Technical Data Sheet

BONDERITE® M-CR 1200S AERO

January 2025

PRODUCT DESCRIPTION

BONDERITE® M-CR 1200S AERO provides the following product characteristics:

Technology	Metal pretreatment
Product Type	Conversion coating
Application	Immersion, spray, brush

BONDERITE® M-CR 1200S AERO is a powdered chemical used to produce a protective coating on aluminum which minimizes corrosion and provides an improved bond for paint. Surfaces treated with the BONDERITE® M-CR 1200S AERO process range in color from a light iridescent golden to tan.

Application areas

BONDERITE® M-CR 1200S AERO coating chemical listed on Qualified Product List QPL-81706, is an approved material to produce Class 1A and Class 3 coatings, bare or painted, in accordance with Military Specifications MIL-DTL-5541.

Technical data

(as supplied):

Appearance	brown powder

GENERAL INFORMATION

Prior to application it is necessary to read the **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.

Operating summary

Chemical / Bath preparation per 100 gallons/1.000 liters

BONDERITE® M-CR 1200S AERO	6.3 pounds/7,5 kg
BONDERITE® M-CR 1200S AERO	12.5 pounds/15 kg (brush)

Operation and Control:

BONDERITE Coating chemical titration, ml	6.0
Concentration, ml	5.0 to 19.0
pH value	1.3 to 2.1
Temperature, °C (°F):	20 to 35 (68 to 95)
Time, sec	15 to 180

Process description:

1. Clean
2. Water rinse
3. Deoxidize (required for heavily oxidized surfaces)
4. Water rinse (required when deoxidizing is used)
5. Treating with BONDERITE® M-CR 1200S AERO processing solution
6. Water rinse
7. Dry

Process tanks and housings should be constructed of 300 series alloy stainless steel, such as 304L or 316L. The 316L being preferred for maximum tank life. In all cases approved welding techniques must be used.

Brush application

Acid-resistant (wood, rubber, stainless steel, or plastic) buckets, troughs, or other suitable containers are used to hold the diluted BONDERITE® M-CR 1200S AERO coating chemical solution. Lead, glass, tin or galvanized iron should not be used. Storing the solution in mild steel containers will result in a slow decomposition of the solution.

Ordinary spray equipment (satisfactory for short or infrequent application) will be attacked slowly by BONDERITE® M-CR 1200S AERO coating chemical. This may be minimized by thoroughly flushing with water immediately after use. For continuous use, plastic or stainless steel cups and nozzles should be used in spray equipment.

Spray and immersion application

Process piping and pumps should be constructed of 316 or 304 stainless steel alloys. PVC Type I is limited to maximum process temperatures of 60°C (140°F) CPVC and PP may be used up to a maximum process temperature of 88°C (190°F). Various formulations of plastic pipe maybe used with recommended support spacing, schedule-80 being generally recommended. PVDF may be used for all expected operating temperatures and may reduce the rate of scale build up in process piping. The nozzles should be fabricated from 316 stainless steel.

Heat exchanger plates should be polished 316 stainless steel. If gas fired burner tubes are used, they should be made of Schedule-80 mild steel pipe or equivalent. 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 FKM or PTFE. EPDM maybe used, but its life will be shorter.

Chemical feed pump parts and other elastomers which may come into contact with the concentrated replenishing chemical should be FKM or PTFE. Again, EPDM may be used, but its life will be shorter.

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

Your local sales representative should be consulted for information on Henkel Adhesive Technologies automatic process control equipment for this process and any additional questions.

Surface preparation

Cleaning
All metal to be treated must be free from grease, oil, rust, scale, or other foreign matter. A complete line of BONDERITE® cleaners is available and the proper one will be recommended for each installation.

Water rinse
After cleaning, the metal must be rinsed thoroughly with hot water. The rinse should be overflowed continuously at a rate, which will keep it clean and free from scum and contamination.

Deoxidize
Aluminum with corrosion products or heavy oxide coated surfaces should be treated with a deoxidizer prior to the conversion coating treatment step. The deoxidizing step should follow the water rinse and should itself be followed by a separate water rinse. Our representative can recommend the correct deoxidizer to be used.

Treating with BONDERITE® M-CR 1200S AERO processing solution

Build up (Immersion or spray)
Fill the tank about 3/4 full with cold water for each 1,000 l (100 gallons) of final solution volume add 7.5 kg (6.3 pounds) of BONDERITE® M-CR 1200S AERO and circulate until thoroughly mixed. Finally, add sufficient water to bring the solution up to the working level and then heat the operating temperature.

Build up (Brush)
Mix 2 oz. of BONDERITE® M-CR 1200S AERO coating chemical per gallon of water (this is equivalent to 15 g of BONDERITE® M-CR 1200S AERO coating chemical per liter of solution). Stir well until the powder is dissolved.

Note: A small amount of insoluble material may settle out of solution; this can be disregards. Stirring of the bath must be stopped when processing the parts. Use an acid-resistant container when preparing the solution.

Operation
Time: 15 seconds to 3 minutes
Temperature: 20° - 35°C (68° to 95° Fahrenheit)

Operational recommendations
Each alloy reacts with the BONDERITE® M-CR 1200S AERO coating chemical bath to produce a coating that is characteristic of the alloy. For the treating time selected, the bath should produce a light, iridescent golden to tan colored coating on aluminum. If the desired coatings are not obtained, add BONDERITE® M-CR 1200S AERO in 1,9 g/l (0,25 oz/gal) increments up to a maximum of 22 g/l (3.0 oz/gal) until satisfactory coatings are produced. As the concentration of BONDERITE® M-CR 1200S AERO is increased, the bath will have to be titrated to determine the operating titration. The desired coatings may also be obtained by adjusting the pH.

