

OXSILAN[®] 9810/2

OXSILAN[®] 9810/2 is a liquid, phosphorous-free, multi-metal, silane-based coating. OXSILAN 9810/2 enhances the performance of subsequently-applied organic coatings. OXSILAN 9810/2 is used at energy-saving ambient temperature by spray or immersion.

1. SCOPE

OXSILAN 9810/2 is a liquid, phosphorous-free, slightly acidic, silane-based product that enhances the performance of subsequently-applied organic coatings. OXSILAN 9810/2 is formulated for use on steel, iron, aluminum and zinc substrates. It is free of any regulated heavy metals. Substrates must be cleaned and thoroughly rinsed prior to processing in OXSILAN 9810/2. OXSILAN 9810/2 is used at ambient temperature by spray or immersion. OXSILAN 9810/2 is normally used with a final water rinse.

2. COMPONENTS

OXSILAN 9810/2	silane component, bath make-up and replenishment
OXSILAN Additive 9906	inorganic component, bath make-up and replenishment
OXSILAN Additive 9951	sodium carbonate additive for increasing pH
OXSILAN Additive 9960	nitric acid additive for reducing pH

3. OPERATION PROCEDURE

Alkaline Clean / Rinse / Acid Pickle (optional) / Neutralizing Rinse (optional) / DI or RO Rinse / DI or RO Halo / Coat with OXSILAN 9810/2 / DI or RO Rinse / Dry

Cleaning and Acid Pickling

Substrates must be thoroughly cleaned prior to coating in OXSILAN 9810/2. Acid pickling and neutralizing may be required depending upon the substrate condition and the performance requirements.

Chemetall has a full line of cleaners, acid pickles and neutralizing rinses, including phosphorous-free products that are compatible with the OXSILAN process. Please contact your Chemetall Technical Sales Representative for the best products for your application.

Rinsing

Thorough rinsing with deionized (DI) or reverse osmosis (RO) water prior to the application of OXSILAN 9810/2 is essential in order to prevent contamination of the OXSILAN solution. Contamination will shorten the effective working life of OXSILAN 9810/2. Counterflowing DI or RO water rinses with exit halos are recommended. The rinse prior to OXSILAN should be maintained at no more than 200 µS/cm (130 ppm TDS). The exit halo should be maintained at no more than 30 µS/cm (20 ppm TDS).

If an acid pickle is used, the first rinse after pickling should be an alkaline neutralizing rinse to prevent flash rust. This should be followed by the DI or RO rinse described above.

Bath Make-up

1. Before filling the tank, ensure that all equipment is completely cleaned, rinsed and free of any sludge, scale or contamination. After chemical descaling, the water used to rinse the tank should have a conductivity of no more than 50 $\mu\text{S}/\text{cm}$ (35 ppm TDS). Manual hose rinsing of the equipment and / or several charges of water may be required to remove residual descale chemicals. Please refer to the Chemetall Spray Washer Preventative Maintenance Guide.
2. Fill the tank to about 95% of its capacity with DI or RO water.
3. Add 2.2% by volume OXSILAN Additive 9906. Mix thoroughly.
4. Add 1.1% by volume OXSILAN 9810/2 while circulating the bath.
5. Mix thoroughly for at least 30 minutes.
6. After mixing for 30 minutes, check the pH. It is necessary to adjust it to the 3.8 - 4.5 range. Add small quantities of OXSILAN Additive 9951. When adjusting the pH, make small additions and mix thoroughly before re-checking the pH. Do not allow the pH to rise above the operating range since active ingredients may precipitate and a new bath may be required. As general guidance, a total of approximately 0.8% of OXSILAN Additive 9951 will be needed.

Bath Operation

Active Points	4.1 - 6.8
pH:	3.8 - 4.5
Temperature:	70 - 86°F (21 - 30°C)
Time:	45 - 120 seconds
Conductivity:	approximately 1700 $\mu\text{S}/\text{cm}$

These parameters represent the optimum operating conditions. Your application may require slightly different parameters. Please contact your Chemetall Technical Sales Representative for the best parameters for your application.

Testing and Control

Bath Control

Active Points and pH should be controlled on a regular basis, at least once per day. Conductivity should be monitored on a regular basis, at least once per day.

Ensure that the bath is filled to the proper operating level and is thoroughly mixed before taking a sample.

pH and Conductivity:

The pH and conductivity should be measured with electronic meters. The probes should be fluoride-resistant and calibrated with fresh calibration solutions regularly.

Active Points: (Gardotest Procedure 216, sample volume 25 ml)

1. Pipet 25 ml of bath solution into a 250 ml beaker. Do not dilute.
2. Add exactly 20 ml of Gardotest Solution 100 with a pipet.
3. Add a few glass boiling beads.
4. Heat to boiling. Be careful not to spatter the solution.
5. Add 25 ml Gardotest Solution 160 to the first solution and boil together for 3 minutes.
6. Cool to allow safe handling. A water bath can be used.
7. Add a spatula tip (about 0.03 - 0.05 gram) of Gardotest Indicator 93. The color should be yellow.
8. Titrate with Gardotest Solution 114 until reaching the first salmon color that persists for 10 seconds.
9. Add 10 ml of Gardotest Solution 10.
10. Wait about 2 minutes. The solution should be yellow.
11. Zero the buret and titrate again with Gardotest Solution 114 until reaching the same endpoint as in step 8.
12. Active Points is equal to the milliliters of Gardotest Solution used in step 11 (not step 8).

