GARDOBOND® X 4650

Chrome-Free, Dry-in-Place Coating for Use on Extruded and Fabricated Aluminum Surfaces

PRIMARY APPLICATION

GARDOBOND X 4650 is a liquid formulation used to produce a coating on aluminum extrusions and fabricated aluminum parts. The Gardobond X 4650 coating improves the adhesion and corrosion resistance of subsequently-applied organic coatings. The coating is dried on the metal surface without a final water rinse (dry-in-place). Gardobond X 4650 does not contain chromium compounds. Gardobond X

4650 will impart a colorless to bluish iridescent color on the aluminum surface. Gardobond X 4650 has been shown to the meet the stringent requirements of AAMA 2605.

CHEMICAL CHARACTERISTICS

Chemical Composition	Zirconium, organic compounds
Appearance	Colorless liquid
Odor	Bland
Bulk Density	8.56 lbs/gal
Foam Tendency	Low
Phosphorous-Free	Yes
Freeze/Thaw Stable	Yes, after thawing, mix before use
pH	About 2

COMPONENTS

- Gardobond X 4650

APPLICATION PROCEDURE

Typical Process Cycle

1. Acid or alkaline clean
2. Rinse
3. Rinse
4. Gardobond X 4650
5. Dry

Initial Bath Makeup

Ensure the tank and associated equipment is clean and the nozzles are properly aligned.

Make-up water should be of good quality, preferably deionized (DI) or reverse osmosis (RO) water. Please contact your Chemetall representative if the water conductivity exceeds 100 µS/cm (70 ppm total dissolved solids).

Fill the tank to about 90% of its capacity with clean water. Add the required amount of Gardobond X 4650. Fill to operating level, mix and heat as necessary to operating temperature.

Operation

Contact Time	15 – 60 seconds
Concentration	1 – 2% by volume
Total Acid	8 – 16 ml
Temperature	70° - 120°F (21° - 49°C)
Conductivity	Monitor

NOTE: Individual operations could require a different process sequence or different operating parameters. For complete details, consult your Chemetall Technical Sales Representative.

SOLUTIONS CONTROL

Bath Measurement

Concentration / Total Acid

1. With a graduated cylinder, place a 100 ml sample of the Gardobond X 4650 bath into a flask.
2. Add 10 - 15 drops of Gardotest Indicator 2.
3. Titrate with Gardotest Solution 1 to a pink endpoint.
4. Record the number of mls of Gardotest Solution 1 as total acid.
5. If needed, total acid can be multiplied by 0.125 to determine concentration in percent by volume.

Bath Replenishment

Gardobond X 4650 should be replenished based on the total acid by feeding Gardobond X 4650. To increase the total acid by 1.0 ml, add 1.25 gallons or Gardobond X 4650 per 1000 gallons of bath (1.25 liters per 1000 liters).

EQUIPMENT

The Chemetall Electrodeless Conductivity/Concentration Control System and Chemical Metering Pump can be used to monitor and automaticallymaintain the concentration of this product using conductivity. Please contact the Chemetall Process Equipment and Engineering Department for specific recommendations.

NOTES ON USE (See Safety Data Sheet)

Aluminum substrates must be free of all organic contaminants (oils, rust preventatives, fingerprints etc) and inorganic contaminants (scale, oxide, etc) before application of Gardobond X 4650.

If an alkaline cleaner is used, it should be non-silicated to avoid interference with Gardobond X 4650.

Rinses should be overflowed to keep them clean. The rinse before Gardobond X 4650 should be controlled at a conductivity of 200 µS/cm (140 ppm TDS) or less. A fresh water riser at the end of the rinse stage before the Gardobond X 4650 stage, draining into the rinse stage is recommended.

In some cases, the addition of Oakite 265 to the rinse immediately ahead of Gardobond X 4650 can be used to improve performance.

The conductivity of the Gardobond X 4650 bath should be monitored. If it climbs excessively, the bath should be partially or completely discharged as this may adversely affect paint performance.

Do not rinse the Gardobond X 4650 once it has been applied. It is a no rinse material and coated substrates should proceed directly to a dry off oven.

Forced air is recommended to remove excess solution from pockets or cavities before drying.

Drying should be at a peak metal temperature of 220 - 350°F (104 - 177°C).

Stainless steel tanks and equipment are recommended, preferably type 316L. Heating surfaces, pumps and valves should also be constructed of stainless steel, preferably type 316L. Suitable plastics may be used for tanks, equipment, piping and nozzles. Mild steel is not recommended unless it is coated with an acid-resistant material. Chemical metering pumps should be constructed of CPVC, with PTFE or PVDF diaphragms and other internal wetted moving parts. As with any chemical, the materials described in this document must be used within the recommended operating ranges.

Avoid contact with or mixing with chlorine-releasingmaterials.

SAFETY AND HANDLING

Prior to handling and use of any of the materials referenced in this document, the Safety Data Sheets should be read and understood by all personnel in contact with these materials.

KEEP OUT OF REACH OF CHILDREN

STORAGE

Dry indoor storage at temperatures between 40°F and 100°F (4.4°C and 37.8°C) is recommended, away from any incompatible materials referenced in the Safety Data Sheets. All containers should be tightly closed when not in use.

DISPOSAL

Any disposal of the materials referenced in this document should be in accordance with all applicable federal, state, providential and local regulations. The process solution can contain components other than those present in the materials as supplied. Analysis of process solutions may be required prior to disposal.

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