The initial charge and replenishment data contained here in are normal for most installations, however, our representative may suggest a deviation if indicated by local conditions.

If the BONDERITE coating is powdery, the cause may be one or more of the following:

1. The work has been improperly cleaned and/or rinsed.
2. The concentration of the BONDERITE coating chemical(s) in the bath is too high.
3. The BONDERITE® M-CR 1200S AERO bath has become contaminated with phosphates, sulfates, chlorides, or some other contaminant (analysis required).
4. The coating time is too long.
5. The bath temperature is too high.
6. The pH of the bath is too low for the concentration selected.

The concentration of BONDERITE® M-CR 1200S AERO in the bath is too low.

1. The treating time is too short.
2. The concentration of BONDERITE® M-CR 1200S AERO in the bath is too low.
3. The temperature of the bath is outside the specified range.
4. The pH of the bath is outside the specified range.

Bath control

Apparatus
- 5 ml Pipet
- Volumetric flask
- Analytic balance
- Spatula
- Cup
- Burette
- Magnetic stirrer

Reagents
- Potassium iodide powder KI
- Concentrated chlorohydric acid HCl (28%)
- Soluble starch solution or starch powder
- Sodium Thiosulfate Na2S2O3 (0.1N)

Processing

Processing
- Pipet a 5 ml bath into the 250 ml iodometric flask and dilute to approximately 100 ml with water.
- Add approximately 2g of KI and agitate to dissolve.
- Add about 10 ml of HCl in 5 ml increments to the lip of the flask, raising the stopper slightly after each addition to allow the acid to run into the flask.
- Rinse the lip several times with water and replace the stopper.
- Carefully mix and wait 1 minute.
- Titrate with the sodium thiosulfate 0.1 N solution until a straw color is obtained.
- Add several ml of the starch solution or approximately 2g of starch powder and continue the titration until the blue-black color disappears.
- Record the Na2S2O3 volume 0.1N needed for the solution “A” titration.

Calculation:
BONDERITE® M-CR 1200S AERO in g/l = 1,25 x A
A = ml of Na2S2O3 0.1N needed for the solution titration

To increase the value 1 point (mL): Add 1 lb of BONDERITE® M-CR 1200S AERO per 100 gallons.

Concentration: 1 mL of titrant = 1.73 mg/mL of hexavalent chrome in BONDERITE® M-CR 1200S AERO

pH Determination:

A pH determination should be made after each replenishing addition. The optimum pH for this bath is between 1.3 to 1.8.

NOTE: The pH of the BONDERITE® M-CR 1200S AERO bath is controlled by the addition of 1/2 pint of concentrated nitric acid for every 2 to 4 pounds of BONDERITE® M-CR 1200S AERO used. It is recommended that no large bulk additions to nitric acid be made. The nitric acid additions should be made along with the required BONDERITE® M-CR 1200S AERO additions.

In certain instances, the pH of the bath will continue to decrease several hours after an addition of nitric acid (as the solution seeks equilibrium). Accordingly, small adjustments in pH should be made allowing 15 minutes to elapse before subsequent adjustment.

If the amount of nitric acid specified is insufficient to maintain the bath pH, the pH will rise causing a reduction in color intensity of the coating. If this occurs, increase the amount of nitric acid per addition (in small increments to a maximum of 1.5 points per 2 to 4 pounds of BONDERITE® M-CR 1200S AERO until the color intensity of the coating is maintained.

After treatment

Water rinsing
After the conversion coating treatment, the work is thoroughly rinsed in cold water. The rinse should be continuously overflowed and the overflow should be regulated with the rate of production so that the main body of the rinse never becomes excessively contaminated.

Drying
The treated articles should be dried immediately after the posttreatment. Enough heat usually remains from a hot post treatment to cause heavy gauge articles to dry satisfactorily. If the post treatment is not heated or the articles do not dry satisfactorily, an indirect fired drying unit or any other means which will not contaminate the treated surface with fumes, oil, or partially burned gases may be used. If an oven or other heat source is used, the temperature of the metal surface should not be permitted to exceed 60°C / 150°Fahrenheit to maintain optimum corrosion resistance.

Products with cavities or pockets which trap moisture should be blown dry with clean, compressed air. Moisture spatters should be dried with clean cloths.

Dried, unfinished parts should not be handled. If handling if necessary, plastic or clean (often changed) cotton gloves should be used.

Storage
Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

Optimal storage: -10 to 40°C

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Henkel representative.

Not for product specifications
The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on the specifications of this product.

Data ranges
The data contained herein may be reported as a typical value. Values are based on actual test data and are verified on a periodic basis.

Temperature/Humidity Ranges: 23°C / 50% RH = 23±2°C / 50±5% RH

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.

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.

Conversions
(°C x 1.8) + 32 = °F
kV/mm x 25.4 = V/mil
mm / 25.4 = inches
µm / 25.4 = mil
N x 0.225 = lb
N/mm x 5.71 = lb/in
N/mm² x 145 = psi
MPa x 145 = psi
N·m x 8.851 = lb·in
N·m x 0.738 = lb·ft
N·mm x 0.142 = oz·in
mPa·s = cP

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, 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 2