Note: As the bath ages, it may be more difficult to see the color endpoint. In this case, in step 1, use a 10 ml bath sample instead of 25 ml, and add 15 ml of DI water. In step 12, multiply the result by 2.5.

Bath Replenishment and Adjustment

Active Points:

The bath is replenished with OXSILAN 9810/2 and OXSILAN Additive 9906 to maintain the Active Points in the operating range.

To increase the Active Points by 1.0, add in order:

3.4 gallon of OXSILAN Additive 9906 per 1000 gallons	(3.4 liters per 1000 liters)
1.5 gallons of OXSILAN 9810/2 per 1000 gallons	(1.5 liters per 1000 liters)

pH:

The pH should be adjusted after all additions of OXSILAN Additive 9906 and OXSILAN 9810/2 have been made and the bath is thoroughly mixed.

The pH is increased with small amounts of OXSILAN Additive 9951. The pH is decreased with small amounts of OXSILAN Additive 9960.

When adjusting the pH, make small additions and mix thoroughly before re-checking the pH.

General Replenishment and Adjustment Comments:

Any water added to the bath should be RO or DI water. Do not add tap water.

If making large bath adjustments, a pH adjustment may also be necessary.

Proportional, continuous replenishment of OXSILAN 9810/2 and OXSILAN Additive 9906 is recommended.

OXSILAN Additive 9906 should always be added before OXSILAN 9810/2.

Automation:

The Chemetall Chemical Metering Pump can be used to automatically maintain the Active Points by feeding OXSILAN 9810/2 and OXSILAN Additive 9906. Chemetall can provide conductivity and fluoride resistant probe pH equipment for bath monitoring and automatic replenishment. Please contact the Chemetall Process Equipment and Engineering Department for specific recommendations.

Water Quality

In some cases, tap water is acceptable for use with OXSILAN 9810/2 if it is of good quality. Your Chemetall representative will help you make this determination.

Coating Quality

The coating color is normally light to medium brown. Sometimes blue or gold colors are seen. If necessary, the coating weight can be determined by the Chemetall lab.

Bath Life

No limits for bath life have been established. Contamination of the bath should be minimized. After processing ferrous substrates, it is normal for the bath to become yellow due to iron floc.

Filtration

Filtration of the bath is recommended. Bag filtration using 25 micron polypropylene needled felt bags with a minimum of 1 - 2 bath turnovers per hour is recommended.

Rinsing After OXSILAN

OXSILAN 9810/2 should be followed by a rinse stage operated with DI, RO or tap water followed by an exit fresh DI / RO water halo. Drip water conductivity should be maintained at less than 30 $\mu\text{S}/\text{cm}$. A flow rate of 3 - 7 gallons per 100 square feet of work surface (1 - 3 liters / square meter) should be adequate. Rinsing after OXSILAN 9810/2 is required prior to e-coat.

Drying

Drying temperature should be 140 - 248°F (60 - 120°C) Peak metal drying temperature should be at least 176°F (80°C). Ensure parts are completely dry before proceeding to the next process. Drying is not necessary prior to e-coat.

4. TEST SUPPLIES

	Chemetall	Fisher*
Flask, Erlenmeyer, 250 ml	OKT-0433	
Pipet, Volumetric, 10 ml		13-650L
Pipet, Volumetric, 20 ml		13-650N
Pipet, Volumetric, 25 ml		13-650P
Pipet Bulb		13-681-51
Glass Beads	OKT-1186-J	
Buret, 25 ml, w/push button	OKT-0162	
Buret Stand, Single	OKT-1090	
Gardotest Indicator 93, xylenol orange, 20 g	OKT-6165-F	
Gardotest Solution 10, potassium fluoride, 250 ml	OKT-9659-K	
Gardotest Solution 100, disodium EDTA, 1000 ml	OKT-9716-M	
Gardotest Solution 114, zinc sulfate, 1000 ml	OKT-9725-M	
Gardotest Solution 160, hexamethylenetetramine, 3800 ml	OKT-9736-N	
Buffer Solution, pH 4, 500 ml	OKT-2866-L	
Buffer Solution, pH 7, 500 ml	OKT-2881-L	
Conductivity standard solution, 1000 $\mu\text{S}/\text{cm}$, 1 liter		224332
Conductivity standard solution, 100 $\mu\text{S}/\text{cm}$, 1 liter		223732
Sample Bottles, 250 ml, with mailer, pkg of 20	OKT-10063	
Cold Rolled Steel test panels		
pH meter with fluoride-resistant probe	Chemetall library	
Conductivity meter	HAN-HI-9033D	
Hotplate		Various

* Chemetall does not specifically endorse Fisher Scientific. Equivalent supplies may be used.

5. **EQUIPMENT**

Stainless steel tanks, heating surfaces, pumps, valves and other equipment are recommended. Mild steel is not recommended unless it is coated with a material resistant to this product. Process pumps may be stainless-fitted. Appropriate plastics such as CPVC or polypropylene may be used. As with any chemical, the materials described in this document must be used within the recommended operating ranges.

6. **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 Material Safety Data Sheets. All containers should be tightly closed when not in use.

7. **SAFETY AND HANDLING**

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

KEEP OUT OF REACH OF CHILDREN

8. **DISPOSAL**

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

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