 90 Seconds
% Total Bath Solids	% Wet Coating Solids
4.0	22 - 42
5.0	27 - 45
6.0	31 - 47

Starter Titration:

Starter Titration is done once per shift by following method:

- Pipette a 10 mL sample of bath into a 250 mL flask.
- Add 25 mL of Auxiliary Test Solution 32.
- Heat the sample to boiling in a hood or well ventilated area. Allow to boil for 1 minute until the coagulation is complete.
- Dilute the sample with DI water to approx.100 mL. Cool completely to room temperature.
- Add Auxiliary Test Solution 35 until the solution changes color from yellow to clear to a light salmon pink.
- Generally, the addition of 10 to 20 mL of ATS 35 is needed for this colour change.
- Add approximately 1 mL Reagent Solution 22. The solution will turn a deep purple. Stir and let sit for 1 minute.
- Fill the automatic burette to the zero mark with Titrating Solution 86.
- While stirring the sample, slowly run in Titrating Solution 86 from the automatic burette until the sample changes from a purple to a faint orange to a light yellow colour.
- Titrate slowly after the solution becomes faint orange.
- Continue to titrate until orange can no longer be detected and the solution appears yellow.
- This color change will be easier to see if the coagulated latex in the sample is not broken into small pieces during stirring.
- Record the number of millilitres of Titrating Solution 86 used as the Starter Titration.

The bath is built at 9-10 Starter Titration.

As steel is processed in the BONDERITE M-PP 930 MU bath, the bath will gradually accumulate iron as determined by the Starter Titration.

Therefore, for every 1,000 m² of metal processed, 3 to 8 gallons 120 to 325 L bath will have to be withdrawn to keep the Starter Titration at 15 ± 3 mL.

The Starter Titration above 20 mL has a detrimental effect on the coating.

When performing bath decants to keep Starter Titration Level within specified range of 15 ± 3 mL, use the following guide as a template for ratio of BONDERITE M-PP 930 R to BONDERITE M-PP 930 MU to use for bath solids adjustment.

15 ± 3 mL Range Starter Titration	% BONDERITE M-PP 930 R	% BONDERITE M-PP 930 MU
1 mL Decant	100	0
2 mL Decant	90	10
3 mL Decant	50	50
4 mL Decant	35	65
5 mL Decant	25	75
6 mL Decant	20	80



7 mL Decant	20	80
8 mL Decant	15	85
9 mL Decant	15	85

Conductivity:

The conductivity measurement is performed once a shift. As steel is processed in the BONDERITE M-PP 930 MU bath, the bath will gradually accumulate iron and other ionic contaminants.

Conductivity is proportional to the total level of these contaminants.

Proper line design and maintenance of pre-rinse stages are required to minimize the accumulation of ionic contaminants.

Your Henkel representative will recommend appropriate process control equipment required.

Mechanical Loss:

Whenever a portion of the bath is discarded or lost by leakage, the volume should be restored with the same proportion of chemicals and water as used in the original bath, excluding BONDERITE M-AD 300 which should only be used in the original bath make-up.

After Treatment:**Maintaining Wet Films from Coating Bath Until Reaction Rinse:**

Misting may be required between the BONDERITE M-PP 930 MU tank and tap water dip rinse and BONDERITE Reaction Rinse to maintain a wet film. It is strongly recommended that the coating line be enclosed over the paint tank, tap rinse tank and reaction rinse tank to ensure proper humidity (>50% RH) is maintained. Fogging nozzles can be used to introduce humidity to completely envelop the work package.

Tap Water Rinsing:

After the part is coated in the BONDERITE M-PP 930 MU bath, it must be rinsed in immersion tap water to remove the residual paint from the substrate. A full-length solution-leveling weir (skimming trough) on the exit side of the tank is strongly recommended. This will help to remove dirt from surface of the tank and provide a uniform defect free coating.

Reaction Rinses:

After the tap water dip rinse, the part is immersed in a heated final dip Reaction Rinse. (This stage must be capable of maintaining rinse temperature at $\pm 1.2^{\circ}\text{C}$). Our Henkel representative can specify the final reaction rinse. A full length solution-leveling weir (skimming trough) on the exit side of the tank is strongly recommended. This will help to remove dirt from surface of the tank and provide a uniform defect free coating.

It is recommended to use BONDERITE M-PT 705 Additive in the BONDERITE M-PT E2/E3 when a uniform and smooth appearance is required for the finished BONDERITE M-PP 930 MU. See TPB for BONDERITE M-PT E2/E3 for details.

Cure of Coatings:

For optimum adhesion, corrosion protection, and film continuity, it is desirable to have a three-zone oven. The first zone (flash-off) is intended to remove all or nearly all of the water from the film and provide a peak metal temperature of 50

to 70°C within the first 5 to 15 minutes of the cure cycle, depending on the mass and volume of coated metal. Time in the first zone may be 5 to 15 minutes.

The second zone shall be capable of bringing the part to a minimum part metal temperature of 175°C . There should be a minimum of 2 to 3 meters per second airflow around the entire work package to ensure a uniform ramp up.

The third zone should be capable of holding the part at the target metal temperature of 175 to 204°C for a period of time giving the optimum performance properties of the coating. Normally, the temperature and time requirements of zone 2 and 3 can be accomplished in 30 to 45 minutes with an oven air temperature at 191°C . Since part mass and heat profiles can vary widely, the heat profiles of the intended work should be examined to determine proper cure schedule. Complete cure of the target part requires a balance of four (4) properties in the curing oven; time, temperature, air speed and dry air volume (air turnovers). Henkel will provide assistance to the customer and its equipment contractor in the development of the optimal design and schedule for performance of the coating. See Aquence Engineering Design Manual for details.

General Maintenance:

An annual transfer of the BONDERITE M-PP 930 MU bath to an acceptable container is recommended.

At this time the integrity of the tank liner should be examined and parts and debris which may have fallen into the bath should be removed.

Henkel Technologies BONDERITE Coating Chemicals are made for use in the practice of Henkel patents and/or proprietary technology covering compositions, processes and equipment related to the practice of the autodeposition coating process.

Waste Water Treatment:

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

Disposal information for BONDERITE M-PP 930 MU, BONDERITE M-AD 300, BONDERITE M-AD 24, & BONDERITE M-AD 35 and BONDERITE Reaction Rinse, are given on the Material Safety Data Sheet for each product.

The processing bath is acidic and contains a small amount of hydrofluoric acid. Waste treatment and neutralization may be required prior to discharge to sewer.

The processing bath and sludge 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.

Particular Cautions:

Before 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 acidic and contains a small amount of hydrofluoric acid.

Do not get in eyes, on skin or on clothing.

In case of contact, follow the recommendations on the Material Safety Data Sheet for BONDERITE M-AD 35.

Testing Apparatus:

1 L : Auxiliary Test Solution 32 (50% HCl)

1 L : Auxiliary Test Solution 35 (65%

Ammonium Acetate)

2* : Beaker, 250-mL



2* : Burette Assembly, automatic, 25-mL
 1** : Myron L Model EP-10 Conductivity Meter
 4* : Flask, Erlenmeyer, 250-mL
 2* : Graduated cylinder, 25-mL
 2* : Graduated cylinder, 50-mL
 1 : Hot plate
 1 L : Reagent Solution 22 (16% Salicylic Acid)
 1**** : LINEGUARD 101 Meter.
 1 : pH/millivolt Meter
 1 : Pipette Filler (Rubber bulb)
 2* : Pipette, 5-mL measuring
 2* : Pipette, 10-mL measuring
 2* : Pipette, 25-mL measuring
 1 : Redox Electrode
 1 : Pocket Thermometer, (-17.8 to 104.5 °C)
 4 L: Titrating Solution 86 (0.01 M EDTA)
 Box : Weighing Dishes, aluminum, disposable (52 mm [2 inch] internal diameter)
 1 : Weighing Balance (4 decimal digits)
 Box : Disposable Transfer Pipettes
 Box : Disposable Non-Sterile 10 cc Syringe
 1 : Lab Oven (185°C capable)
 2 : 1.5 L plastic containers
 2*** : One gallon plastic pails with lids
 2***** : Packages of 25-3"x4" ACT CRS panels (APR18585)
 2*** : 100 mm Watch glass
 1*** : Beaker tongs
 1***** : Optional Mettler HR83P or HG63P moisture analyzer.

Storage:

BONDERITE M-PP 930 MU and BONDERITE M-PP 930 R as well as the BONDERITE M-PP 930 (known as AQUENCE 930 COATINGS) will freeze below 0 °C).

Freezing will destroy the products. It is recommended that the products be shipped and stored indoors between 4.4 to 38 °C.

Classification:

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

Hazards identification
Transport information
Regulatory information

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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